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INVESTIGATION AND CLOSURE OF UNDERGROUND STORAGE TANKS

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

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MAY, 1988

OFFICE
COPY

The undersigned have reviewed this report and the data on which it is based. Professional judgment represented herein is predicated on the evaluation of the analytical results, the data gathered during the field investigation, information available from previous studies, as well as general experience in hazardous waste investigations.

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1.0 ABSTRACT

The Burbank-Glendale-Pasadena Airport Authority instructed A. L. Burke Engineers to begin an investigation of underground tanks located on its property in October 1986. This investigation constituted the first phase of the Authority's underground tank management program. All tanks, active or abandoned, Authority or Tenant-owned, were included in this work. In addition, the potential for contamination from crash and rescue operations at the firepit area was also evaluated.

Records research, personal interviews, visual inspection, and remote sensing methods (magnetometry and electromagnetic induction) were used to determine the location of tanks. Soil sampling and analysis was conducted at the firepit and eight sites; this investigation included soil sampling from the area near a total of 18 tanks. One sump sample was collected and analyzed.

Laboratory analyses indicated minimal levels of contamination at two sites -- the firepit and near the Authority's abandoned tanks in the current Hertz Equipment Rental lease; no contamination was detected at the other sites. Recommendations for regulatory compliance were developed for each tenant and for the Authority. Plans and specifications for removal of abandoned tanks were prepared, and the contract was let to Academy Geotechnical Engineering of Lake Elsinore, California.

At closure, six tanks were removed, one was abandoned in place, and another suspected tank was found to have nothing more than the fill pipe remaining. Soil samples were taken for analysis under each tank and suspected tank. The laboratory results showed minimal levels of contamination, and the areas were backfilled, compacted to greater than 95% and repaved.

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2.0 INTRODUCTION

This report presents the investigation and closure of underground tanks at the Burbank-Glendale-Pasadena Airport (hereafter referred to as the Burbank Airport), Burbank, California. This section summarizes background information including concerns regarding underground tanks, the objectives of the study, and site descriptions of the area within the study.

2.1 Background

Subtitle I of the Hazardous and Solid Waste Amendments of 1984 authorized the U.S. Environmental Protection Agency (EPA) to establish a program regulating underground storage tanks. The statute required owners to notify their State of the existence of underground tanks, prohibited the installation of new unprotected tanks, and delegated responsibility to the EPA for the promulgation of corrective action standards. In response to these new regulations, the State of California adopted regulations regarding the storage of petroleum products and other hazardous substances in underground tanks. The counties are the primary government entity responsible for enforcing these regulations. One small area of the Burbank Airport lies within the City of Los Angeles; the city has passed a separate ordinance and therefore, they have jurisdiction in this area. The main intent of the legislation was to protect ground water, specifically aquifers used for drinking water purposes, from contamination. Consequently, many businesses are required to examine their underground storage tanks for leakage. The Burbank Airport Authority requested A. L. Burke Engineers, Inc. to survey the entire airport area, including leaseholds, for underground storage tanks and to prepare plans and supervise the closure of the abandoned tanks.

2.1.1 Summary of the Investigation

A records search and field investigation was completed in October, November, and December, 1986. Records, former correspondence relating to real estate property transfers, and drawings were reviewed. The investigation included interviews with the tenants and airport personnel familiar with past practices relating to underground storage of fuels and waste materials. The field investigation consisted of site reconnaissance and coordination, identification and location of both abandoned and active underground tanks, field geophysical work, collection of subsurface soil samples, and chemical analysis of the samples. Interpretation of the data, preparation of the first phase report and closure plans were completed, and closure of the abandoned tanks was then carried out.

2.1.2 Objectives of Investigation

The Burbank Airport Authority decided to take an inventory of all active and abandoned tanks and to investigate the soils and any ground water encountered near abandoned tanks. The main objective is to come into compliance with applicable regulations and to remove any potential hazard to the community from the underground storage tanks. The tasks were:

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1. to identify all active tanks;

2. to determine their locations; and

3. to tabulate the above information and represent it graphically.

The abandoned tanks were subjected to a geotechnical investigation for leakage. Specific objectives for these structures were:

1. to identify all abandoned underground tanks;

2. to pinpoint the location of the tanks;

3. to determine their dimensions and the nature of their contents;

4. to evaluate the evidence for leakage of the contents and their spread in the environment;

5. to formulate closure plans for abandoned tanks; and

6. to supervise closure of the abandoned tanks.

2.2 Site Descriptions

Burbank-Glendale-Pasadena Airport is located in southern California within the city limits of Burbank (Figure 1). The airport is bounded by San Fernando Road to the north, Hollywood Way to the east, Van Owen Street to the south, and Vineland and Clybourne Avenues to the west. The airport lies within a transition from commercial and industrial land to the east to residential land to the west. The land was originally owned by Lockheed Air Terminal and leased to the Burbank Airport Authority; however, the Burbank Airport Authority purchased the property in 1978. A fire pit is located to the north of the north-south runway; it periodically is used for fire fighting (crash and rescue) practice.

2.3 Tenant Leaseholds

Some of the land around the perimeter of the Burbank Airport is leased to various tenants. These tenants use the land for car rentals, airplane maintenance, aircraft fuel, and small aircraft rental. Figure 2 shows the tenants and their location as of the date of this survey. Underground storage tanks on their property were also part of this investigation.

3.0 SCOPE OF SERVICES

This investigation included an inventory of the underground tanks at the Burbank Airport (both those used by the Authority and by the tenants) and a geotechnical investigation of the abandoned tanks. The soil around and under the abandoned tanks was sampled and tested to determine the extent of any leaks, and the presence, quantity, and type of contaminants. Closure plans were formulated, and the tanks closed.

The primary objective was to remove any potential hazard to the community from underground storage tanks and to come in compliance with applicable regulations.

The Airport Authority desired a comprehensive study of all known and unknown underground storage tanks and an evaluation of the airport's practice fire pit on its property. General tasks within the scope of work include:

PHASE I SURVEY

I. Review all pertinent documents, leases, easements, aerial photographs, and appraisals with airport staff members. Also research the records of appropriate city agencies.

II. Inspect the airport property and confirm the location of the tanks suggested in documents reviewed and search for potential tanks not identified in documents.

III. Prepare an inventory listing tanks and depict the location of the tanks on an airport furnished layout plan.

IV. Do an appropriate inspection on each tank to yield as much data as reasonably possible about the tank.

A. Abandoned Tank
   1. Screen contents;
   2. Perform soil boring to determine if contamination present; and
   3. Determine size and other data on tank.

B. Operational Tank
   1. Review user documentation;
   2. Inspect site; and
   3. Report status.

C. Fire Pit
   1. Inspect site; and
   2. Perform soil borings to determine if contamination present.

V. Prepare recommendations for the Authority for the removal of storage tanks.

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DRAWN G.H.M. DATE 5/23/86	CHECKED DATE	GENERAL LOCATION MAP
APPR. MGR.	APPR. CLIENT	
SCALE NONE	CLIENT DWG. NO.	MGR. DWG. NO. / REV. NO.

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VI. Prepare recommendations for actions which the tenants needed to take to comply with appropriate regulations.

The site reconnaissance included a review of the available plans and drawings, as well as interviews with operating personnel for the various activities. An inventory was compiled and areas where abandoned tanks were still thought to be underground, were listed. The individual areas of abandoned tanks were examined visually and with geophysical instruments such as a magnetometer and electromagnetic induction. At the sites where abandoned underground storage tanks were thought to be located, potential places for borings were selected.

The field exploration phase consisted of logging borings and collecting soil samples for analysis. The borings were drilled with a hollow stem auger drill rig. A geologist observed the soils encountered in each boring and compiled a detailed subsurface log, including:

1) soil units encountered;
2) depth obtained and condition of samples collected;
3) evidence of contamination, if observed; and
4) depth to ground water, if encountered.

A technician collected and prepared samples for transport to the laboratory. This procedure included:

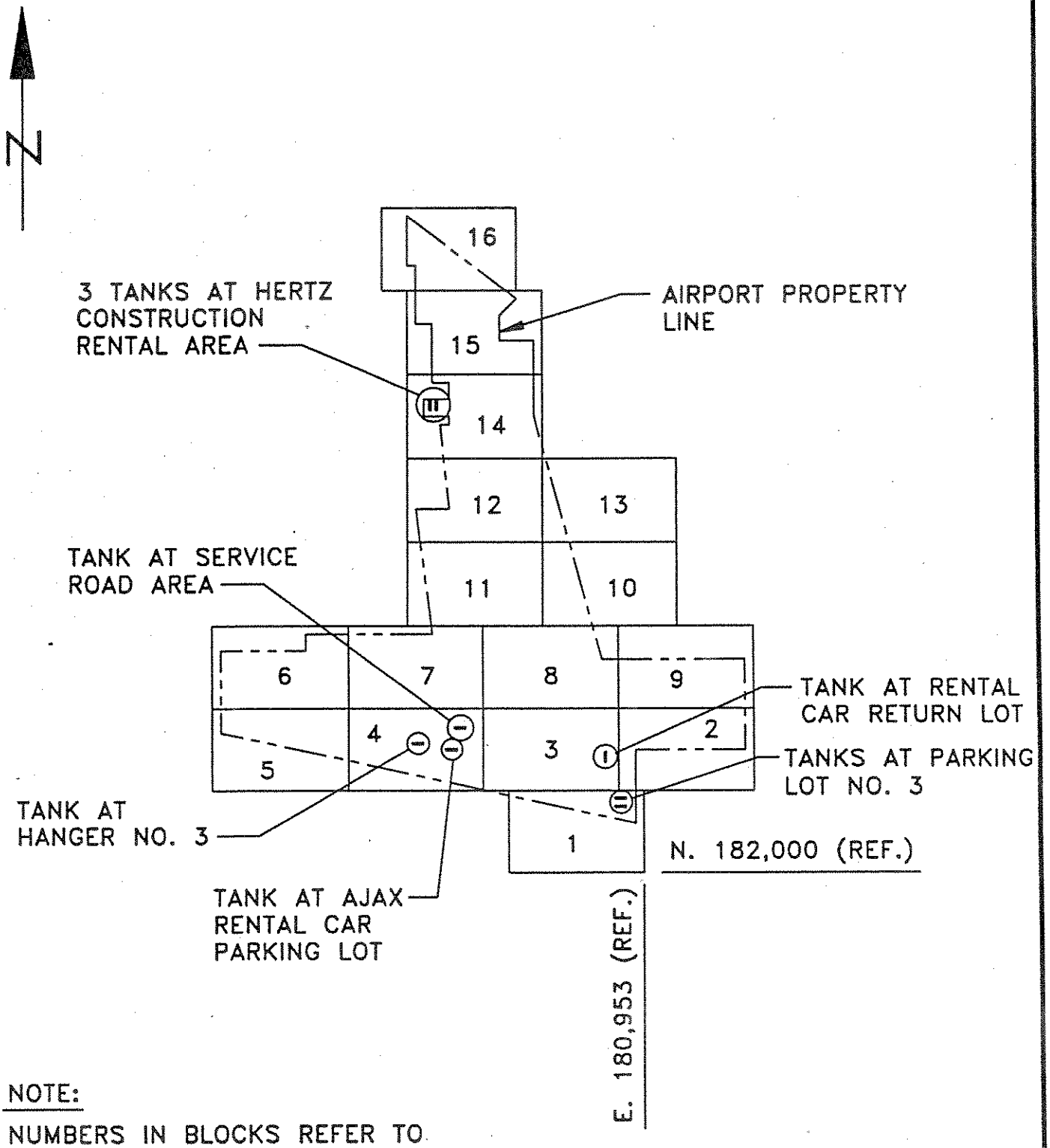
1) trimming each soil sample and capping it with aluminum foil, and plastic protective caps;
2) labeling each sample, entering the data onto a field log, and preparing chain of custody documentation; and
3) storing the samples in portable ice chests to reduce the potential for volatilization.

The soil samples were taken to the laboratory at the end of each day. A laboratory representative signed for the samples and placed them into cold storage until analysis.

The Phase I report included a description of the field work and laboratory testing procedures together with general findings on the geologic and hydrogeologic conditions, laboratory test results, toxicity data, and applicable government regulations. Design parameters for excavations and information on closure plans were also discussed. Airport layout plans with the location of each underground storage tank were given to the Airport Engineer.

PHASE II CLOSURE

I. Preconstruction Meeting to discuss sequence of work, schedule, storage areas, temporary use of utilities, project coordination, airport procedure, security, safety, airport operations, and housekeeping, particularly the need for dust control to prevent a nuisance and also to prevent possible spread of contamination by dust born particles.



NOTE:

NUMBERS IN BLOCKS REFER TO MASTER UTILITY PLAN DWGS.

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DRAWN G.H.M. DATE 5/25/88	CHECKED DATE	KEY PLAN (FOR UNDERGROUND TANK LOCATIONS)
APPR. ALBE	APPR. CLIENT	
SCALE NONE	CLIENT DWG. NO.	ALBE DWG. NO. / REV. NO.

8606.DWG

II. Location and marking of the tanks to be removed. These were checked using magnetometry.

III. Exposure of tanks, removal of any contents in barrels and disposal at the appropriate site. Inerting tanks using carbon dioxide.

IV. Checking of tanks for any residual hydrocarbons, remove tanks, take soil samples from one foot under each tank.

V. Checking for any leakage with laboratory analysis of soil samples, remedial action if necessary, backfill, compact to 95% minimum, repair pavement.

TABLE 3-1

LOCATION OF TANKS TO BE CLOSED

Hertz Equipment Rental Yard	3	tanks
Ajax Rental Car Parking Lot	1	tank
Service Road Area near Runway	1	tank
Rental Car Return Lot	1	tank
Parking Lot 3	1	tank

An abandoned tank was found close to Hangar 3. As no contamination was detected at this site and because of possible damage to the Hangar foundation, this tank is being abandoned in place. A copy of the letter concerning this tank is found in Appendix C.

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4.0 PROCEDURES

4.1 Phase I Field Investigation

The field investigation of Phase I consisted of interviews of tenants and airport personnel, a geophysical survey near suspected abandoned tanks, a health and safety program for the drilling operations, air and soil sampling near the selected sites, and one sump sample collection. A daily field log was kept which detailed onsite activities.

4.1.1 Interviews

A. L. Burke Engineers, Inc. interviewed the various tenants and airport personnel (fire and maintenance departments) to determine the locations of tanks in use or abandoned. Based on the results of the interviews, visual inspections of the Airport property, aerial photographs, real estate records, written correspondence, and from input by the Airport manager and engineer, the approximate number and locations of abandoned underground storage tanks were determined. These tanks were then investigated using geophysical techniques.

4.1.2 Geophysical Survey

McClelland Engineers, Inc. performed a geophysical survey using an electromagnetic Geonics EM31 unit in late November. They surveyed nine areas to try to pinpoint the locations of abandoned underground storage tanks.

4.1.3 Health and Safety Program

The major elements of the Health and Safety Program were the following:

* medical monitoring to establish baseline data and to track possible exposure to any compounds encountered during the field work.

* occupational health and safety plan to define procedures for the use of protective equipment; field operations; on-line monitoring requirements; and personnel safety training.

* respiratory protection plan to detail the use and care of respiratory protection equipment.

* coordination procedures for interface with local public facilities.

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4.1.3.1 Medical Monitoring - All of A. L. Burke Engineers personnel, whose work includes field operations at underground tank investigations, are required to take a pre-job physical.

Essentially, the preliminary medical test results indicated that all A. L. Burke Engineers, Inc. personnel were in good health; no test results indicated significant previous exposures. At the conclusion of major projects, all personnel undergo a final physical examination.

4.1.3.2 Health and Safety Plan - The occupational health and safety plan, as updated for this field work, was presented in its entirety in Appendix B of the final report of the Phase I investigation.

4.1.3.3 Coordination Procedures - Coordination procedures for the use of medical facilities were defined in the health and safety plan.

4.1.4 Air Monitoring Program

As part of the safety program as well as the gas monitoring air pollution program, a Bacharach Model TLV "Sniffer" was used at each drill site to measure the organic vapors from the boring.

4.1.5 Soil Sampling Procedures

4.1.5.1 Selection Process for Boring and Sample Locations - To evaluate the environmental impact of abandoned underground storage tanks at Burbank Airport, a detailed set of data must be compiled on the soil conditions in the vicinity of the tanks. In order to optimize the number and location of the borings and maximize the field exploration data, several factors were evaluated prior to selection of each soil boring location. These factors included:

1. location and orientation of abandoned underground tanks and adjacent subsurface and surface structures;
2. tank size;
3. physical and chemical properties of material(s) stored during the tank service period;
4. regional soil and geologic conditions; and
5. regional ground water conditions.

The borings were located based on regional ground water gradient, anticipated dispersivity of the stored materials, and local subsurface and surface structure constraints.

Prior to the drilling of each boring, a site utilities map was inspected to locate any underground obstructions such as electric lines, telephone lines, or piping. When drilling operations were close to buildings, the first two feet of soil was dug by hand as an added precaution against interrupting utility service.

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During the field exploration, each boring was continuously monitored for the presence of combustible vapors using a Bacharach Instruments TLV meter. The vapor monitoring was used to evaluate, on a real time basis, the possible presence of soil contamination and make appropriate modifications to the boring locations in order to determine the extent of contamination.

During the closure of the tanks, soil samples were taken using a backhoe to remove soil from under the tanks. Preparation of the samples were the same as for the first phase of the investigation.

4.1.5.2 Drilling and Sampling Procedures - A Mobile B-61 hollow stem flight auger drill rig was used to drill the borings in this project.

The hollow flight augers allow the insertion of soil samplers which pass through the lead auger and into the undisturbed soil beneath the cutting bit.

The soil sampler was a 3 inch O.D. split-barrel attached to a waste barrel containing a ball check valve. Six inch long brass tubes were placed inside the sampler and following sampling, the tube nearest the driving shoe was trimmed and capped for shipment to the laboratory.

4.1.5.3 Soil Sample Preparation - After a soil sample was selected for laboratory testing, each end of the brass tube was covered with aluminum foil and a plastic tight-fitting cap. The sample was placed in a Zip-Loc plastic bag and a label affixed to the tube and/or the plastic bag. Samples were then placed in a styrofoam chest with frozen Blue Ice and delivered to the laboratory each afternoon. Chain-of-Custody forms were filled out for each shipment.

4.1.6 Sump Sampling Procedures

At abandoned tanks where liquids remained in the tank and where the fill pipes were able to be opened, a sump sample was taken with a bailer, poured into a glass vial, and sent to the laboratory for analysis. One sump sample was collected during this project; it was obtained from the southern most abandoned tank located in the Hertz Equipment Rental yard (lease area 3).

4.2 Phase II Tank Closure

4.2.1 Pre-Construction Meeting

The Pre-Construction Meeting for the Underground Tank Removal, Bid Schedule 87-7 was held in Conference Room 3, Building 9 of the Burbank-Glendale-Pasadena Airport on March 7, 1988 at 10:00 a.m. Representatives from the Airport Authority, Academy Geotechnical Engineering and A. L. Burke Engineering were in attendance. The Agenda included a summary of the project, the sequence of work with locations of the tanks to be confirmed

using magnetometry, and scheduled start on March 21. The contract area, storage requirements, temporary use of facilities such as water and electricity and communications were discussed. Key personnel were designated from each group. Airport procedures were discussed, including security, fire regulations, safety and first aid, the necessity for dust control and safe movement and use of crane operations, especially near the runway.

The removal of the tanks was to be performed by Academy Geotechnical Engineering of Lake Elsinore, California.

4.2.2 Location of Tanks

On April 4, 1988 the locations of the tanks were confirmed using the magnetometer, and marked using paint on the pavement except for one location where there was no pavement, but the location of the tank was clearly marked by a fill pipe. The marking was done by Academy Geotechnical Engineering with a representative from A. L. Burke Engineers concurring with the findings.

4.2.3 Removal of Tanks

On April 7, Academy Geotechnical Engineering exposed the tanks and cut holes in the tops. The soil from each excavation was piled around the excavation, and cordoned off with yellow cones and tape labeled "Caution. Do not enter". Academy informed A. L. Burke representatives that they had treated the tanks with carbon dioxide (dry ice) on April 7 and again on the morning of April 8 when the tanks were removed from the ground.

On April 8, Academy moved their crane onto the site, together with trucks which would remove the tanks. The first site to have the tanks removed was at the Hertz Equipment Rental Yard where three tanks were removed. The method of removing the tanks was the same for all locations. First, a sniffer was used to confirm that there were no volatile hydrocarbons remaining in the tanks, cables were attached to the tank at two points for lifting, and lighter lines for controlling the movement of the tanks. The crane lifted each tank with two men holding the lines and directing its movement onto the flatbed of the truck. When in place, strong cables were placed around the tank attaching it to the truck. The largest tank was lifted first, then the next with the smallest tank being lifted last. At all other sites there was only one tank to be removed. When the tanks had been removed, the crane and trucks moved to the next site for the next tank removal.

Tanks were then removed from beside the service road beside the runway, at the Ajax Rental Car lot, and the Rental Car Return lot. Airport security personnel accompanied all personnel at the site beside the runway. Security, Burbank fire chief and Airport Authority personnel were present at the Ajax Rental Car lot to observe progress of the removal.

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4.2.4 Soil Sampling Under Tanks

Sampling was done using a backhoe. The backhoe first removed any soil which had caved into the excavation, then removed several scoops of soil from underneath the tank's position until an undisturbed sample could be lifted by the backhoe. Samples were then taken in laboratory bottles, sealed, labeled and placed in a cooler for shipment to the laboratory. Two samples were taken from underneath each tank - one to be tested and the other to be archived for possible future use. A Chain-of-Custody form was filled out for the samples.

All information indicated that there was a tank buried at the end of Parking Lot 3. The location was marked, but when Academy dug to uncover the tank; nothing could be found. They excavated to a depth of 16 feet, then backfilled the hole. On April 8 a backhoe was used to trench the area and soil samples were taken from undisturbed soil where the tank had been according to records.

4.2.5 Backfilling and Repairing Pavement

After the samples had been taken, the holes were backfilled to prevent accidents. The samples were taken to the laboratory for testing. Results were available verbally on Tuesday, April 12, showing minimal amounts of volatile hydrocarbons, and Academy was informed that they could continue with the compaction and repaving of the disturbed areas.

While excavating at the Hertz Equipment Rental Yard, a water line was broken. This line was closed off by Academy, and later repaired by the Airport Authority.

Academy checked the compaction, which was also checked independently by a representative of the Airport Authority and was found to be greater than 95%. The Airport Authority reported that the asphalt repairing of the pavement disturbed by the excavation was acceptable.

4.3 Laboratory Testing

4.3.1 Chemical Screening Program

Soil samples, taken near tanks which contained gasoline products in the past, were analyzed for petroleum hydrocarbons by means of the fuel footprint test -- a modified form of EPA test 8015 during the first phase of the project. Samples taken from under the tanks during closure were analyzed using EPA 418.1 for total hydrocarbon content.

4.3.2 Test Procedures

The test methods that were used to run the analyses were according to <u>Test Methods for Evaluating Solid Waste</u> (EPA, 1982). Table 4-1 describes the test methods according to EPA numbers and the chemical compounds detected by each test method. Chemical Research Laboratories, Inc. in Stanton, CA performed the analytical work; this laboratory is certified by the California Department of Health Services to perform hazardous waste

analysis. The laboratory performed their own internal Quality Assurance/Quality Control (QA/QC) program consisting of duplicates, blanks, and spiked samples according to federal and state standard laboratory practices.

TABLE 4-1. TEST METHODOLOGY AND PARAMETERS ANALYZED

The following laboratory methods analyze samples for the chemical parameters listed:

1. VOLATILE ORGANICS ANALYSIS (VOA) (EPA 8240)
(This method is based upon a purge-and-trap, gas chromatographic/mass spectrometric (GC/MS) procedure. It is used to determine volatile organic compounds in a variety of solid waste matrices.)

Chloromethane
Bromomethane
Vinyl chloride
Chloroethane
Methylene chloride
Trichlorofluoromethane
1,1-Dichloroethene
1,1-Dichloroethane
trans-1,2-Dichloroethene
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon tetrachloride
Bromodichloromethane
1,2-Dichloropropane
trans-1,3-Dichloropropene
Trichloroethene (Trichloroethylene or TCE)
Benzene
Dibromochloromethane
1,1,2-Trichloroethane
cis-1,3-Dichloropropene
2-Chloroethylvinyl ether
Bromoform
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
Chlorobenzene
Ethyl benzene
Acetone
Carbon disulfide
2-Butanone
Vinyl acetate
2-Hexanone
4-Methyl-2-pentanone
Styrene
Total xylenes

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TABLE 4-1. TEST METHODOLOGY AND PARAMETERS ANALYZED (CONTINUED)

2. FUEL FOOTPRINT (EPA 8015 Modified)
(A soil extraction is performed first, followed by the insertion of the extract into a gas chromatograph (GC) using a flame ionization detector (FID). Hydrocarbon standards are run on the GC and a fingerprint of the hydrocarbons (jet fuel, lube oil, or gasolines) is obtained.)

Total Petroleum Hydrocarbons (Aliphatics and Aromatics)

3. ORGANOCHLORINE PESTICIDES AND PCB'S (EPA 8080)
(A soil extraction is performed first, using either the Soxhlet extraction (Method 3540) or sonication (Method 3550) procedures. The extract is injected into a gas chromatograph (GC) using the solvent-flush technique, and compounds are detected by an electron capture detector (ECD).)

PCB'S including quantification of:

Aroclor	1016
Aroclor	1221
Aroclor	1232
Aroclor	1242
Aroclor	1248
Aroclor	1254
Aroclor	1260

4. TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (EPA 418.1)
(The sample is acidified to a low pH (<2) and serially extracted with fluorocarbon-113 in a separatory funnel. Interferences are removed with silica gel adsorbent. Infrared analysis of the extract is performed by direct comparison with standards.)

Total Petroleum Hydrocarbons (Light fuels, gasoline, diesel fuel)

5.0 FINDINGS

5.1 Results of Investigation

The following sections summarize the results of document reviews, interviews with tenants and Airport Authority personnel, visual reconnaissance and soil testing.

5.1.1 Abandoned Tanks

Soil borings were drilled near all of the abandoned tanks discovered during

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the investigation. Closure plans were prepared and these tanks have now been closed.

5.1.2 In-Use Tanks

Tanks currently in use by the Authority or tenants require leak detection and tank monitoring programs to be implemented for each of these tanks in order to obtain an underground storage permit and comply with current regulations.

5.1.3 Firepit (Crash and Rescue Operations)

The investigation of the firepit area was expanded because of the nature and levels of contamination found at two other major southern California Airports. At those sites, PCB's and a range of volatile organic compounds were detected. Based on the results of the investigation, no curtailment of operations or remedial structures were recommended. The Airport Authority may want to consider paving the site to contain any liquids and prevent migration of the liquids into the ground. It was recommended that an ongoing record of operations at this site be maintained. This document should include the date of any burns; the quantity, type and source of combustible material used; and any unusual conditions or results noted. It is also recommended that liquids of unknown origin not be used for practice operations to avoid introducing potentially toxic substances (transformer oils, mixed solvents, etc.) into the area.

5.2 Geologic Conditions

5.2.1 Regional Setting and Topography

The Burbank Airport is located on the eastern side of the San Fernando Valley Basin. This Basin is bounded on the east and northeast by the Verdugo and San Gabriel Mountains. The north side of the Basin consists of the San Gabriel Mountains and the eroded south limb of the Little Tujunga Syncline. This syncline separates the San Fernando Basin from the Sylmar Basin. The northwest and west parts of the San Fernando Basin are surrounded by the Santa Susana Mountains and the Simi Hills; the Santa Monica Mountains rim the southern portion of the Basin.

Burbank Airport lies on a flat alluvial plain of the San Fernando Valley; it is outside the 100 year floodplain. Elevations range from 680 feet above sea level on the southeast part of the Burbank Airport to 790 feet above sea level on the northwest. This represents a change in relief from the northwest to southeast of 110 feet. (PRC Engineering, 1984)

5.2.2 Soils and Lithology

The geologic units underlying Burbank Airport are a complex section of Cenozoic and Upper Mesozoic sedimentary rocks overlain by Quaternary alluvial deposits. Soils consist of Tujunga (60%), Soboba (30%), and sand and cobbly material (10%). The Tujunga-Soboba soil association can occur

to depths of 5 feet and is characterized by high permeability. (PRC Engineering, 1984)

In general, the eastern portion of the San Fernando Basin contains alluvial deposits of coarse materials, such as sands and gravels, interbedded with localized lenses of clays and silts. (Los Angeles City, 1986) Soils encountered during the field investigation were mostly coarse sands with occasional gravels and pebbles. The deepest soil borings continued to 40 feet; ground water was not encountered. The sands were very loose with little cohesion. Due to the grain size and lack of cohesion, any product which may have leaked from underground storage tanks in the past, would have migrated through these soils rapidly.

5.2.3 Faulting

The closest known seismic fault, the Verdugo, lies one mile southwest of the Burbank Airport. The fault is potentially active and has a Maximum Credible Earthquake rating of 6.8 (Richter Scale). Other major faults in the area include: the San Gabriel Fault zone (nine miles away), the Inglewood Fault zone (nine miles away), and the San Andreas Fault zone (28 miles away). Minor fault complexes exist at the eastern terminus of the Santa Monica Mountains (five miles away) and in the San Rafael hills (eight miles away). (PRC Engineering, 1984)

5.3 Hydrologic Conditions

5.3.1 Ground Water Hydrology

The Burbank Airport is located in the southeastern part of the San Fernando Hydrologic subarea of the Los Angeles River Basin. The volume of usable stored ground water in the San Fernando Basin is estimated to be 1 million acre-feet. Regional ground water velocity is 300 ft/yr in a southeasterly direction. Ground water in the eastern San Fernando Valley Basin is generally unconfined with a depth to water table ranging 50-200 feet. (Los Angeles City, 1983) The ground water consists of a three-component aquifer/aquitard formation. The upper layer consists of a highly permeable aquifer, approximately 100 feet in thickness. This aquifer overlies a broken, nonhomogeneous layer of relatively impermeable clay and silt. Below this aquitard, another aquifer extends 500-800 feet below the surface; this lower aquifer is a source of drinking water for Los Angeles, Burbank, and several other cities. (Los Angeles City, 1986)

Ground water replenishment in the basin occurs by deep percolation of rainfall, artificial recharge through spreading basins, and subsurface inflow. In the Airport area, percolating surface waters can infiltrate directly into the uppermost aquifer due to the coarse grain size of the alluvial deposits. This area also has characteristically high soil permeabilities resulting in higher surface infiltration rates (0.30 - 0.45 inches/hour) than the infiltration rates (0 - 0.05 inches/hour) in the western parts of the ground water basin. (Los Angeles City, 1986) Therefore, due to the high infiltration rate and soil permeability, the uppermost aquifer can become polluted from surface spills of fuels or leakage of hazardous materials from underground storage tanks.

5.3.2 Existing Water Quality Data

Public water supply wells for the Cities of Burbank and Los Angeles are located less than two miles from the Airport area. (PRC Engineering, 1984) Ground water in the area is generally within the recommended limits of the United States Public Health Service Drinking Water Standards. (Upper Los Angeles River Area Watermaster, 1986) However, in 1980 when public supply wells in the San Fernando Ground Water Basin were analyzed for volatile organics, trichloroethene (TCE) and perchloroethylene (PCE) were detected at levels above State Department of Health Services recommended action levels. While other volatile organics were present in some samples, most were detected at concentrations below State action levels. (Los Angeles City, 1983) In 1984, the U.S. Environmental Protection Agency (EPA) proposed that this well field be included on the National Priorities List for uncontrolled hazardous waste sites. This area is now eligible for federal (Superfund) assistance under the Comprehensive Environmental Response, Compensation, and Liability Act. (Los Angeles City, 1986)

The ground water in the North Hollywood area, to the west of Burbank Airport, is the most heavily contaminated. However, the ground water downgradient of the Burbank Airport, is also contaminated with TCE and PCE. Two wells in the City of Burbank were shut down as a result of the ground water contamination. (Los Angeles City, 1983) Most of these ground water contaminants are solvents; on the other hand, the underground storage tanks at the Burbank Airport contain mostly petroleum hydrocarbons. Therefore, the underground storage tanks investigated in this study would not be a likely source of these contaminants.

The contaminant concentrations vary widely in water samples taken at different times and a single point source for the contamination has not been discovered. (Los Angeles City, 1983) Tests conducted with an inflatable well packer indicate that contamination is much greater in the upper aquifer than in the lower one. Modeling studies suggest that pumping has caused contaminants to migrate from the upper contaminated aquifer to the relatively uncontaminated lower aquifer. Current cleanup projects include a proposal for the construction of an aeration facility with a granular activated carbon adsorption design to treat the contaminated water. (Los Angeles City, 1986)

5.4 Air Monitoring Results

At two locations during the drilling operations of Phase I, a reading above background level was indicated by the gas monitor. These occurred at the Hertz Equipment Rental Yard (now lease #3, formerly the old maintenance yard), at both borings done at this site. The off-gassing measured in the boring taken to 25' correlated with slight contamination detected in the laboratory results. The second gas monitor measurement in the boring to 15' does not correlate with any detectable level of contamination according to the analytical results.

5.5 Laboratory Test Results and Interpretation of Data

Most of the results from the analytical tests of Phase I were below the detection limit. Low levels of toluene (below one part per million, mg/kg) were found in three samples (1-1-A, 0.2 mg/kg and 1-2-A, 0.4 mg/kg at the Firepit; and 2-1-E, 0.6 mg/kg at the Hertz Equipment Rental Yard). The levels of toluene observed in these soil samples are close to the limit of detection for the analytical procedure used (0.1 ppm). Since the soil toluene levels are so close to the detection limit, the samples do not show much evidence of leakage.

In addition to the toluene data discussed above, low levels of other volatile organics were detected in some of the soil samples. However, since the same compounds were detected in blank samples, analyzed at the same time as part of the laboratory QA/QC procedures, these values are probably due to the storage and handling procedures in the laboratory.

A sump sample was collected from the southernmost abandoned underground storage tank at the Hertz Equipment Rental Yard (lease #3, formerly the Authority's old maintenance yard. Analysis showed this residue to be 100% petroleum hydrocarbons. Its characteristics most closely matched those of gasoline.

Samples taken during the closure of the abandoned tanks showed very low levels of contamination under three of the tanks, none was detected under the remaining three. Table 5-1 presents the Phase II analytical results.

TABLE 5-1: ANALYTICAL RESULTS FOR SOILS SAMPLED DURING CLOSURE

EPA Method 418.1

Sample Location	Sample No.	Concentration, mg/kg
Hertz Rental Yard	1	ND
	2	ND
	3	100.
Runway	4	18.
Ajax	5	12.
Hertz Return Lot	6	ND
Parking Lot	7	1.

The detection limit for the procedure is 1.0 mg/kg.

Complete Laboratory results and chain of custody forms for the Phase I investigation were included in the final report for that work. Those for the Phase II closure are included in Appendix B.

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6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

The underground tanks considered during this study were either in various stages of use ("in use"), or were abandoned in place ("abandoned"). Several tanks listed in various background documents have been removed from the premises, and these were indicated as "removed" on the inventory. Some of the abandoned tanks have been abandoned empty, while others were left in place and slurry filled. Many of the tanks had been abandoned prior to the cutoff date for Federal tank regulations (January 1, 1974). Tanks which were not slurried upon abandonment prior to January 1, 1984, have now been abandoned in accordance with County-approved closure plans. In addition, tanks which are currently in use are subject to regulation by California Water Resources Control Board.

6.2 Tenant Owned Tanks

During the investigation, tanks and tank farms owned and operated by tenants were visually inspected. All the tenants have or are in the process of filling the proper registration forms with the County and implementing an annual program to test the integrity of the tanks at the time the Phase I investigation was conducted.

6.3 Airport Authority

The same basic requirements for a monitoring program for the tenant organizations apply for the in-use tanks maintained by the authority. This includes annual testing for tank integrity, installation of a leak detection system and/or vapor probe monitoring system, and written procedures for inspecting the tanks. In addition, the Authority should register any tank capable of being used i.e., any tank in place which is not slurry filled, with the California Water Resources Control Board. County permits should also be obtained for each tank.

Where tanks need to be replaced, it is recommended that the replacement vessels be of double-walled construction, or other approved method.

Where possible, the use of tank farms rather than many individual tanks over a widespread area is recommended. This simplifies maintenance, monitoring, and tracking procedures. It also limits the potential impact of failure of any containment system. In addition, it should reduce the overall cost of installation.

6.4 Abandoned Tanks

Tank removal plans and specifications described procedures for tank abandonment which will meet regulatory requirements. All of the abandoned tanks were removed with the exception of the tank located adjacent to Hangar 3.

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As soil sampling performed at this site showed no contamination and the field investigation showed no evidence of remaining residue and removal of the tank could damage the foundations of Hangar 3, it was recommended that the tank be abandoned in place. A letter was prepared for the Burbank Fire Department detailing the reasons for the request to abandon the tank in place. The letter included an evaluation by a California-registered civil engineer.

The tank is currently being inspected for evidence of any residual material, and will be inerted and filled with slurry grout for abandonment.

Some general abandonment procedures followed for the other tanks are summarized below. The closure plans and specifications detailed the work which was required.

- In excavating the tanks, the contractor noted that the location of the tank may be approximate due to limitations on available records, precision of remote sensing technology, and other factors. The fill pipes and/or access manways were exposed prior to full-scale excavation operations.

- Where liquids remained in the tanks, these contents were pumped out, containerized, properly labeled, and removed to a suitable disposal facility. Triple rinsing and inerting of the tanks was performed in accordance with City regulations.

- The empty tanks were removed and a sample of underlying soil from one foot below the center of each tank was removed and analyzed to confirm the analytical results of this study. No contaminated soil was encountered, but if any had been, it would have been removed and disposed of as determined by the nature and level of contamination. In addition, the empty tank was properly disposed of. The tank excavation was properly backfilled, compacted, and repaved.

The tanks in the Hertz Equipment Rental Yard were removed first since a slight amount of petroleum hydrocarbons occurred in one soil sample in the investigative phase; a positive measurement was seen on the air monitor and one tank still contained liquids which were analyzed to be 100% petroleum hydrocarbons with the characteristics of gasoline. None of the other soil samples -- from the other abandoned tanks -- had displayed any compounds above the detection limit. The remainder of the tanks were removed following the work in this area. The abandonment procedures followed those requirements listed above as recommendations.

A copy of the letter recommending abandonment in place for the tank found beside Hangar 3 is attached in Appendix C.

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APPENDIX A

CHEMICAL ANALYSES RESULTS AS RECEIVED FROM THE LABORATORY

Chemical Research Laboratories, Inc.
SOUTHERN CALIFORNIA DIVISION
7440 Lincoln Way • Garden Grove, CA 92641
(714)898-6370 • FAX: (714)891-5917 • (800)LAB-1CRL

April 14, 1988

A.L. BURKE ENGINEERS, INC.
1162 North Kraemer Place
Anaheim, CA 92806
ATTN: Anne Burke

ANALYSIS NO.: 809937-001/014
ANALYSES: EPA Method 418.1
DATE SAMPLED: 04/08/88
DATE SAMPLE REC'D: 04/08/88
PROJECT: Burbank

Enclosed with this letter is the report on the chemical and physical analyses on the samples from ANALYSIS NO: 809937-001/014 shown above.

The samples were received by CRL in a chilled state, intact, and with the chain-of-custody record attached.

Verbals were given April 12, 1988 at 12:50 p.m. to Ms. Marol Robinson.

Please note that ND( ) means not detected at the detection limit expressed within the parentheses.

REVIEWED AND APPROVED

The Report Cover Letter is an integral part of this report.
This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purposes without authorization is prohibited

Chemical Research Laboratories, Inc.
SOUTHERN CALIFORNIA DIVISION
7440 Lincoln Way • Garden Grove, CA 92641
(714)898-6370 • FAX: (714)891-5917 • (800)LAB-1CRL

LABORATORY REPORT

A.L. BURKE ENGINEERS, INC.
1162 North Kraemer Place
Anaheim, CA 92806
ATTN: Anne Burke

ANALYSIS NO.: 809937-001/014
ANALYSES: EPA Method 418.1
DATE SAMPLED: 04/08/88
DATE SAMPLE REC'D: 04/08/88
DATE ANALYZED: 04/12/88
SAMPLE TYPE: Solid
PROJECT: Burbank

SAMPLE IDENTIFICATION	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS EPA METHOD 418.1 (mg/kg)
1 Hertz EQ Rental	ND(1.)
2 Hertz EQ Rental	ND(1.)
3 Hertz EQ Rental	100.
4 Runway	18.
5 Ajax	12.
6 Hertz Return	ND(1.)
7 Parking Lot	1.

The Report Cover Letter is an integral part of this report.
This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purposes without authorization is prohibited.

APPENDIX B

CHAIN-OF-CUSTODY FORMS FOR CLOSURE SAMPLES

A. L. BURKE ENGINEERS, INC.

1162 N. KRAEMER PL., ANAHEIM, CA 92806 (714)666-1120

CHAIN OF CUSTODY FORM

SHEET 1 OF 2

PROJECT NO.	PROJECT NAME	SAMPLERS (SIGNATURES)
	Burbank	[signature]

SAMPLING METHOD

FIELD CONDITIONS

DATE	~~TIME~~ SAMPLE	STATION NUMBER/LOCATION	SAMPLE TYPE	SAMPLE CONTAINER	TYPE OF PRESERVATIVE	ANALYSIS REQUIRED
4-8	1A	Hertz Eq Rack	Soil	JAW	Blue	8015
	1					
	2					
	2A					
	3					
	3A					
	4	Runway				
	4A	" "				
	5	Ayr				
	5A	" "				
	6	Hertz Return				
	6A	" "				

COMMENTS

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
[signature]	4/8/88	4:15pm	Don Burley				
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)

BGPAA 0700

A. L. BURKE ENGINEERS, INC.

1162 N. KRAEMER PL., ANAHEIM, CA 92806 (714)666-1120

CHAIN OF CUSTODY FORM

SHEET 2 OF 2

PROJECT NO.	PROJECT NAME	SAMPLERS (SIGNATURES)
	Burbank	

SAMPLING METHOD	FIELD CONDITIONS

DATE	~~TIME~~ SAMPLE	STATION NUMBER / LOCATION	SAMPLE TYPE	SAMPLE CONTAINER	TYPE OF PRESERVATIVE	ANALYSIS REQUIRED
4/8	7	Parking Lot	Soil	Jar	[illegible]	8015
	7A	" "	"	"	"	" "

COMMENTS

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
[illegible]	4/8/88	4:15 pm	[illegible]				
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)

BGPAA 0701

APPENDIX C

LETTER CONCERNING ABANDONNED TANK

AT HANGAR 3

A. L. BURKE ENGINEERS, INC.

February 16, 1987

Burbank-Glendale-Pasadena Airport Authority
2627 Hollywood Way
Burbank, CA 91505

Attn: Mr. Jan Garpner
Airport Engineer

Subject: Underground Tank Investigation Project
Recommendations for Underground Tank Adjacent to Hangar 3

References: (Drawing S-1 of Work Order No. 623 dated 5-8-41; Report Underground Tank Study by A. L. Burke Engineers, Inc., dated 18 December 1986)

Gentlemen:

After completing the investigation described in the project report, we have recommended removal of the abandoned underground tanks at the airport, with one exception. That exception is the tank located adjacent to Hangar 3. Based on available information (foundation detail drawing referenced above; known location of existing fill pipe; results of survey with Geonics Electromagnetic Induction Unit EM31), the wall of the tank is closer than ten (10) feet to the foundation of Hangar 3.

Removal of the tank would require an excavation pit with a slope of 1:1.5 due to the properties of the surrounding fill. With the tank in its identified position, this excavation would expose the foundation and cause added stresses in the soil leading to possible instability and undermining of the foundation. The foundation was not designed to withstand the forces which would be caused by excavating so close to it, and damage could occur. The attached sketch (Figure 6: Impact of Excavation at Hangar 3 from the above-referenced report) illustrates the impact of excavation on the foundation of the Hangar.

Further, the soil sampling performed at this site showed no evidence of contamination, and our inspection did not indicate any residue remaining in the tank. It is therefore recommended that the tank be abandoned in place. The absence of residue should be confirmed, and the tank should be filled with grout.

1162 NORTH KRAEMER PLACE • ANAHEIM CALIFORNIA 92806 • (714)666-1120 • (714)666-1121

If you have any questions or need additional information, please contact Anne Burke or me.

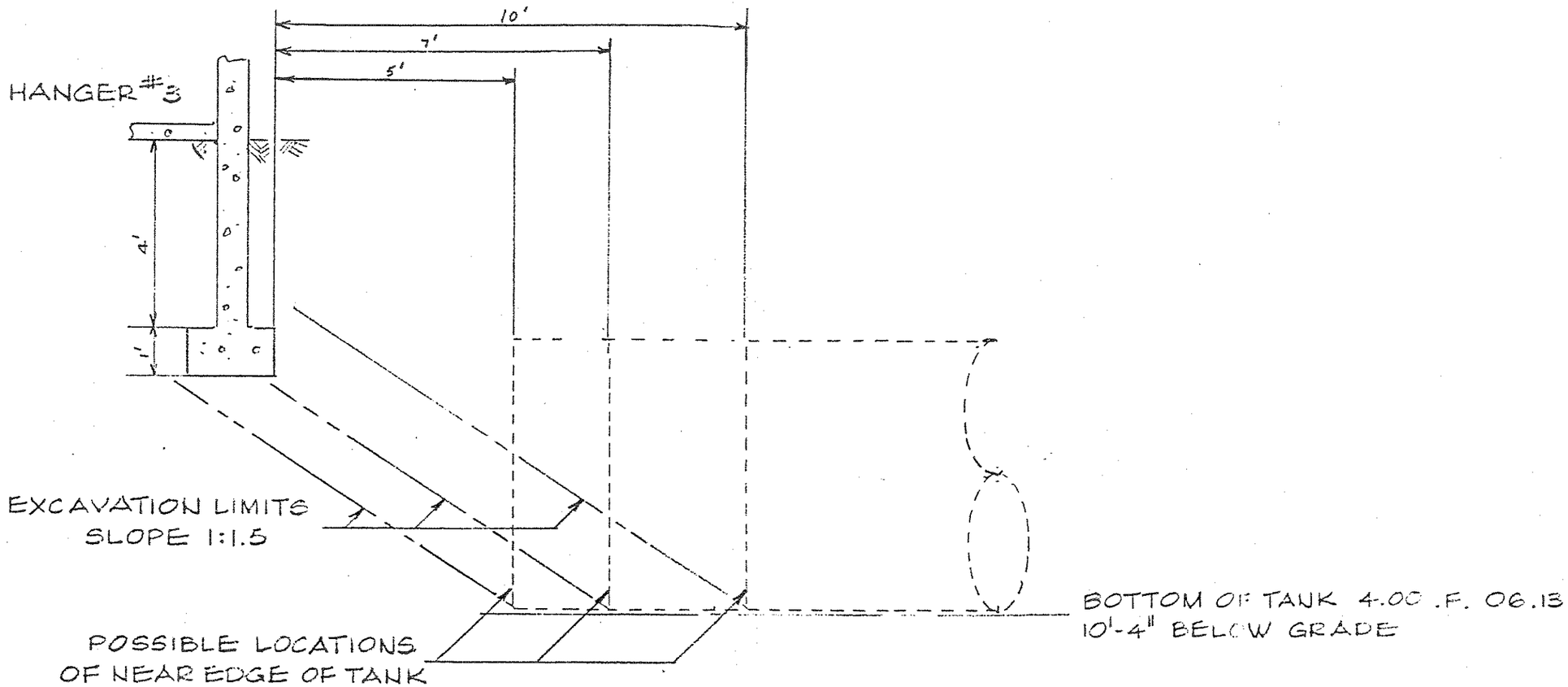
Sincerely,

Mollie E. Halewijn

Mollie E. Halewijn, P. E.
Senior Civil Engineer

Attachment

REGISTERED PROFESSIONAL ENGINEER
MOLLIE E. HALEWIJN
Exp. 3/31/89
No. 37200
M. E. Halewijn
CIVIL
STATE OF CALIFORNIA



DESCRIPTION	LE	PE	CLIENT	REV	DESCRIPTION	LE	PE	CLIENT	DRAWING NO	TITLE
T - REPORT	RFB									

A. L. BURKE ENGINEERS, INC.
1162 NORTH KRAEMER PLACE
ANAHEIM CALIFORNIA 92806

DRAWN RFB
DATE 2/21/87
APPR ALBE
CHECKED
DATE
APPR CLIENT
SCALE 3/8" = 1'-0"
CLIENT DWG NO
ALBE DWG NO FIG. 6
REV NO

IMPACT OF EXCAVATION AT HANGER #3

BGPAA 0706

TB 4.0.12

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

TARGET ENVIRONMENTAL SERVICES, INC.

TARGET ENVIRONMENTAL SERVICES, INC.

November 21, 1991

AL BURKE ENGINEERS INC.

NOV 21 1991

NOV 22 1991

Mr. Ronnie Almero
A.L. BURKE ENGINEERS, INC.
451 W. Lambert Road
Suite 211
Brea, CA 92621

Dear Mr. Almero:

Enclosed please find three (3) copies of the report on the Soil Gas Survey performed by TARGET at the Burbank-Glendale-Pasadena Airport site in Burbank, California.

If you have any questions or comments about this report, please give me a call at (301) 992-6622. We appreciate the opportunity to provide our services to you on this project.

Sincerely,

TARGET ENVIRONMENTAL SERVICES, INC.

Kenneth B. Ranlet
Vice President

9180 RUMSEY ROAD, COLUMBIA, MARYLAND 21045 (301) 992-6622 Fax: (301) 992-0347

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

PREPARED FOR

A.L. BURKE ENGINEERS, INC.

451 WEST LAMBERT ROAD, SUITE 211

BREA, CALIFORNIA 92621

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.

9180 RUMSEY ROAD

COLUMBIA, MARYLAND 21045

(301) 992-6622

NOVEMBER 1991

EXECUTIVE SUMMARY

On October 29 through 31, 1991, **TARGET** Environmental Services, Inc. (**TARGET**) conducted a soil gas survey at **Burbank-Glendale-Pasadena Airport**, Burbank, California in the Old Maintenance Yard Area and ASI Fuel Farm Area. Samples were collected at 6 feet in all sampling locations and at multiple depths in fourteen locations and were analyzed by GC/FID and GC/ECD for petroleum and halogenated hydrocarbons, respectively.

Low levels of tetrachloroethene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA) were present beneath and near Building #502 and along the southern survey boundary in the Old Maintenance Yard Area. The very low levels of volatile hydrocarbons observed in the remainder of the maintenance yard do not suggest the presence of significant contamination in these areas.

A moderate level of 1,1,1-TCA occurred northwest of Loading Rack #9 in the ASI Fuel Farm area. A low level of Total FID Volatiles also occurred in this sample. The FID chromatogram signature of this sample revealed a petroleum hydrocarbon fuel mixture. The very low levels of PCE and other volatile hydrocarbons observed in the remainder of the ASI Fuel Farm do not suggest the presence of significant contamination in these areas.

Introduction

A. L. Burke Engineers, Inc. contracted **TARGET** Environmental Services, Inc. (**TARGET**) to perform a soil gas survey in the Old Maintenance Yard Area and ASI Fuel Farm Area at the **Burbank-Glendale-Pasadena Airport** in Burbank, California. The purpose of the soil gas survey was to determine the presence and extent of volatile hydrocarbons in the subsurface. Ground water and soils information were not reported. The field phase of the soil gas survey was conducted October 29 through 31, 1991.

Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

The terms "elevated" and "significant" are used to describe concentrations of analytes which indicate the existence of a potential problem in the soil or ground water.

Field Procedures

Soil gas samples were collected at a total of 88 locations, as shown in Figures 1A and 1B. Samples were collected at multiple depths at most of the locations. The first one or two digits in the sample numbers represent the sample location number. The digits after the "-" represent the sampling depth, i.e., "6", "10", "15" and "20".

To collect the samples, a van-mounted hydraulic probe was used to advance connected 3' sections of 1" diameter threaded steel casing down to the sampling depth. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge. A teflon line was inserted into the casing to the bottom of the hole, and the bottom-hole line perforations were isolated from the up-hole annulus by an inflatable packer. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and taken to **TARGET**'s on-site mobile laboratory for analysis.

At sampling locations where samples were collected from more than one depth, the shallow sample was collected first, and then the probe was further advanced to collect deeper samples in the same manner as above.

Prior to the day's field activities all sampling equipment and probes were decontaminated by washing with soapy water and

rinsing thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities and after every twentieth soil gas sample. These QA/QC samples were obtained by inserting the probe tip into a tube flushed by a 20 psi flow of pre-purified nitrogen and collecting in the same manner as described above. Detectable levels of 1,1,1-trichloroethane (1,1,1-TCA) and/or tetrachloroethene (PCE) were observed in Field Control Samples 102 and 107, indicating low level carryover in the sampling equipment.

Laboratory Procedures

The samples collected during the field phase of the survey were subjected to dual analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

1,1-dichloroethene (11DCE)
methylene chloride (CH_2Cl_2)
trans-1,2-dichloroethene (t12DCE)
1,1-dichloroethane (11DCA)
cis-1,2-dichloroethene (c12DCE)
chloroform ($CHCl_3$)
1,1,1-trichloroethane (111TCA)
carbon tetrachloride (CCl_4)
trichloroethene (TCE)
1,1,2-trichloroethane (112TCA)
tetrachloroethene (PCE)

The halogenated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), but using direct injection instead of purge and trap. The analytes selected for standardization in this analysis were:

acetone
methyl tertiary butyl ether (MTBE)
methyl ethyl ketone (MEK)
benzene
toluene
chlorobenzene
ethylbenzene
meta- and para- xylene
ortho-xylene

BGPAA 0970

These compounds were chosen because of their utility in evaluating the presence of fuel products, or petroleum-based solvents.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples and their response factors were used to calculate the analyte concentrations.

The Total FID Volatiles values were generated by summing the areas of all chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of the Total FID Volatiles (Totals) values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter (μg/l) in Tables 1 and 2. The first one or two digits represent the sample location number. The digits after the "-" represent the sampling depth; i.e., "6", "10", "15" and "20". Although "micrograms per liter" is equivalent to "parts per billion (v/v)" in water analyses, they

are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. Because pentane and MTBE co-elute, they are listed together in the table. The xylenes concentrations reported in Table 1 are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas (99.999%) were also analyzed after every tenth field sample.

Discussion and Interpretation of Results

In order to provide graphic presentation of the results, individual data sets in Tables 1 and 2 have been mapped to produce Figures 2 through 9. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the detection limit. Analytical data for all sampling depths are shown on the maps; however, contours respect the data obtained from the 6 foot sampling depth.

Old Maintenance Yard Area

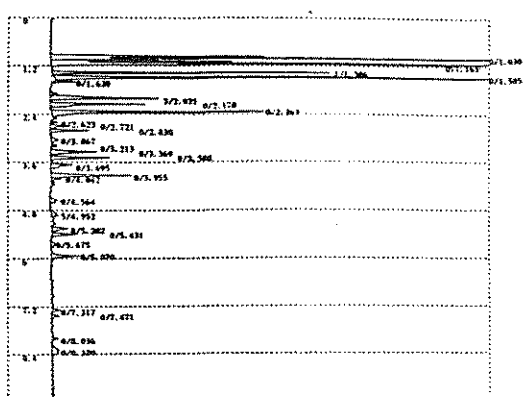
GC/ECD analysis of samples from this area revealed relatively low to very low levels of tetrachloroethene (PCE, Figure 2) throughout most of the surveyed area. The 1,1,1-trichloroethane levels (1,1,1-TCA, Figure 3) were similar in magnitude to PCE, but the 1,1,1-TCA occurrence was more limited in areal extent than PCE. Chloroform (not mapped) was detected in one sample east of Building #505 (Station 3-6) and in one sample from the eastern survey boundary (Station 21-6). None of the remaining standardized ECD analytes were present above their respective detection limits in any of the samples from this area.

The Total FID Volatiles map (Figure 4) reveals an isolated very low occurrence in the northwest corner of the site (Station 19-6). None of the standardized FID analytes were present above the 1 μg/l detection limit in any of the samples from this area. The FID chromatogram signature of Sample 19 reveals a few small late-eluting peaks, however, the levels are insufficient to allow chromatographic interpretation.

ASI Fuel Farm Area

Very low levels of PCE (Figure 5) were observed throughout much of this area. A moderate level of 1,1,1-TCA (Figure 6) was present at the northwest corner of the survey area (Station 31-6). Very low levels occurred in a few other samples.

A low level of Total FID Volatiles (Figure 7) was also present at the northwest corner of the survey area (Station 31-6). Very low levels occurred in a few samples east and south of Loading Rack #9 and in one sample southeast of the vents. Acetone (Figure 8) was detected in Sample 31-6 and in one sample north of Loading Rack #10. Toluene (Figure 9) was observed in one sample east of Loading Rack #9 (Station 33-6) and in one sample southeast of the vents (Station 37-6).



CHROMATOGRAM 1. GC/FID SIGNATURE OF SAMPLE 31-6

The FID chromatogram signature of Sample 31-6 reveals peaks representing a petroleum hydrocarbon fuel mixture (Chromatogram 1).

Detectable levels of PCE were observed in two field control samples, indicating low level carryover in the sampling equipment. Careful examination of the sampling order and analytical data suggests that some component of the reported PCE concentrations (up to approximately 0.50 μg/l) may be the result of carryover rather than a reflection of conditions in the soil vapor. Therefore,

reported concentrations of less than 0.5 $\mu g/l$ are not considered to be significant.

With this in mind, significant concentrations of volatile hydrocarbons were observed beneath and near Building #502 and along the southern survey boundary of the Old Maintenance Yard Area. In the ASI Fuel Farm Area, significant concentrations of volatile hydrocarbons occurred at the northwest corner of the survey area.

TABLE 1

ANALYTE CONCENTRATIONS VIA GC/FID (μg/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
1-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
9-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
11-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
13-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
16-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
17-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
19-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.1	5.0
20-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

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TABLE 1 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (μg/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
21-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
22-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
23-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
25-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
27-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
27-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
27-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
27-19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28-6	4.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7
28-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28-19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
29-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
31-6	38	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	158
32-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
33-6	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	<1.0	<1.0	11
34-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.3
35-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
36-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
37-6	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0	<1.0	10
38-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1] CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2] CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

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TABLE 1 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (μg/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
39-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
40-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
41-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
42-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
43-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
44-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
45-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
45-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
45-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
45-20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
46-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
FIELD CONTROL SAMPLES									
101	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
102	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
103	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
104	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
105	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
106	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
107	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
108	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
109	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY DUPLICATE ANALYSES									
108	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
108R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-15R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

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TABLE 1 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (µg/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
LABORATORY DUPLICATE ANALYSES (cont)									
35-10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
40-6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
40-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY BLANKS									
108B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8-06B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10-15B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
40-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1] CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2] CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

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TABLE 2

ANALYTE CONCENTRATIONS VIA GC/ECD (μg/l)

SAMPLE	11DCE	CH_2Cl_2	t12DCE	11DCA	c12DCE	$CHCl_3$	111TCA	CCl_4	TCE	112TCA	PCE
1-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.22	<0.05	<0.10	<0.10	1.1
2-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.29
3-6	<1.0	<1.0	<1.0	<1.0	<1.0	0.18	<0.10	<0.05	<0.10	<0.10	0.06
4-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.31
4-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
4-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.31
4-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
5-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
6-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.54	<0.05	<0.10	<0.10	3.0
6-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.48	<0.05	<0.10	<0.10	2.2
6-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.67	<0.05	<0.10	<0.10	2.5
6-19	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.49	<0.05	<0.10	<0.10	1.7
7-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.30	<0.05	<0.10	<0.10	0.42
7-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.64	<0.05	<0.10	<0.10	0.43
7-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.99	<0.05	<0.10	<0.10	0.52
7-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.3	<0.05	<0.10	<0.10	0.59
8-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.21	<0.05	<0.10	<0.10	0.87
9-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.59	<0.05	<0.10	<0.10	2.7
10-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.24	<0.05	<0.10	<0.10	0.70
10-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.36	<0.05	<0.10	<0.10	0.83
10-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.42	<0.05	<0.10	<0.10	0.94
10-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.49	<0.05	<0.10	<0.10	1.0
11-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.15	<0.05	<0.10	<0.10	0.50
12-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.11
12-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
12-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.14
12-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12
13-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.15
14-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.25	<0.05	<0.10	<0.10	0.77
14-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.19	<0.05	<0.10	<0.10	0.63
14-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.25	<0.05	<0.10	<0.10	0.70
14-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.49	<0.05	<0.10	<0.10	1.0
15-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.1	<0.05	0.14	<0.10	1.4
16-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.28
17-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.57
18-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

CH_2Cl_2 = methylene chloride
11DCA = 1,1-dichloroethane
$CHCl_3$ = chloroform
CCl_4 = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (μg/l)

SAMPLE	11DCE	CH_2Cl_2	t12DCE	11DCA	c12DCE	$CHCl_3$	111TCA	CCl_4	TCE	112TCA	PCE
19-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.18
20-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.17
21-6	<1.0	<1.0	<1.0	<1.0	<1.0	0.11	0.32	<0.05	<0.10	<0.10	0.45
22-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.22	<0.05	<0.10	<0.10	0.57
23-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.38	<0.05	<0.10	<0.10	1.2
24-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
24-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.05
24-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
24-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
25-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.16
26-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	0.13	<0.10	0.84
26-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.21
26-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.09
26-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.13
27-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12
27-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
27-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
27-19	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
28-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.20
28-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
28-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.10
28-19	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12
29-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.13
29-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
29-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.07
29-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
30-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.30	<0.05	<0.10	<0.10	0.30
30-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.52	<0.05	<0.10	<0.10	0.14
30-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.74	<0.05	<0.10	<0.10	0.10
30-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.53	<0.05	<0.10	<0.10	0.06
31-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	16	<0.05	<0.10	<0.10	0.20
32-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.05
33-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
34-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

CH_2Cl_2 = methylene chloride
11DCA = 1,1-dichloroethane
$CHCl_3$ = chloroform
CCl_4 = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

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TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (μg/l)

SAMPLE	11DCE	CH_2Cl_2	t12DCE	11DCA	c12DCE	$CHCl_3$	111TCA	CCl_4	TCE	112TCA	PCE
35-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.07
35-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
35-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
35-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
36-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.12
37-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.12	<0.05	<0.10	<0.10	0.16
38-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.16
39-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.13	<0.05	<0.10	<0.10	0.20
40-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.20
41-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.23
42-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.15	<0.05	<0.10	<0.10	0.33
43-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.41
44-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	0.12	<0.10	0.72
45-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.12	<0.05	<0.10	<0.10	0.09
45-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
45-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
45-20	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
46-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
FIELD CONTROL SAMPLES											
101	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
102	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.31	<0.05	<0.10	<0.10	0.41
103	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
104	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
105	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
106	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
107	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.11
108	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
109	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
LABORATORY DUPLICATE ANALYSES											
108	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
108R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
6-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.48	<0.05	<0.10	<0.10	2.2
6-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.42	<0.05	<0.10	<0.10	2.1
8-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.21	<0.05	<0.10	<0.10	0.87
8-06R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.1	<0.05	0.13	<0.10	1.2

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

CH_2Cl_2 = methylene chloride
11DCA = 1,1-dichloroethane
$CHCl_3$ = chloroform
CCl_4 = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

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TABLE 2 (cont)

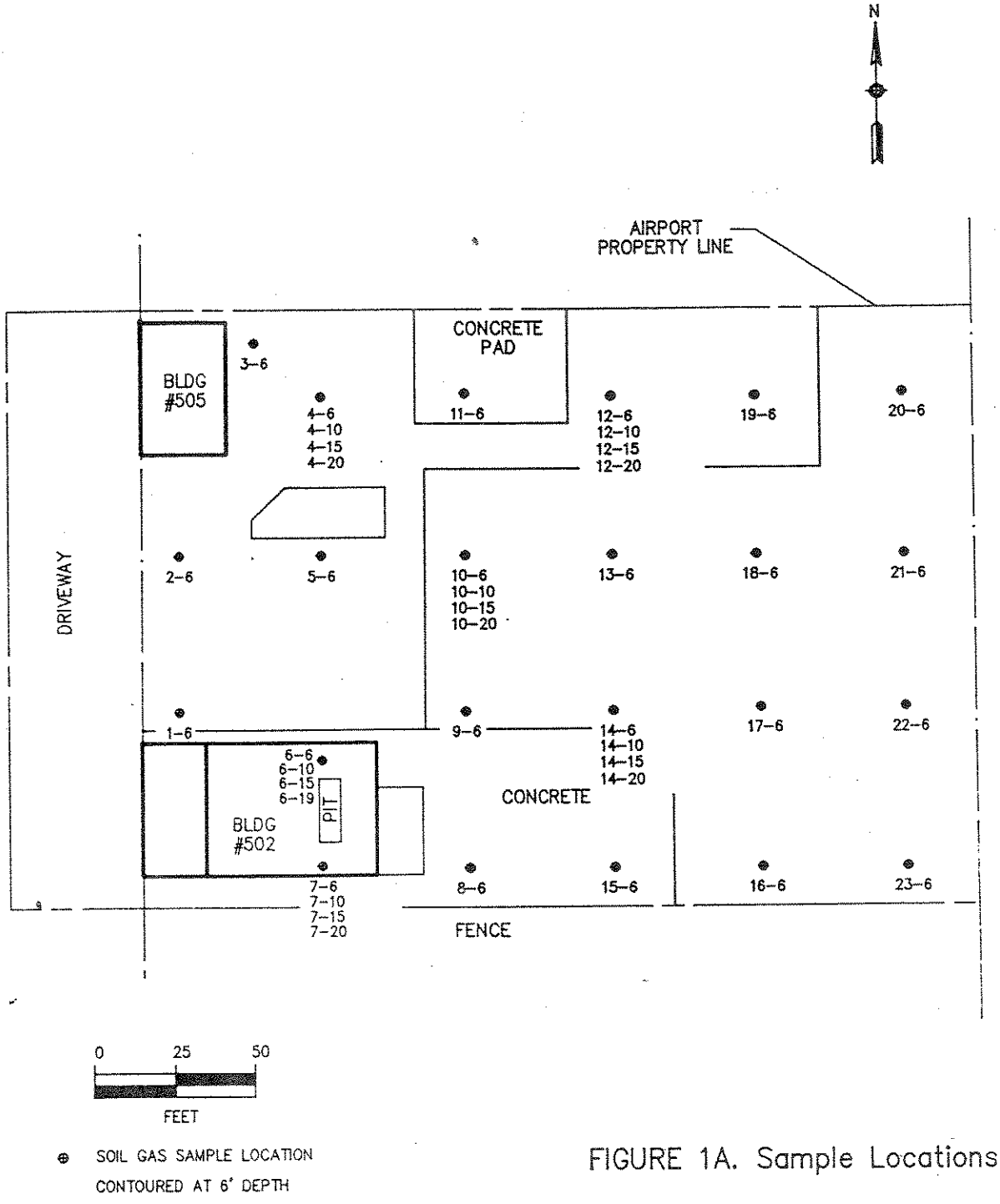
ANALYTE CONCENTRATIONS VIA GC/ECD (μg/l)

SAMPLE	11DCE	CH_2Cl_2	t12DCE	11DCA	c12DCE	$CHCl_3$	111TCA	CCl_4	TCE	112TCA	PCE
10-15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.42	<0.05	<0.10	<0.10	0.94
10-15R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.45	<0.05	<0.10	<0.10	0.94
12-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
12-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.09
24-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
24-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.08
30-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.30	<0.05	<0.10	<0.10	0.30
30-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.27	<0.05	<0.10	<0.10	0.30
30-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.52	<0.05	<0.10	<0.10	0.14
30-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.54	<0.05	<0.10	<0.10	0.13
35-10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
35-10R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
40-6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.20
40-6R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.18
LABORATORY BLANKS											
108B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
6-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
8-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.25
10-15B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
12-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.19	<0.05	<0.10	<0.10	0.28
24-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
30-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
30-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
35-10B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
40-6B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

CH_2Cl_2 = methylene chloride
11DCA = 1,1-dichloroethane
$CHCl_3$ = chloroform
CCl_4 = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

BGPAA 0983



⊕ SOIL GAS SAMPLE LOCATION CONTOURED AT 6' DEPTH

FIGURE 1A. Sample Locations

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

BURBANK–GLENDALE–PASADENA AIRPORT
OLD MAINTENANCE YARD
BURBANK, CALIFORNIA

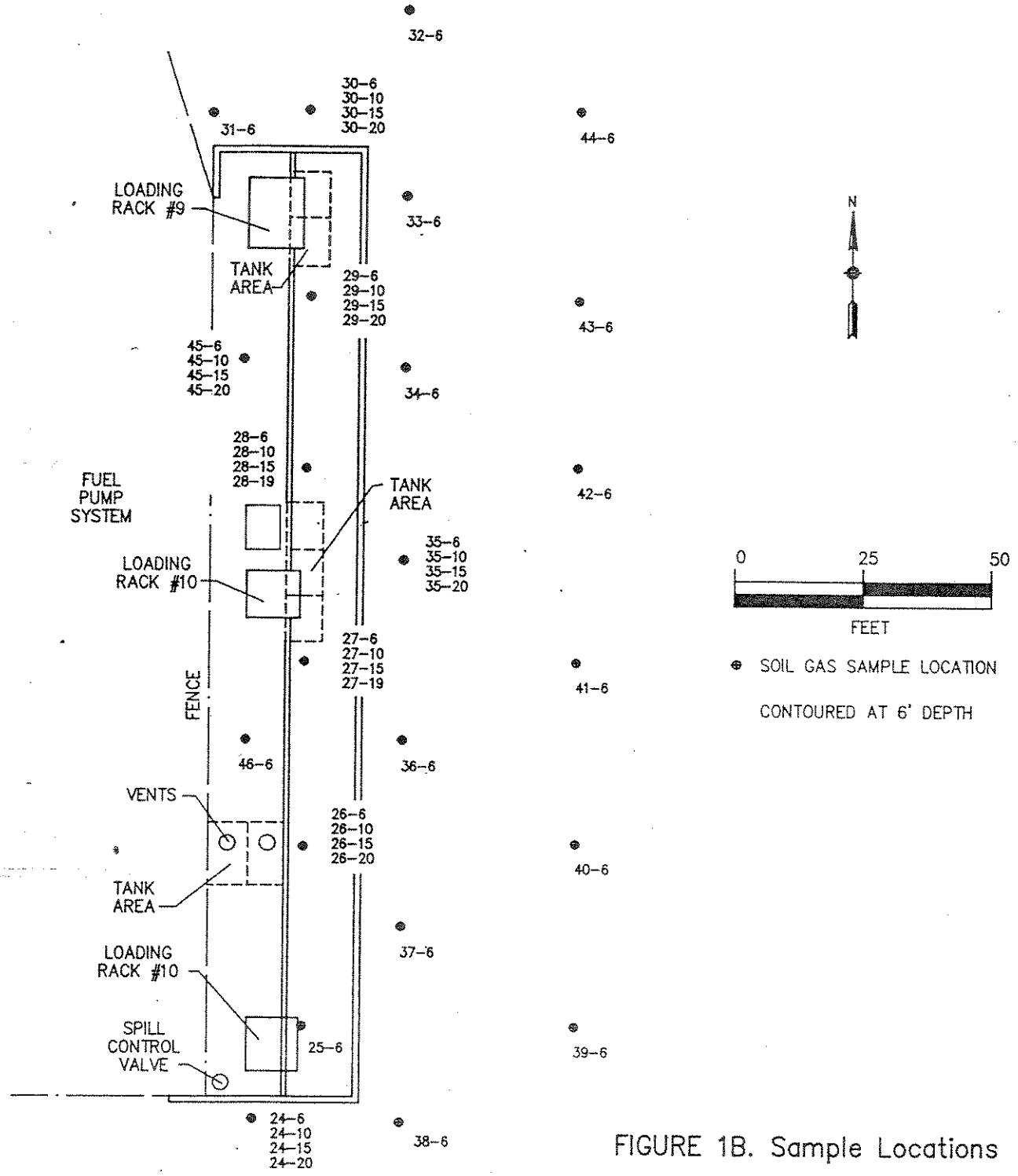


FIGURE 1B. Sample Locations

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

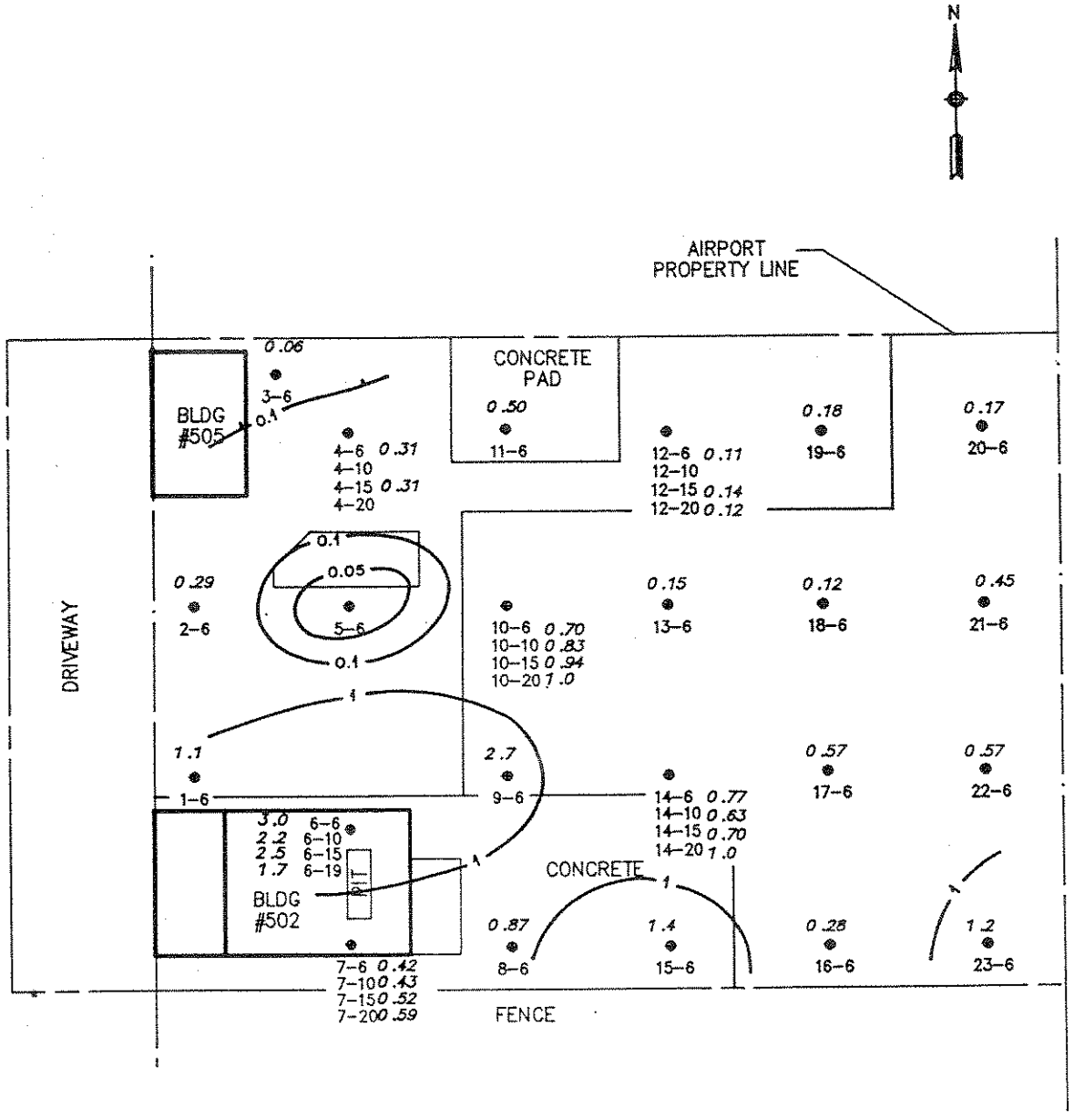


FIGURE 2. Tetrachloroethene (PCE) ($\mu g/l$)

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

BURBANK-GLENDALE-PASADENA AIRPORT
OLD MAINTENANCE YARD
BURBANK, CALIFORNIA

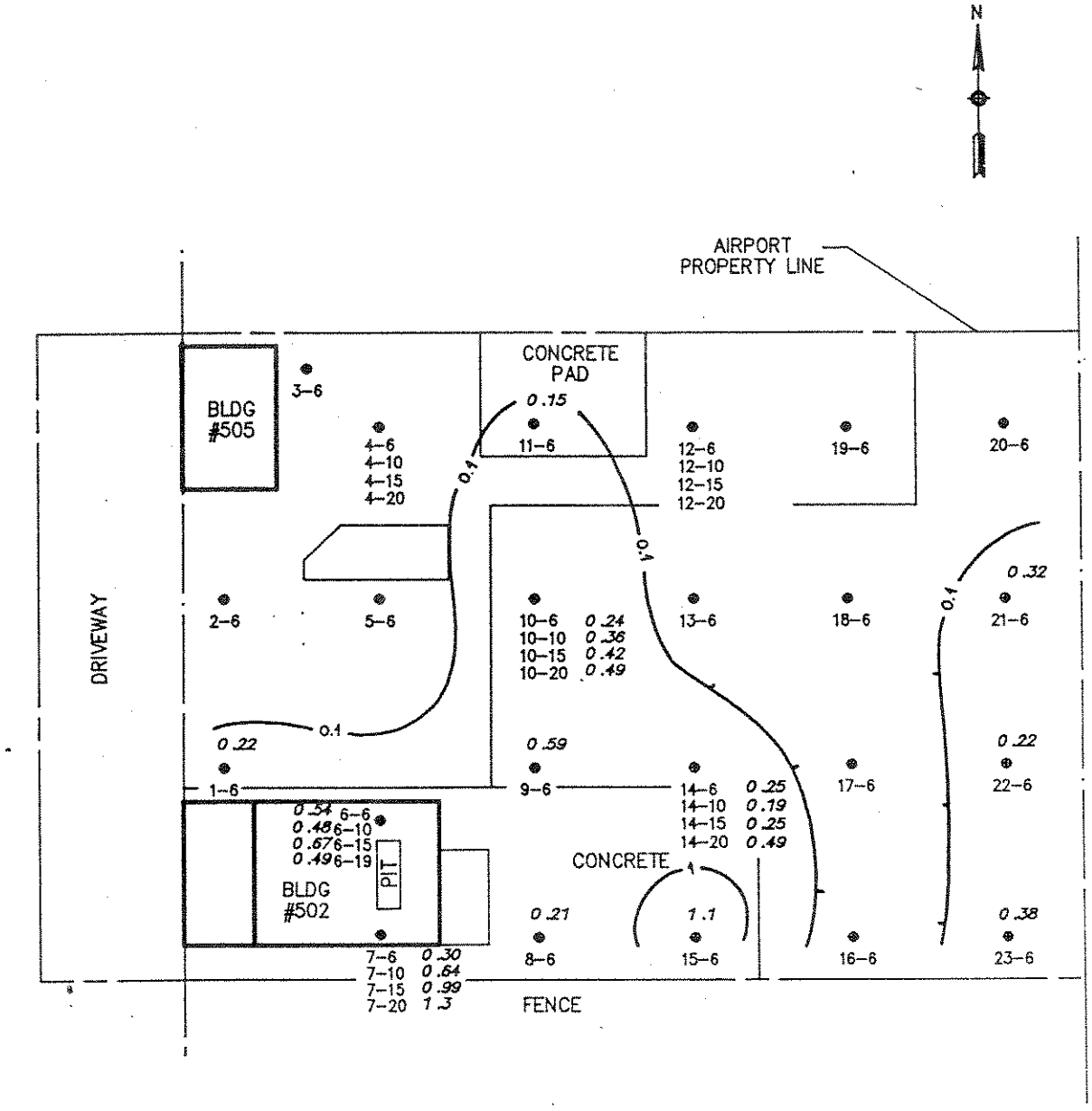
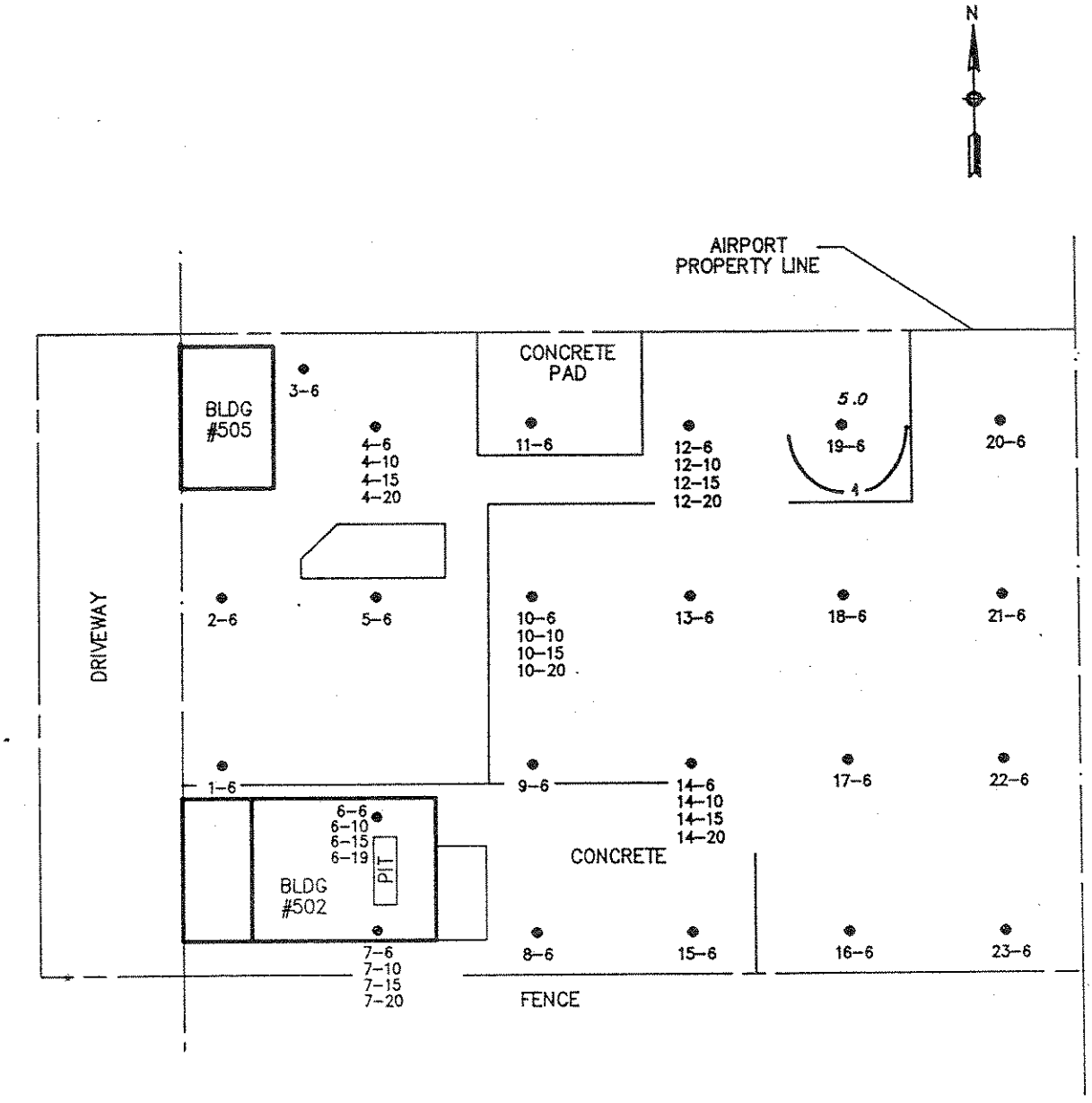


FIGURE 3. 1,1,1–trichloroethane (1,1,1–TCA) (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

BURBANK–GLENDALE–PASADENA AIRPORT
OLD MAINTENANCE YARD
BURBANK, CALIFORNIA



SOIL GAS SAMPLE LOCATION
CONTOURED AT 6' DEPTH

FIGURE 4. Total FID Volatiles
(calc'd µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

BURBANK-GLENDALE-PASADENA AIRPORT
OLD MAINTENANCE YARD
BURBANK, CALIFORNIA

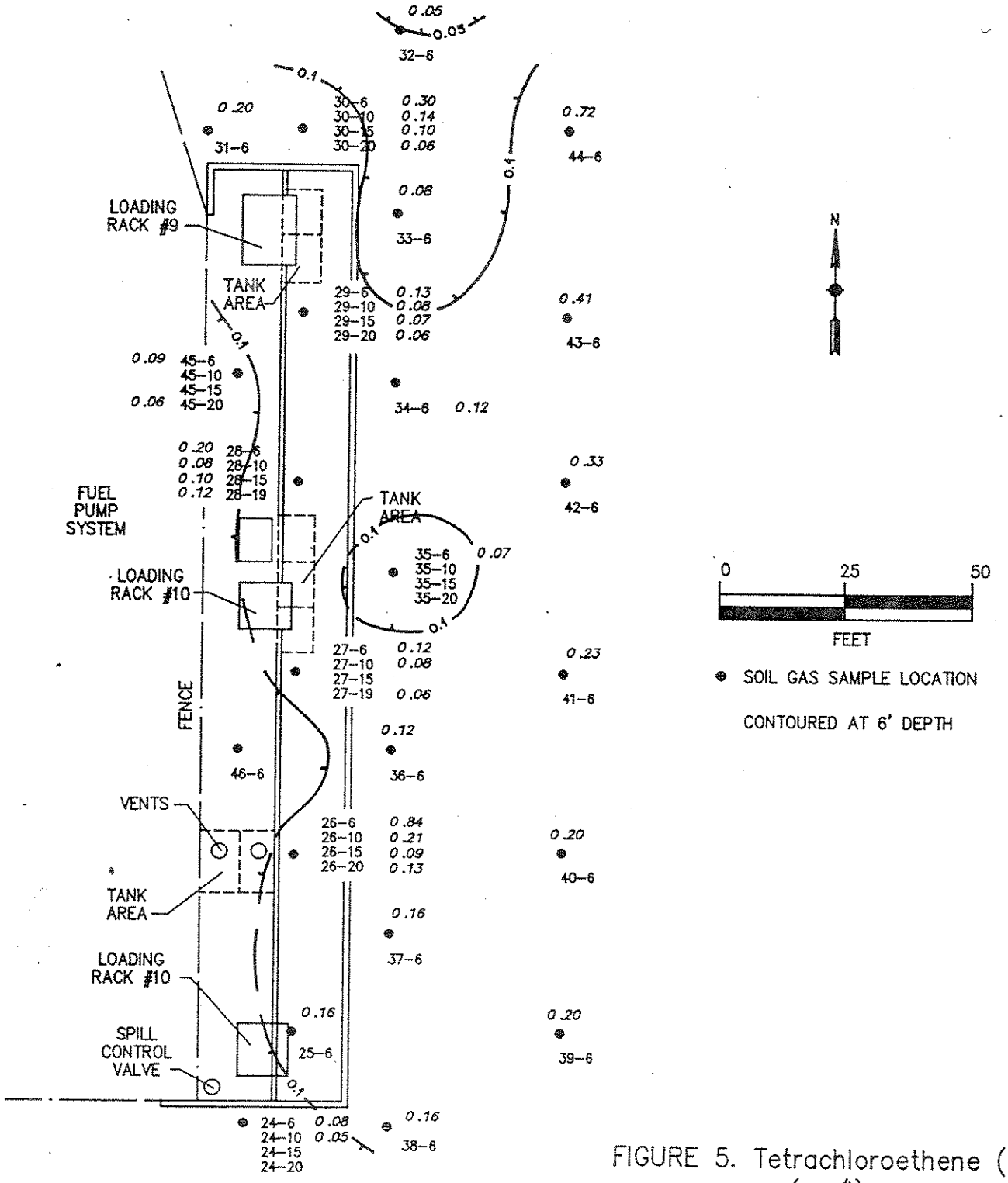


FIGURE 5. Tetrachloroethene (PCE) ($\mu g/l$)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

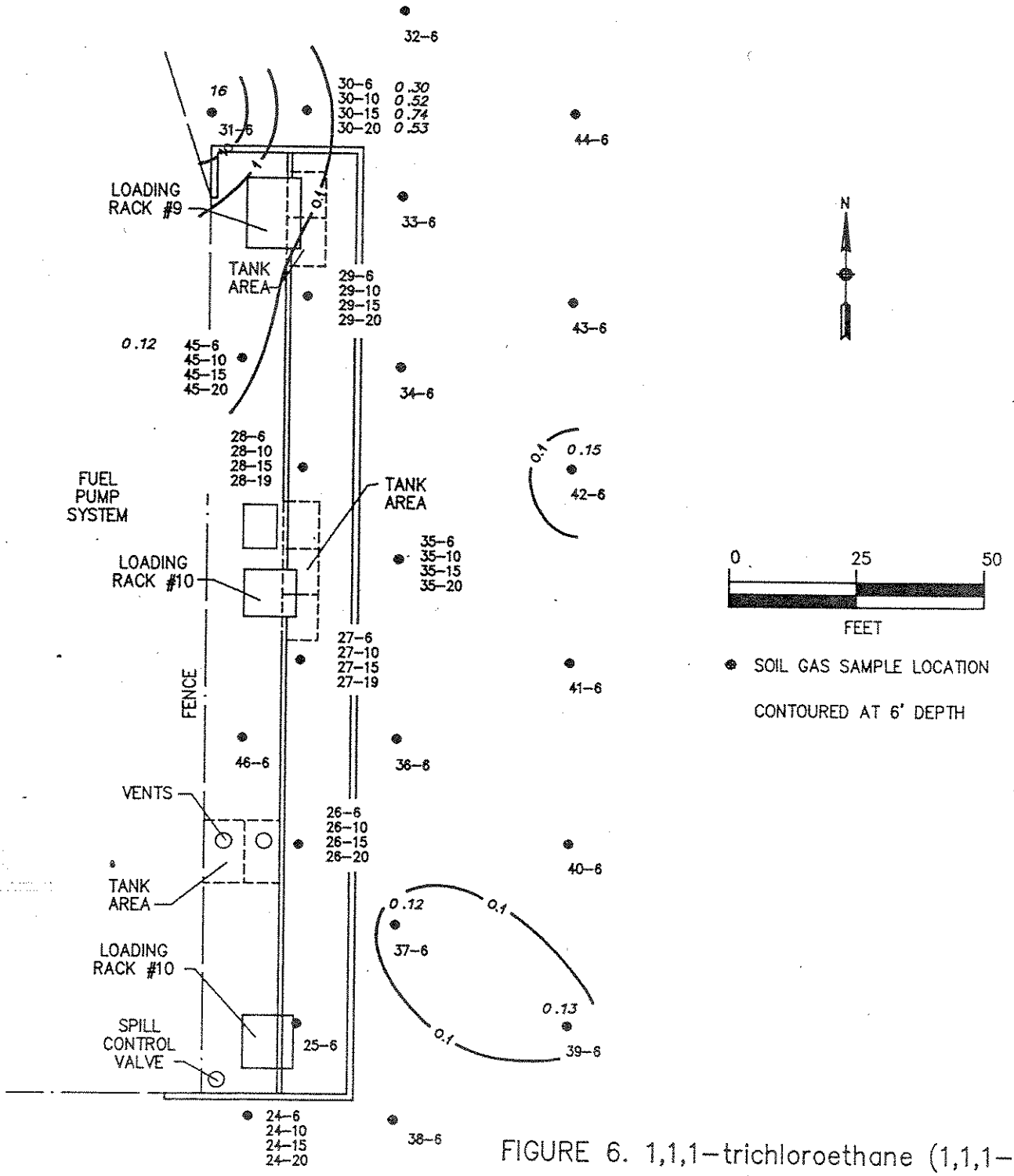
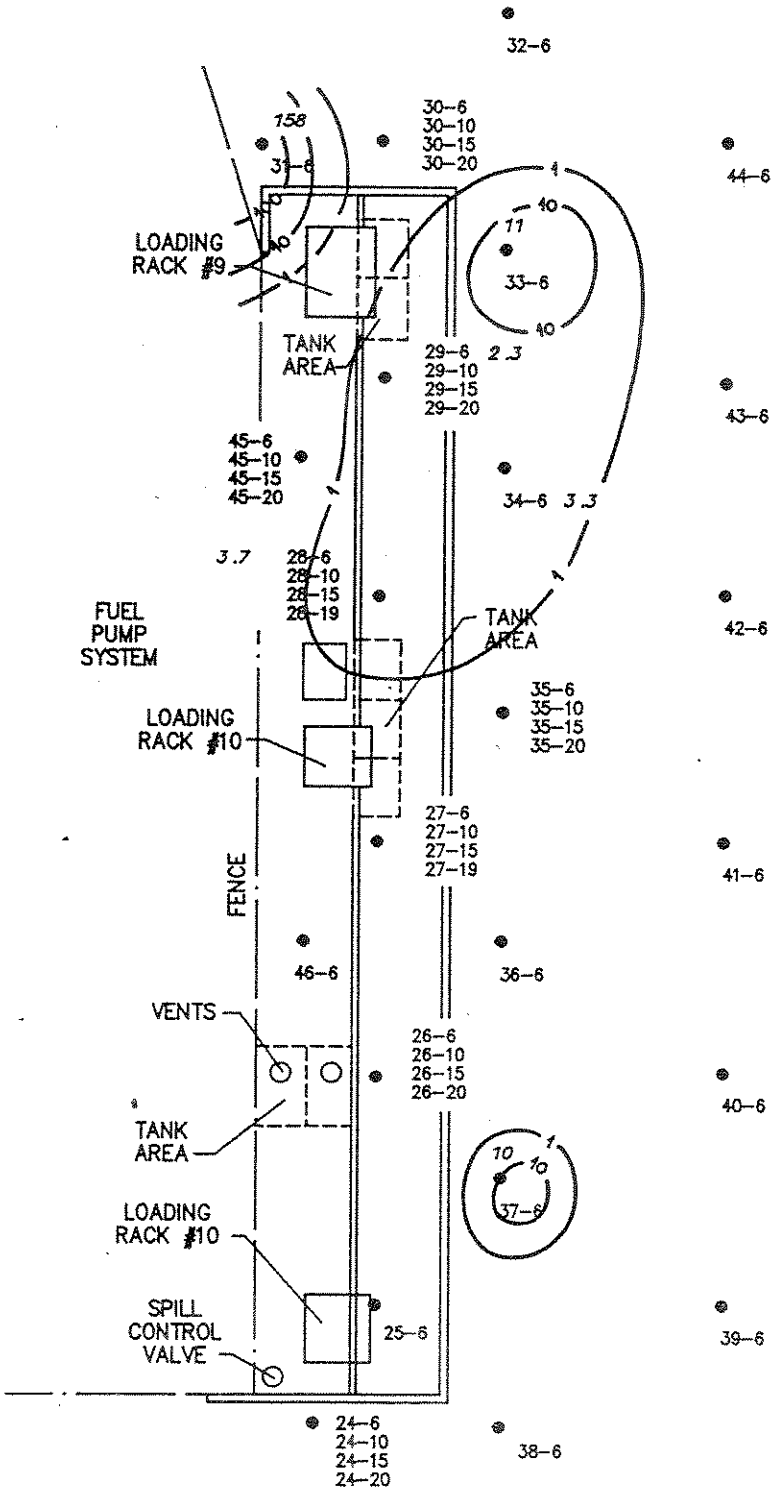


FIGURE 6. 1,1,1-trichloroethane (1,1,1-TCA) (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



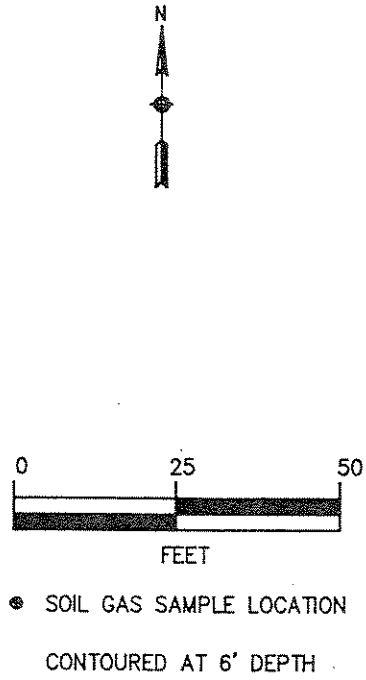


FIGURE 7. Total FID Volatiles
(calc'd $\mu g/l$)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

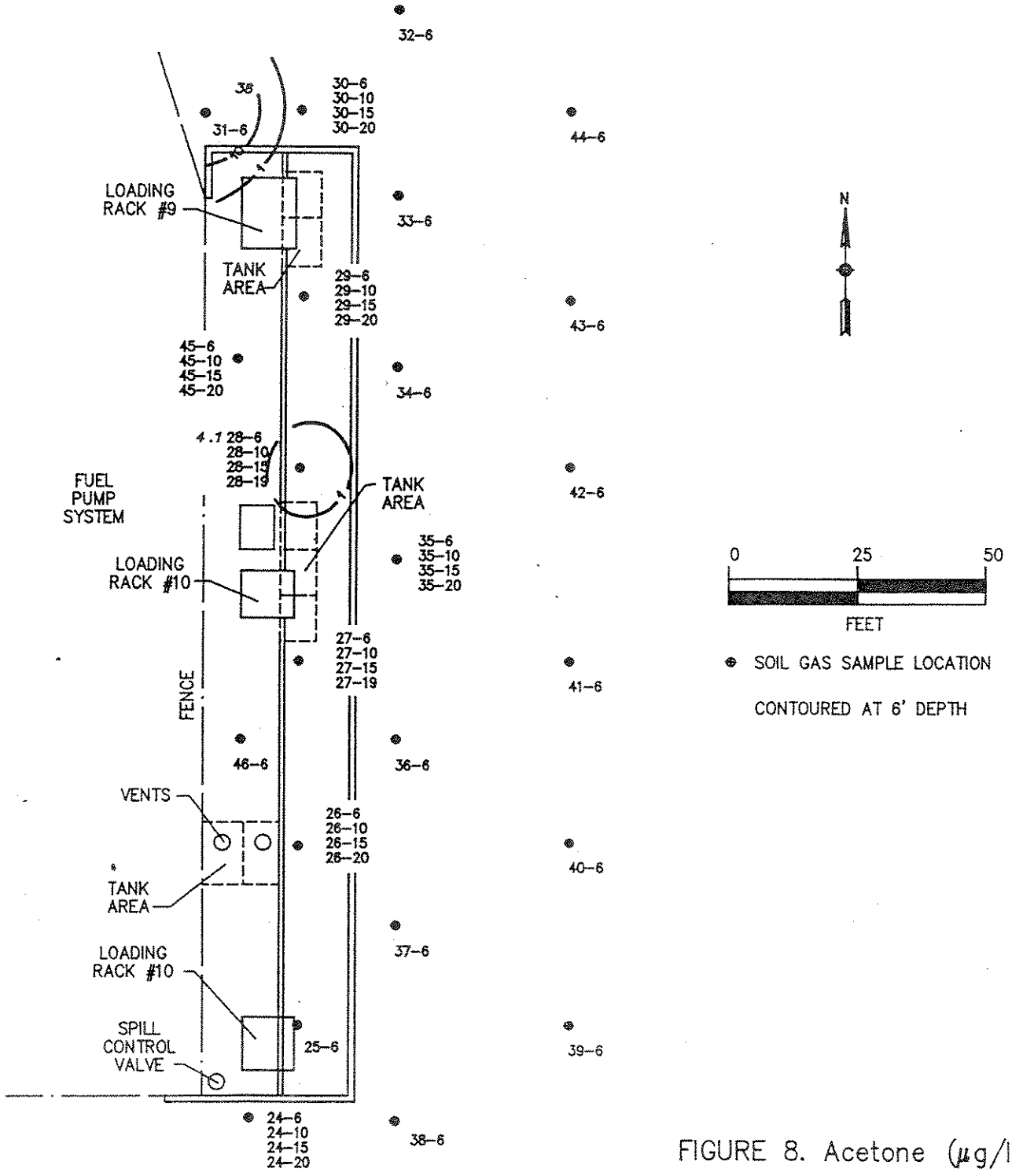


FIGURE 8. Acetone (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

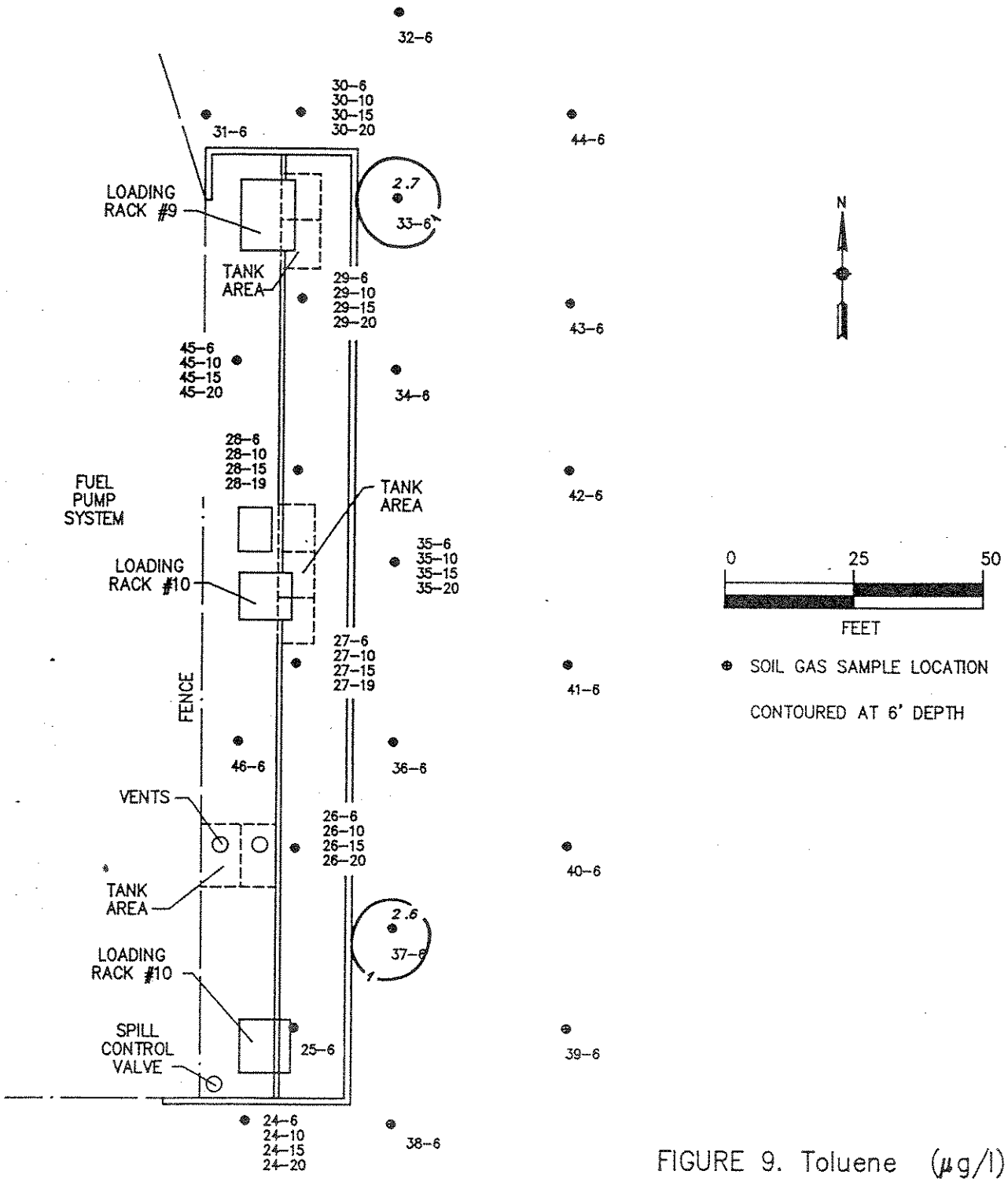


FIGURE 9. Toluene (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

BURBANK-GLENDALE-PASADENA AIRPORT
ASI FUEL FARM
BURBANK, CALIFORNIA

-B 5/12

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

TARGET ENVIRONMENTAL SERVICES, INC.

TARGET ENVIRONMENTAL SERVICES, INC.

November 15, 1991

NOV 15 1991

Mr. Ronnie Almero
Al Burke Engineers
451 W. Lambert Road
Suite 211
Brea, CA 92621

Dear Mr. Almero:

Enclosed please find three (3) replacement copies of the report on the Soil Gas Survey performed by **TARGET** at the Burbank-Glendale-Pasadena Airport site in Burbank, California. The changes you requested were made on title page, i, 1 and all the maps.

Sincerely,

TARGET ENVIRONMENTAL SERVICES, INC.

Kenneth B. Ranlet
Vice President

A/C 665

9180 RUMSEY ROAD, COLUMBIA, MARYLAND 21045 (301) 992-6622 Fax: (301) 992-0347

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

PREPARED FOR

A.L. BURKE ENGINEERS, INC.

451 WEST LAMBERT ROAD, SUITE 211

BREA, CALIFORNIA 92621

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.

9180 RUMSEY ROAD

COLUMBIA, MARYLAND 21045

(301) 992-6622

OCTOBER 1991

EXECUTIVE SUMMARY

On September 11 and 12, 1991, **TARGET** Environmental Services, Inc. (**TARGET**) conducted a soil gas survey at Burbank-Glendale-Pasadena Airport, Burbank, California in an area south of the Lockheed Corporation Area C-1. Samples were collected at 6 feet in all sampling locations and at multiple depths in nine locations and were analyzed by GC/FID and GC/ECD for petroleum and halogenated hydrocarbons, respectively.

Elevated levels of 1,1,1-TCA, PCE and t-1,2-DCE and lower levels of TCE, MTBE/pentane, acetone, benzene, toluene, and the xylenes were observed within the survey area. Map patterns of the halogenated hydrocarbons and MTBE/pentane suggest that the contaminants originated in or near the wash down areas. The low levels of petroleum hydrocarbons present in scattered locations around the survey are probably related to vehicular use. While the concentrations of halogenated hydrocarbons were typically of similar magnitude at all depths, the occurrences of non-halogenated hydrocarbons, with the exception of MTBE/pentane, were limited to the shallower samples.

BGPAA 0938

Introduction

A. L. Burke Engineers, Inc. contracted **TARGET** Environmental Services, Inc. (**TARGET**) to perform a soil gas survey in an area south of the Lockheed Corporation Area C-1 at the Burbank-Glendale-Pasadena Airport in Burbank, California. The purpose of the soil gas survey was to determine the presence and extent of volatile hydrocarbons in the subsurface. Ground water and soils information were not reported. The field phase of the soil gas survey was conducted September 11 and 12, 1991.

Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

The terms "elevated" and "significant" are used to describe concentrations of analytes which indicate the existence of a potential problem in the soil or ground water.

Field Procedures

Soil gas samples were collected at a total of 49 locations, as shown in Figure 1. Samples were collected at multiple depths at most of the locations. The first one or two digits in the sample numbers represent the sampling depth, i.e., "6", "10", "15" and "20". The last two or three digits represent the sample location number.

To collect the samples, a van-mounted hydraulic probe was used to advance connected 3' sections of 1" diameter threaded steel casing down to the sampling depth. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge. A teflon line was inserted into the casing to the bottom of the hole, and the bottom-hole line perforations were isolated from the up-hole annulus by an inflatable packer. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and taken to **TARGET**'s on-site mobile laboratory for analysis. When equipment malfunctioned, the remaining samples were shipped to **TARGET**'s corporate headquarters and analyzed in the home laboratory.

At sampling locations where samples were collected from more than one depth, the shallow sample was collected first, and then the probe was further advanced to collect deeper samples in the same manner as above.

Prior to the day's field activities all sampling equipment and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities and after every twentieth soil gas sample. These QA/QC samples were obtained by inserting the probe tip into a tube flushed by a 20 psi flow of pre-purified nitrogen and collecting in the same manner as described above.

Three sample locations (Stations 1007, 1516 and 1521) were sampled a second time after the initial sample vials were broken during analysis.

Laboratory Procedures

The samples collected during the field phase of the survey were subjected to both of the following analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

1,1-dichloroethene (1,1-DCE)
methylene chloride (MC)
trans-1,2-dichloroethene (t-1,2-DCE)
1,1-dichloroethane (1,1-DCA)
cis-1,2-dichloroethene (c-1,2-DCE)
chloroform (CF)
1,1,1-trichloroethane (1,1,1-TCA)
carbon tetrachloride (CT)
trichloroethene (TCE)
1,1,2-trichloroethane (1,1,2-TCA)
tetrachloroethene (PCE)

The halogenated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), but using direct injection instead of purge and trap. The analytes selected for standardization in this analysis were:

acetone
methyl tertiary butyl ether (MTBE)
methyl ethyl ketone (MEK)
benzene
toluene
chlorobenzene
ethylbenzene
meta- and para- xylene
ortho-xylene

BGPAA 0943

These compounds were chosen because of their utility in evaluating the presence of fuel products, or petroleum-based solvents.

The Total FID Volatiles values were generated by summing the areas of all chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of the Total FID Volatiles (Totals) values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples and their response factors were used to calculate the analyte concentrations. The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter (μg/l) in Tables 1 and 2. The first one or two digits in the sample numbers represent the sampling depth; i.e., "6", "10", "15" and "20". The last two or three digits represent the sample location number. Although "micrograms per liter" is equivalent to "parts per billion (v/v)"

in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. Because pentane and MTBE co-elute, they are listed together in the table. The xylenes concentrations reported in Table 1 are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas (99.999%) were also analyzed after every tenth field sample.

A total of five samples vials (Samples 612, 1007, 1516, 1521, and 2022) were broken during analysis. Samples were recollected at three of the locations, as mentioned in the Field Procedures section; however, analytical data are not available for Samples 612 and 2022.

Discussion and Interpretation of Results

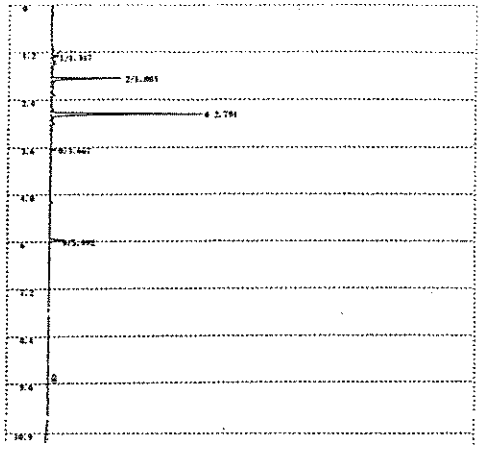
In order to provide graphic presentation of the results, individual data sets in Tables 1 and 2 have been mapped to produce Figures 2 through 8. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the detection limit. Analytical data for all sampling depths are shown on the maps; however, contours respect the data obtained from the 6' sampling depth.

GC/ECD analysis revealed that 1,1,1-trichloroethane (1,1,1-TCA, Figure 2) was the most prominent halogenated hydrocarbon on the site. Concentrations of 1,1,1-TCA were highest beneath (Station 620) and south of the wash down areas (location 5). Concentrations in the soil gas were elevated at all depths (Stations 605, 1005, 1505, and 2005). Lower levels were present at all other sampling locations and at all depths. The tetrachloroethene (PCE) and trichloroethene (TCE) map patterns resemble the 1,1,1-TCA features and are not mapped separately. PCE and TCE were observed in all samples, with the highest concentrations observed in samples collected south of and beneath the wash down areas. The trans-1,2-dichloroethene occurrence (t-1,2-DCE, Figure 3) was limited to the area in and around the wash down area and to several isolated samples to the west and south.

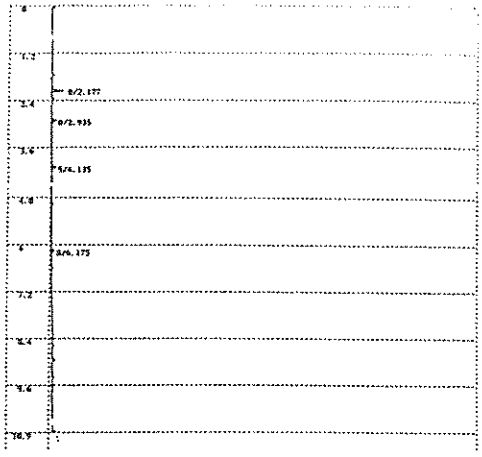
GC/FID analysis indicated that Total FID Volatiles (Figure 4) were highest in and beneath the wash down areas. Low levels occurred at most of the remaining sampling locations. MTBE/pentane (Figure 5) were highest in and around the wash down areas. Xylenes (Figure 6) were present in low levels in several samples around the

wash down areas and in some samples across the service road. Low levels of acetone (Figure 7) occurred in several samples in and near the service road. A low level of benzene (Figure 8) was present at one sampling location (Station 607) near the service road.

The FID chromatogram signatures of samples with elevated levels of volatile hydrocarbons show isolated peaks typical of halogenated hydrocarbons, as exemplified by Chromatogram 1, Sample 2005. Peaks indicative of low levels of petroleum hydrocarbons are evident in the chromatograms of a number of samples, as exemplified by Chromatogram 2, Sample 617.



CHROMATOGRAM 1. GC/FID SIGNATURE OF SAMPLE 2005



CHROMATOGRAM 2. GC/FID SIGNATURE OF SAMPLE 617

Elevated levels of 1,1,1-TCA, PCE and t-1,2-DCE and lower levels of TCE, MTBE/pentane, acetone, benzene, toluene, the xylenes were observed within the survey area. Map patterns of the halogenated hydrocarbons and MTBE/pentane suggest that the contaminants originated in or near the wash down areas. The low levels of petroleum hydrocarbons present in scattered locations around the survey are probably related to vehicular use. While the

concentrations of halogenated hydrocarbons were typically of similar magnitude at all depths, the occurrences of non-halogenated hydrocarbons, with the exception of MTBE/pentane, were limited to the shallower samples, i.e., samples collected at 6' and 10'.

TABLE 1

ANALYTE CONCENTRATIONS VIA GC/FID (ug/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
601	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
602	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
603	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
604	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
605	<1.0	19	<1.0	<1.0	1.9	<1.0	<1.0	3.1	50
1005	<1.0	23	<1.0	<1.0	1.2	<1.0	<1.0	2.6	59
1505	<1.0	18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
2005	<1.0	12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	27
606	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1006	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	3.2
1506	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
607	1.9	<1.0	<1.0	1.0	1.9	<1.0	<1.0	3.0	6.6
1007	1.6	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	2.8	5.9
1507	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
2007	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
608	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
609	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
610	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	1.2	4.8
611	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
1512	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
613	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
614	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.4
1014	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
1514	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9
2014	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8
615	1.2	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	2.8
1015	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
1515	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
2015	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
616	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	2.6	3.4
1016	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
1516	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
2016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
617	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
618	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6

MEK = Methyl ethyl ketone

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

BGPAA 0949

TABLE 1 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (ug/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
619	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9
620	<1.0	17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	26
621	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0
1021	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.5	3.8
1521	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2021	<1.0	2.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
622	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.0
1022	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	2.3
1522	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
FIELD CONTROL SAMPLES									
101	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
102	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
103	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
104	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
105	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
106	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY DUPLICATE ANALYSES									
1005	<1.0	23	<1.0	<1.0	1.2	<1.0	<1.0	2.6	59
1005R	<1.0	23	<1.0	<1.0	1.1	<1.0	<1.0	2.6	58
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
2006R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7
613	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
613R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
1021	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.5	3.8
1021R	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	2.3
LABORATORY BLANKS									
1005B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2006B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
613B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1021B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

MEK = Methyl ethyl ketone

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2

ANALYTE CONCENTRATIONS VIA GC/ECD (ug/l)

SAMPLE	11DCE	MC	t12DCE	11DCA	c12DCE	CF	111TCA	CT	TCE	112TCA	PCE
601	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.93	<0.05	0.14	<0.10	0.92
602	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.0	<0.05	0.35	<0.10	2.0
603	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	10	<0.05	0.30	<0.10	3.3
604	<1.0	<1.0	2.4	<1.0	<1.0	<0.10	11	<0.05	0.15	<0.10	3.0
605	<1.0	<1.0	20	<1.0	<1.0	<0.10	82	<0.05	0.77	<0.10	14
1005	<1.0	<1.0	38	<1.0	<1.0	<0.10	135	<0.05	0.46	<0.10	16
1505	<1.0	<1.0	30	<1.0	<1.0	<0.10	109	<0.05	0.38	<0.10	13
2005	<1.0	<1.0	23	<1.0	<1.0	<0.10	75	<0.05	0.32	<0.10	9.7
606	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.11	<0.10	1.5
1006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.0	<0.05	<0.10	<0.10	0.71
1506	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.0	<0.05	<0.10	<0.10	1.5
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.8	<0.05	0.14	<0.10	1.8
607	<1.0	<1.0	1.9	<1.0	<1.0	<0.10	1.2	<0.05	0.59	<0.10	2.0
1007	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.13	<0.05	0.16	<0.10	0.90
1507	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	<0.10	<0.10	0.98
2007	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.7	<0.05	0.14	<0.10	1.1
608	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.3	<0.05	0.22	<0.10	1.3
609	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.60	<0.05	0.18	<0.10	1.2
610	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.86	<0.05	0.42	<0.10	1.8
611	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.94	<0.05	0.23	<0.10	1.3
1012	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.9	<0.05	0.11	<0.10	1.7
1512	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.6	<0.05	<0.10	<0.10	1.2
2012	<1.0	<1.0	1.5	<1.0	<1.0	<0.10	11	<0.05	<0.10	<0.10	1.6
613	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.16	<0.10	1.9
614	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	14	<0.05	0.20	<0.10	2.6
1014	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	7.9	<0.05	0.12	<0.10	2.1
1514	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	15	<0.05	0.13	<0.10	2.5
2014	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	14	<0.05	0.13	<0.10	2.3
615	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.14	<0.10	1.3
1015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.5	<0.05	<0.10	<0.10	0.87
1515	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.5	<0.05	<0.10	<0.10	1.3
2015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.4	<0.05	<0.10	<0.10	1.2
616	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.3	<0.05	0.30	<0.10	1.3
1016	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.8	<0.05	0.14	<0.10	0.96
1516	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
2016	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.4	<0.05	0.12	<0.10	0.99
617	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.13	<0.10	1.5

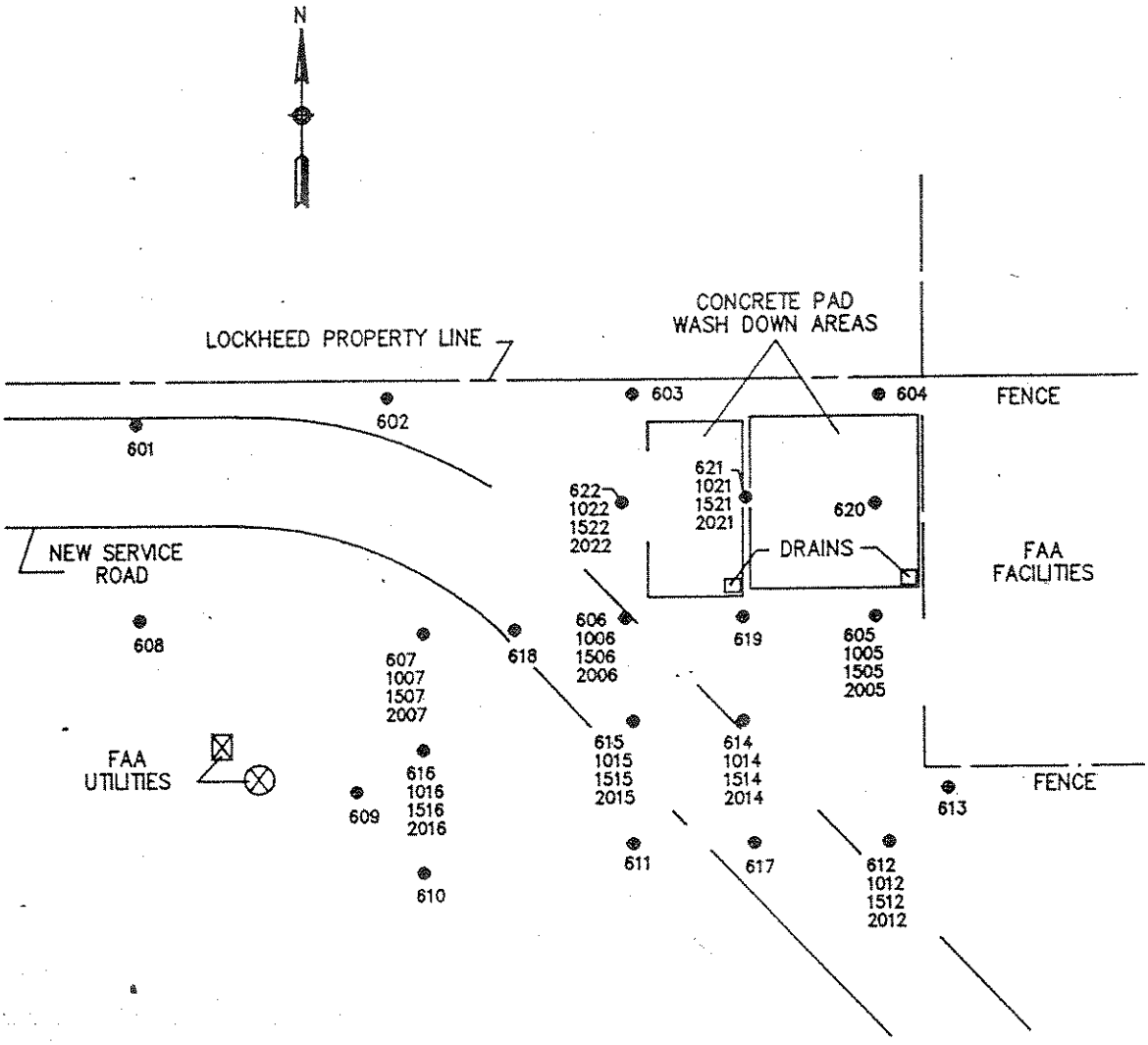
11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene
MC = methylene chloride
11DCA = 1,1-dichloroethane
CF = chloroform
CT = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (ug/l)

SAMPLE	11DCE	MC	t12DCE	11DCA	c12DCE	CF	111TCA	CT	TCE	112TCA	PCE
618	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.8	<0.05	0.19	<0.10	1.5
619	<1.0	<1.0	1.2	<1.0	<1.0	<0.10	15	<0.05	0.27	<0.10	5.3
620	<1.0	<1.0	22	<1.0	<1.0	<0.10	113	<0.05	0.49	<0.10	9.1
621	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	7.5	<0.05	0.22	<0.10	2.9
1021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.1	<0.05	0.28	<0.10	2.4
1521	<1.0	<1.0	1.1	<1.0	<1.0	<0.10	1.9	<0.05	0.10	<0.10	0.89
2021	<1.0	<1.0	2.4	<1.0	<1.0	<0.10	12	<0.05	0.13	<0.10	2.2
622	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.7	<0.05	0.57	<0.10	2.7
1022	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.5	<0.05	0.12	<0.10	1.5
1522	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.17	<0.10	1.4
FIELD CONTROL SAMPLES											
101	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.29
102	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.11
103	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
104	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.23
105	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
106	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
LABORATORY DUPLICATE ANALYSES											
1005	<1.0	<1.0	38	<1.0	<1.0	<0.10	22	<0.05	0.46	<0.10	8.8
1005R	<1.0	<1.0	35	<1.0	<1.0	<0.10	22	<0.05	0.44	<0.10	8.8
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.8	<0.05	0.14	<0.10	1.8
2006R	<1.0	<1.0	2.1	<1.0	<1.0	<0.10	6.9	<0.05	0.14	<0.10	1.7
613	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.16	<0.10	1.9
613R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.0	<0.05	0.11	<0.10	1.4
1021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.1	<0.05	0.28	<0.10	2.4
1021R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.0	<0.05	0.28	<0.10	2.4
LABORATORY BLANKS											
613B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
1005B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
1021B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
2006B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene
MC = methylene chloride
11DCA = 1,1-dichloroethane
CF = chloroform
CT = carbon tetrachloride
112TCA = 1,1,2-trichloroethane



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

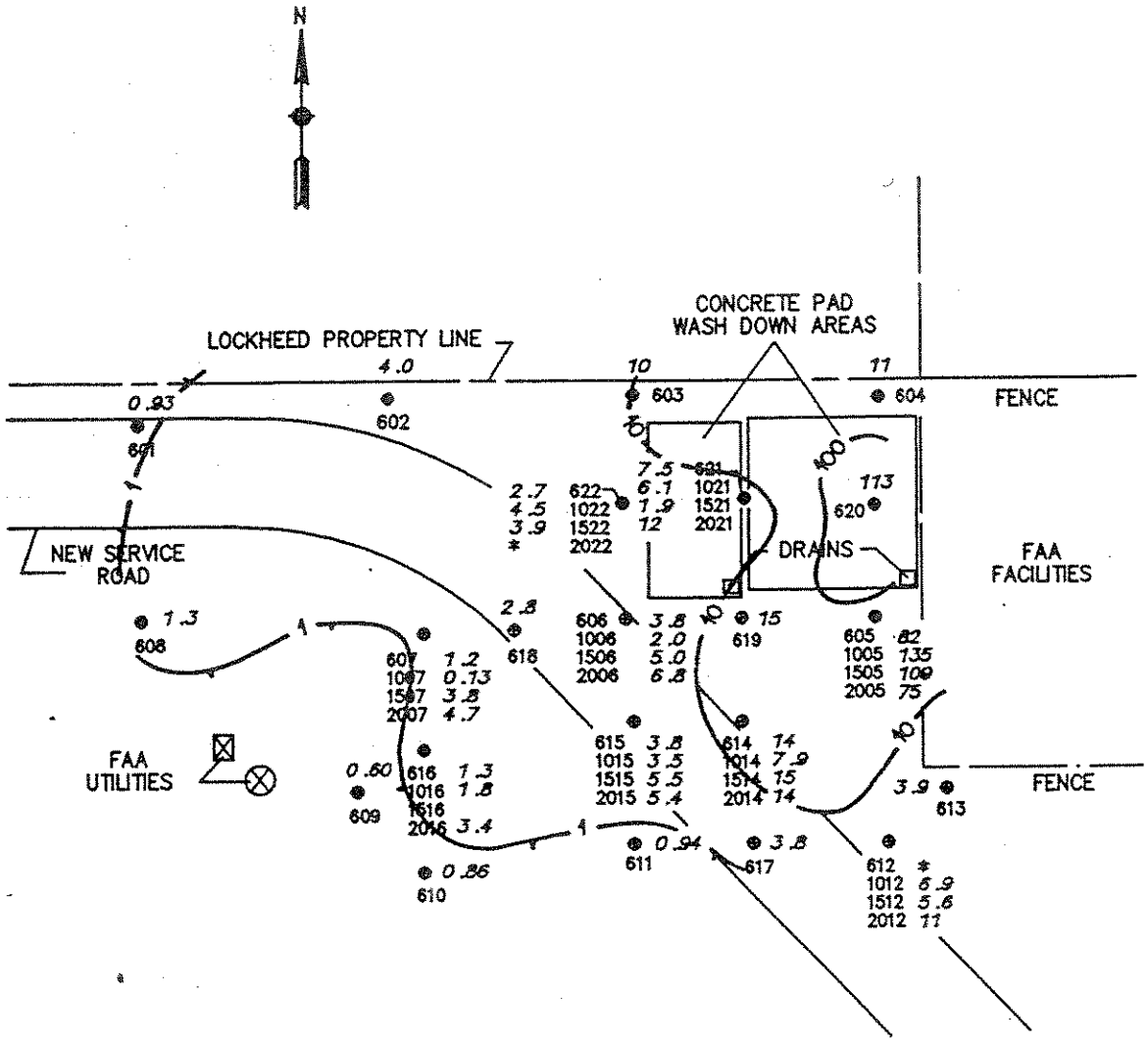
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 1. Sample Locations

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

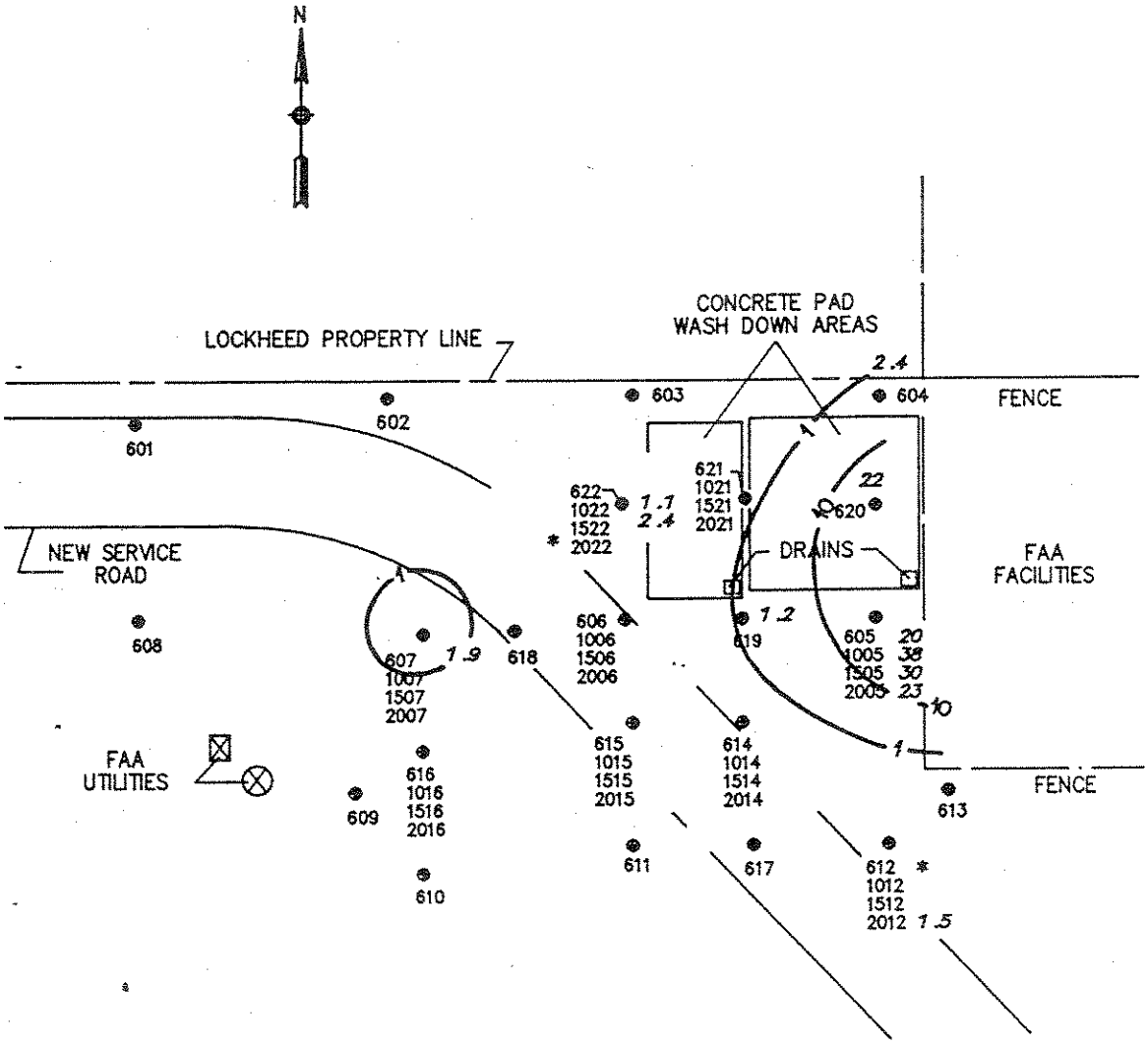
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 2. 1,1,1-trichloroethane (1,1,1-TCA) (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

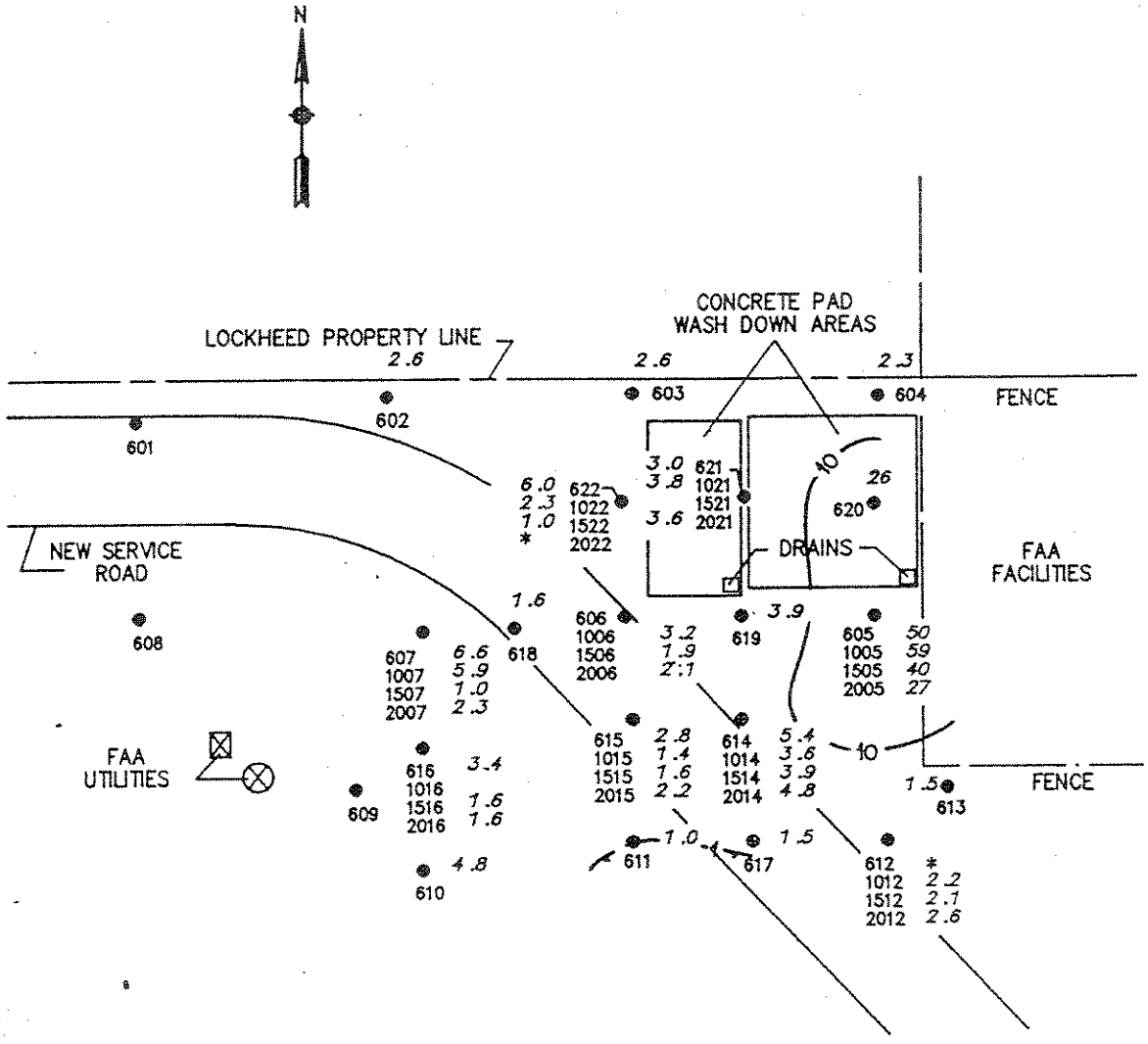
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 3. trans–1,2–dichloroethene (t–1,2–DCE) (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

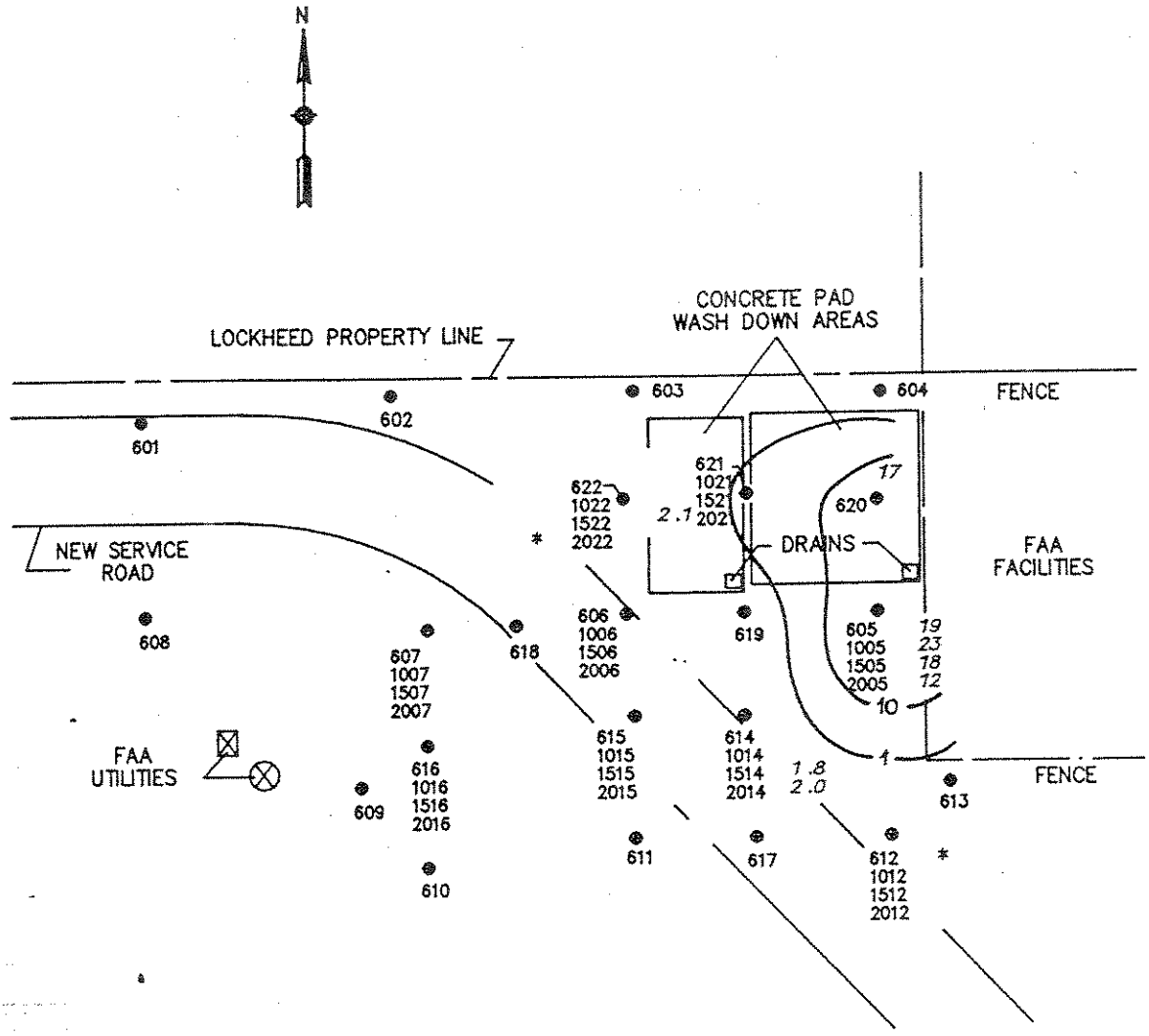
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 4. Total FID Volatiles (calc'd µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

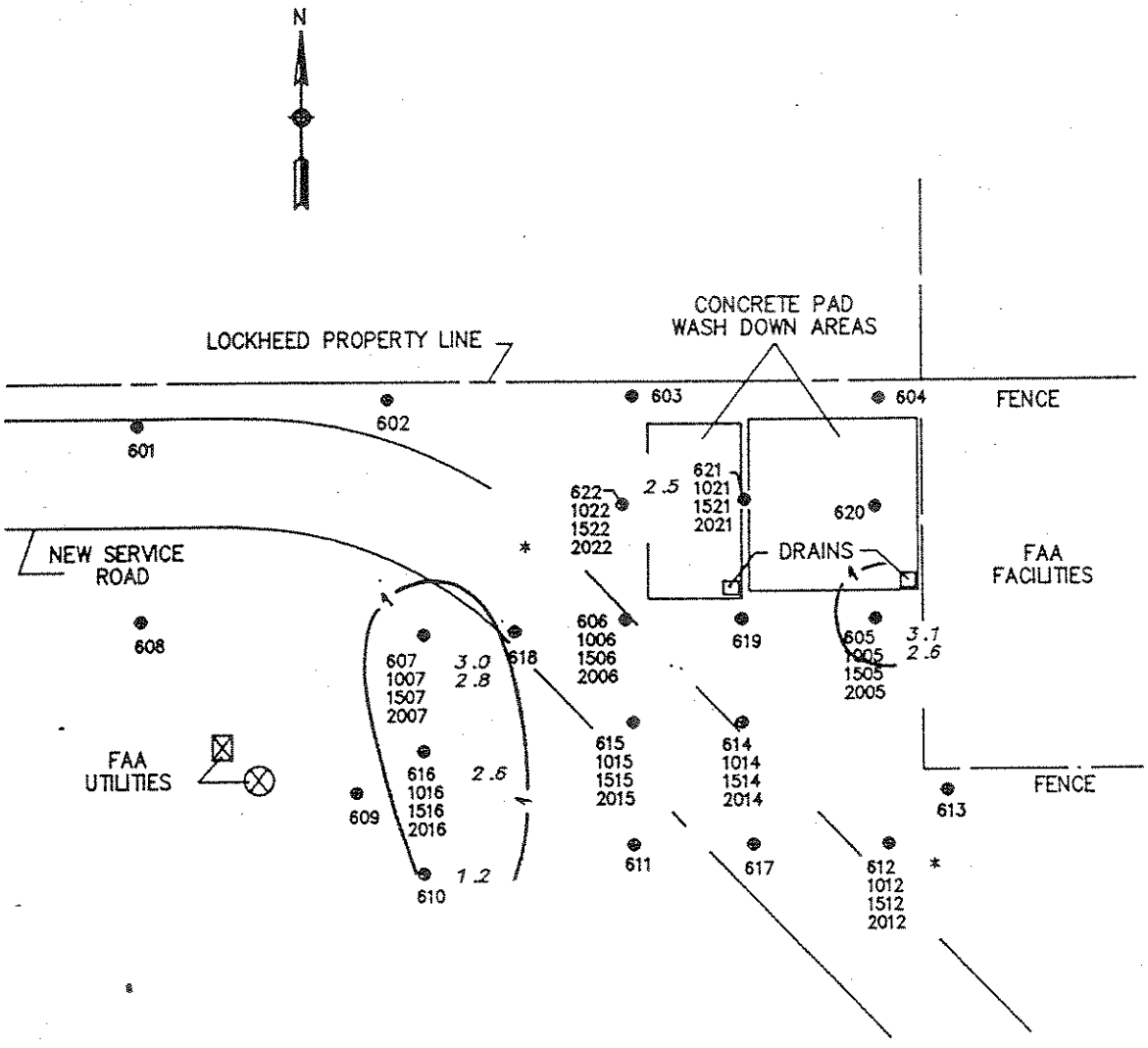
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 5. Pentane/Methyl Tertiary Butyl Ether (MTBE) (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

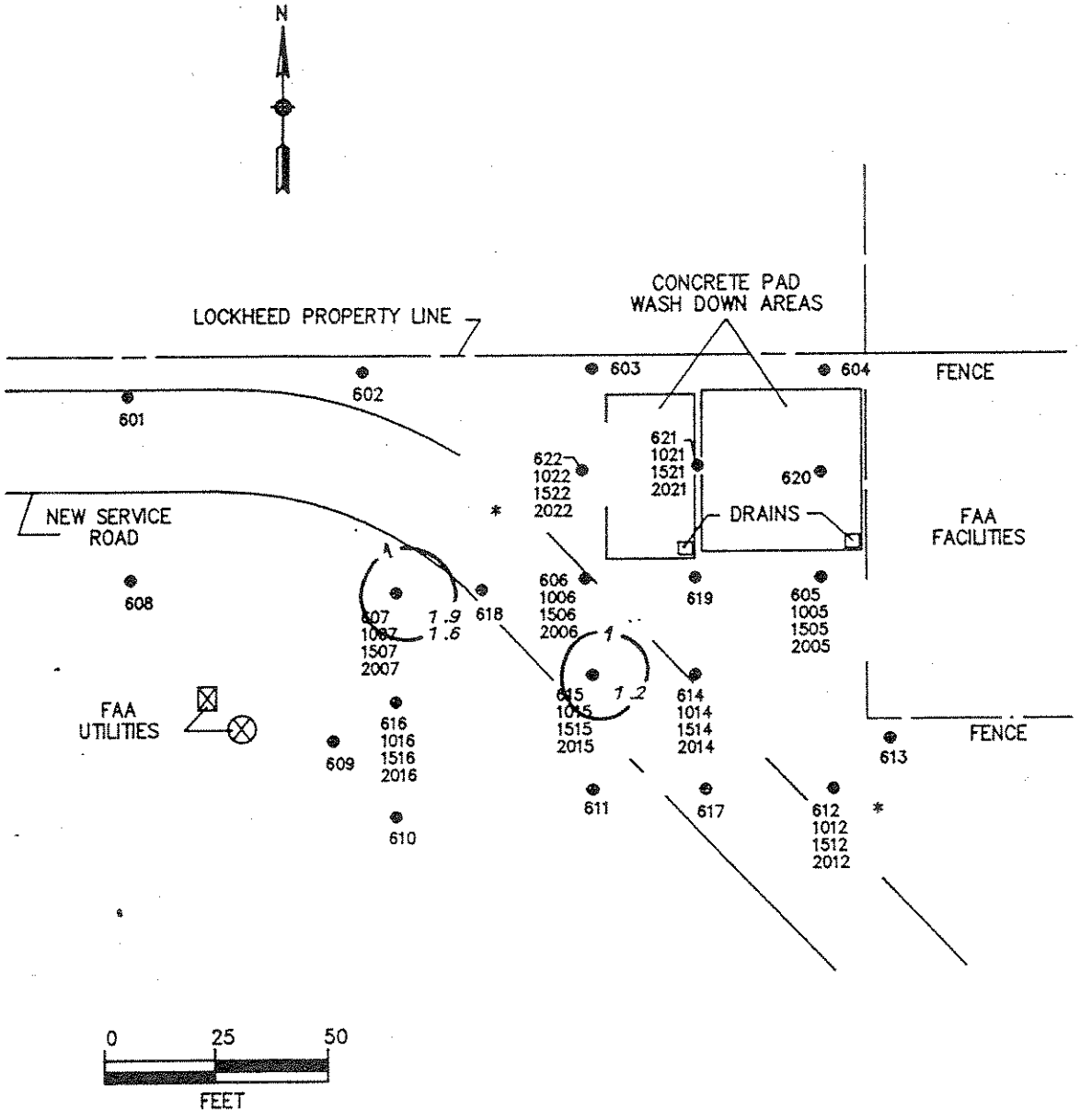
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 6. Xylenes (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

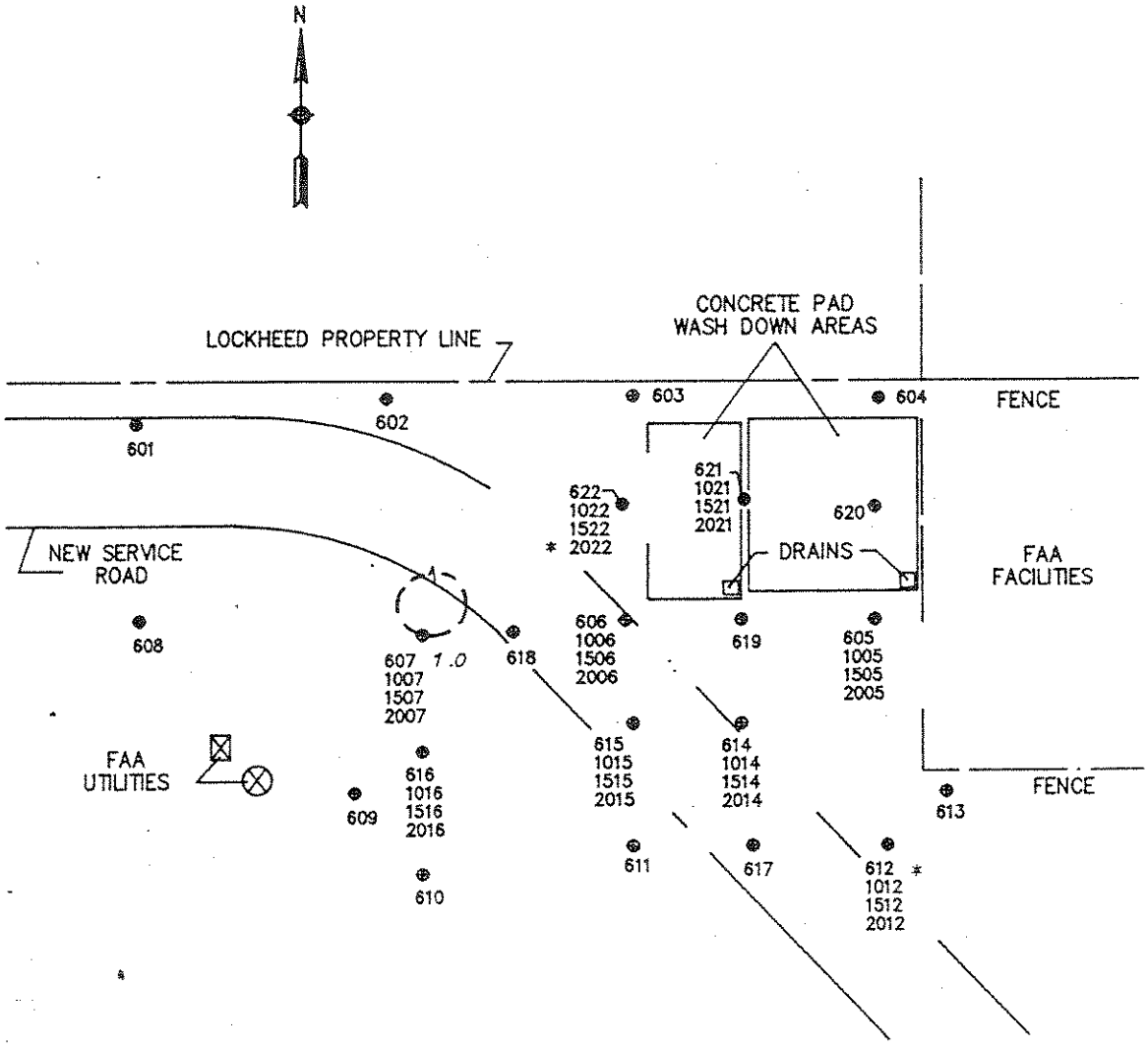
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 7. Acetone (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 8. Benzene (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

REPORT ON THE SOIL INVESTIGATION AND STUDY CONDUCTED AT THE NEW SERVICE ROAD AREA OF THE BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

Burbank, California

January, 1992

Presented to:

Burbank-Glendale-Pasadena
Airport Authority
2627 Hollywood Way
Burbank, California 91505

Presented by:

A. L. Burke Engineers, Inc.
451 West Lambert Road
Suite 211
Brea, California 92621

Volume I - Main Report

The findings and recommendations in this report were prepared in accordance with the generally accepted norm of professional engineering and geologic practice. We make no other warranty, either expressed or implied.

The recommendations are based on our present knowledge of the subsurface conditions of the general area, and the extrapolation of lithologic units between and beyond boring locations, the evaluation of the analytical tests results, the review of available data and information gathered during the course of this study. Changes in the recommendations may be necessary during the site implementation of the remedial alternative as dictated by the actual field conditions.

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REPORT ON THE SOIL INVESTIGATION AND STUDY CONDUCTED AT THE NEW SERVICE ROAD AREA OF THE BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

1.0 INTRODUCTION

This report presents the results of the soil gas survey and the confirmatory soil borings and sampling conducted in an area where a new service road of the Burbank-Glendale-Pasadena Airport Authority (Airport Authority) was recently constructed.

The area, located south of Lockheed Aeronautical System Company (Lockheed) Plant C-1, was formerly leased from the Airport Authority and used for Lockheed operations. As part of the expansion project of the Airport Authority, it reassumed possession of the property and is negotiating for the purchase of Lockheed Plant C-1.

Because of certain environmental concerns which may be associated with Lockheed operations, the Airport Authority had undertaken soil investigations for environmental site assessment in order to determine whether the subsoils in the area had been impacted/contaminated as the results of Lockheed's activities. Two concrete wash-down containment pads were used by Lockheed for its drum and equipment washing activities. Two (2) sumps were provided to collect and transport waste water.

The confirmatory boring was conducted by West Hazmat Drilling Corporation (West Hazmat) on November 14-15, 1991. Target Environmental Services, Inc. (Target) performed the soil gas survey on September 11-12, 1991. Both firms subcontracted the work with A. L. Burke Engineers, Inc. (ALB), consultant-advisor to the Airport Authority.

The evaluation of the soil contaminations was based on the results of these studies as well as the previous investigation conducted in the area both by the Airport Authority and Lockheed.

2.0 OBJECTIVE AND SCOPE OF STUDY

The present study is part of the environmental assessment of the property previously leased to Lockheed. The primary objective of this study is to confirm the contaminations that had been detected in the previous soil investigation and to assess whether such contaminations are related to the previous operations of Lockheed.

In order to meet this objective, the study was comprised of soil gas survey, soil boring and sampling, analytical tests of soil samples, review of the previous investigation, assessment of the subsoils characteristics and conditions, evaluation of the impact of contaminations and environmental recommendations. Specifically, the various tasks which were performed to complete the environmental site assessment are summarized as follows:

- Health and Safety Plan/Emergency Action Plan was prepared and discussed with the Field Personnel. All personnel read, understood and agreed to comply with its provisions before fieldwork began. Safety procedures were strictly enforced by the Field Geologist. A copy of the Plan is included as Appendix 1.

- Soil gas survey was conducted and 49 vapor samples were collected from 22 location points. Analyses of the samples were done on-site by the use of mobile laboratory. Details are discussed in Section 6.0.

- Results of previous investigation were reviewed and incorporated in the present report. Results of analyses of soil samples are shown in Tables 1 and 2.

- Five (5) confirmatory borings were drilled in locations where previous sampling indicated significant level of concentration of certain compounds. The depth of the boring is 80 feet. The soil boring data are summarized in Table 4 while the details of the field investigation are discussed in Section 7.0.

- Soil samples and drill cuttings were examined on-site by the Field Geologist in accordance with the Unified Soil Classification System (USCS). A boring log was prepared for each hole, incorporating the lithological description and type of the subsoils, graphical log, the Standard Penetration Test (SPT) data as well as the OVA or TLV measurements.

- Soil samples were analyzed in accordance with the Sampling and Analytical Tests Schedule (Table 5). Soil samples were analyzed for volatile organics, volatile aromatics, CAM metals and fuel hydrocarbon. The results of the analytical tests and the chain-of-custody documentation were compiled in separate volume (Volume II-Results of Analytical Tests).

- The findings, conclusion and recommendations were based on the evaluation of the field and analytical tests data.

3.0 SITE LOCATION AND DESCRIPTION

The area which was formerly leased to Lockheed is located north of the east-west Runway 8-26 and south of Lockheed Plant C-1. Figure 1, Airport Plan, shows the location of the site.

The present service road is paved by new asphalt surfacing. While most of the old asphalt pavement was removed and replaced by new one, a small portion of the old asphalt and the old concrete wash downs built by Lockheed were not demolished and remain in the area. The concrete wash containment pads are located adjacent and northeast of the service road. The concrete surface and the old asphalt shows oil stainings. Sludges/residues were observed in the drains.

Prior to the construction of the service road, the old asphalt surfacing had shown evidences of deterioration, crackings and oil stainings. In one of the excavations for the cable line during construction, the soil exhibited faint petroleum odor.

4.0 GEOLOGY

The discussion on the geologic conditions was based on the information from the references cited (Ref. 1, 2 and 6) and from previous soil borings drilled at the different areas within the airport.

4.1 Regional Geologic Setting

The Airport Authority property lies on the eastern side of the San Fernando Valley. The valley is an intercoastal basin bounded by the Santa Susana Mountains to the northwest, the San Gabriel and Verdugo Mountains to the north and northeast, the San Rafael Hills to the east, the Santa Monica Mountains to the south, and the Simi Hills to the west. The valley slopes south-southeast toward the Los Angeles River.

The Basin is composed of alluvial deposits derived from the surrounding mountains and hills. The alluvial deposits consist primarily of fine-grained sediments on the western side of the valley. The eastern side of the valley is underlain by coarse grained deposits. Due to high permeability of the alluvial deposits on the eastern side of the valley, this area stores much of the ground water contained within the basin. The depth to ground water throughout the valley varies between 50 and 300 feet with deeper levels found near the center of the valley and near areas of pumpage. The regional ground water gradient dips in a south-southeasterly direction. In the vicinity of the Airport Authority and the Lockheed facilities, the depth to the ground water is expected to be within 200 to 230 feet.

4.2 Site Geology

The new service road area is underlain by fine to coarse sands with varying amounts of silts and gravels immediately after the 2-3 inch of asphalt paving. The subsoils range from poorly graded (SP) to well graded (SW), medium dense to very dense materials. Minor lenses of non-plastic to slightly plastic silts (ML) interbed with the SP/SW units. Because the fines occur as thin and discontinuous lenses, the vertical migration of the contaminants are not restricted. The 3 types of subsoil materials were found to intertongue with each unit. This condition may be related to the process and the prevailing environment during deposition.

Cobbly to bouldery layers (GP/GW) were encountered at depth 75 feet and 80 feet. In other facilities within the airport, the cobbly to bouldery units were found at 70 feet.

Figures 2 and 3 show the vertical disposition of the different soil types as extrapolated from the borings.

5.0 PREVIOUS SITE INVESTIGATION

Lockheed had performed environmental site assessment on its properties which the Airport Authority are planning to purchase. The property where the Airport Authority is initially interested is the Lockheed Plant C-1. Site investigation was conducted by Lockheed in Plant C-1 including the area which was previously leased from the Airport Authority. The Airport Authority also performed preliminary environmental assessment in the leased area. In both studies by Lockheed and the Airport Authority, the subsoils quality in the leased area had been impacted by certain levels of contaminations

Results of these investigation as they pertain to the leased area are discussed in the following sub-section.

5.1 Lockheed's Studies

Gregg and Associates, Inc. and McLaren-Hart Environmental Co. were contracted by Lockheed to undertake environmental studies in its Plant C-1 facilities. Shallow borings were undertaken at the different facilities including the leased area. The maximum depth of the borings in the leased area was 20 feet. The findings from these borings in the leased area which show some levels of contaminations are shown in Tables 1 and 2.

As can be noted in Tables 1 and 2, the trend of contamination was decreasing at depth where the high concentration values of TPH and some of the aromatics were confined within the upper 5 feet. In one boring (SB-16), 3468 mg/kg TPH was found at 14 feet.

Table 1: Results of Analysis (Gregg and Associates, Inc.)

Boring No.	Depth (feet)	Concentration, TPH (mg/kg)
B11	2.5	1000
	5	2
	10	7
B18	2.5	140
	5	3
	10	40
	15	<1
	20	<1
B19	2.5	20
	5	2
	10	<1
	15	6
	20	<1
B24	2.5	500
	5	4
	10	4
B30	2.5	1400
	5	14
	10	4
B31	2.5	240
	5	2
	10	<1
	15	<1
	20	1

Continued

Boring No.	Depth (feet)	Concentration, TPH (mg/kg)
B33	2.5	480
	5	<1
	10	3
	15	<1
	20	<1

Note: TPH - total petroleum hydrocarbon (EPA 418.1) Ref. 3

Table 2: Results of Analysis (McLaren-Hart)

Borings Numbers	Depth (feet)	Concentration Toluene (ug/kg)	O-Xylene (ug/kg)	TPH (mg/kg)
SB-16	4	<2.5	<0.5	320
	9	<2.5	<0.5	<5
	14	<2.5	<0.5	3468
SB-49	1	56	1.2	6
	5	43	0.7	120
	10	<2.5	<0.5	5
SB-50	1	2.5	<0.5	<5
	5	3.2	<0.5	<5
	10	<2.5	<0.5	54
SB-51	1	4.8	<0.5	14
	5	<2.5	<0.5	<5
	10	<2.5	<0.5	<5
SB-67	3.5	<2.5	<0.5	230
	8.5	<2.5	<0.5	<5
	13.5	<2.5	<0.5	<5

Note: TPH - total petroleum hydrocarbons (EPA 418.1) Ref. 4

5.2 Airport Authority Studies

In May 1990, the Airport Authority commissioned ALB to undertake an environmental site assessment of the area leased to Lockheed in order to determine whether the soil in this area had been impacted/contaminated as a result of Lockheed operations (Ref. 5).

The fieldwork, which was performed during the construction of the new service road consisted of shallow borings and sampling at 5 feet and soil gas survey undertaken by ABB Environmental Services, Inc. Boring and soil gas sampling points were located along the new service road.

The soil gas sampling points and boring locations where some level of contaminations had been detected are summarized as follows:

a) Soil Gas Sampling Results

From out of 47 sampling points, some degree of contamination was detected in soil gas samples collected from 3 points.

Sampling Point	Depth	Solvent Detected	Concentration (ppm)
1	4.5 feet	Halogenated Solvent	1.9
33	2.5	Toluene	2.0
		Halogenated Solvent	4.6
44	2.5	Halogenated Solvent	3.7

Halogenated Solvents detected in Sampling Points 1 and 44 may be related to overflow or spillage during the washing activities. Relative to the location of the wash-down concrete pads, Sampling Point 1 was at a depression approximately 11 feet south of the eastern edge of the east concrete pad while sampling point 44 was located within the west concrete wash pad. Oil stains were pervasive in this vicinity.

b) Results of Soil Sampling

Six (6) shallow borings by hand auger were performed along the new service road. Soil samples were collected at 1 foot and at 5 feet. Soil samples which showed total petroleum hydrocarbon by EPA 418.1 above detection limits are shown in Table 3:

Table 3: Results of Analysis (ALB)

Boring No.	Depth (feet)	Concentration, TPH (mg/kg)
HB-1	1	37
	5	60
HB-2	1	140
	5	10

Continued

Boring No.	Depth (feet)	Concentration, TPH (mg/kg)
HB-3	1	550
	5	39
HB-4	1	15000
	5	880
HB-5	1	51
	5	<10
HB-6	1	36
	5	<10

Petroleum hydrocarbon is the major contaminant detected in all 6 soil samples collected at 1 foot and 5 feet. The highest concentration of 15,000 mg/kg was detected in shallow boring H-4, a few feet from the southeast corner of the smaller wash down concrete pad. While this contamination may be related to surface stainings (caused by overspill) due to petroleum-related wastes, contaminants had migrated downward to at least 5 feet as manifested in soil analysis of 880 mg/kg. Testing by EPA 8015 on some of the soil samples also indicated total fuel hydrocarbon (TFH) findings.

6.0 SOIL GAS SURVEY

A soil gas survey was conducted by Target Environmental Services, Inc. within an area of 110 by 200 feet south of Lockheed Plant C-1. Forty nine (49) vapor samples were collected from 22 location points. Thirteen (13) samples were obtained from 13 location points at depth of 6 feet (single depth). Thirty-six (36) samples were also collected from 9 location points at 4 sampling depths (multi-depth) of 6, 10, 15 and 20 feet. The detection of a solvent in a particular sampling location is representative of vapor, dissolved and/or liquid phase contamination at that location. The results of Target's survey are presented in its report (Appendix 2) dated October, 1991 and appended in this report as Appendix 2.

6.1 Number and Sampling Points

Figure 1 in Appendix 2 shows the location of the 22 sampling locations. A total of 49 samples were collected consisting of 13 single-depth samples (6 feet) from 13 locations and 36 multi-depth samples (6, 10, 15 and 20 feet) from 9 locations.

Certain considerations were used in determining the spacing and depth from where the samples were collected. These factors have been developed by Target through years of experience: purpose of the survey; source of contamination; subsurface condition, and size of site. The location of 40 to 50 feet distance between sampling points was a compromise between a reconnaissance-level sampling (50 to 100 feet) and a more definitive sampling (20 feet). Considering the site characteristics of silty fine sands and the absence of impermeable clay layers as well as a very deep ground water (200 feet), the distance of 40-50 feet between sampling points were adequate to meet the sampling objective. Multi-depth sampling was performed in certain locations where initial peaks or significant concentrations were detected at 6 feet. Samples were then collected at 10, 15 and 20 feet. This pattern provided the details to determine the nature, extent, and probable source (s) of contaminants detected at the site.

6.2 Field Sampling Procedures

ALB established the sampling grid pattern based on the considerations as discussed in Subsection 6.1. Since impermeable soil layers were not anticipated in the area, a 6-foot sampling depth was initially done. Presence of significant level of concentration necessitated the collection of samples at depth 10, 15 and 20 feet.

The sampling locations were marked on the ground by ALB field personnel. Each sample location was marked with a white circle and identified with a sampling point number. ALB also coordinated with the Utilities Services Alert (USA) in identifying the location of any product lines or other underground utilities or structures prior to the start of sampling.

Upon arrival at the site, Target field team checked the site map for accuracy. Sampling locations were measured and double-checked to known landmarks. Using an electrical and/or pipe detector probes, location of underground electrical cables and/or water pipes was reconfirmed.

In the collection of soil gas samples, Target utilized a van-mounted hydraulic probe to advance 3-foot sections of 1-inch diameter threaded steel casing down to the sampling depth. A hollow teflon line was inserted into the casing to the bottom of the hole, and the bottom-hole line perforations were isolated from the up-hole annulus by an inflatable (rubber) packer. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial. The self-sealing vial was detached from the sampling system, packaged, labeled and taken to Target on-site mobile laboratory for analysis.

For a multi-depth sampling, the shallow sample was collected first, and the probe was further advanced to collect the next sample in the same procedure as discussed.

Decontamination of all sampling equipment and probes were done prior to the start of the work. Field control samples were also collected as part of the field QA/QC.

6.3 Laboratory Procedures

The vapor samples were analyzed on-site using a gas chromatograph equipped with a flame-ionization detector (FID) for petroleum hydrocarbons and an electron-captive detector (ECD) for chlorinated hydrocarbon.

Analysis for chlorinated solvents was performed in accordance with EPA Method 601 (modified) but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

1,1-dichloroethene (1,1-DCE)
methylene chloride (MC)
trans-1,2-dichloroethene (t-1,2-DCE)
1,1-dichloroethane (1,1-DCA)
cis-1,2-dichloroethene (c-1,2-DEC)
chloroform (CF)
1,1,1-trichloroethane (1,1,1-TCA)
carbon tetrachloride (CT)
trichloroethene (TCE)
1,1,2-trichloroethane (1,1,2-TCA)
tetrachloroethene (PCE)

Analysis for petroleum-based solvents was performed in line with EPA Method 602 on GC/FID, but using direct injection instead of purge and trap. The analytes standardized in this analysis were:

acetone
methyl tertiary butyl ether (MTBE)
methyl ethyl ketone (MEK)
benzene
toluene
chlorobenzene
ethylbenzene
meta- and para- xylene
ortho-xylene

6.4 QA/QC Laboratory Analyses

Quality Assurance/Quality Control procedures as contained in Target's Quality Assurance Project Plan for Soil Sampling Under Mobile laboratory Conditions (Appendix 3) were strictly followed throughout the analysis phase, summarized as follows:

- Calibration of the analytical equipment was performed using a three point instrument-response curve before the start of the work. Calibration was also done when analyte retention times drift enough to prevent analyte identification.

- The retention time of the standard compounds were used to identify the unknown compounds in the field samples. To ensure the validity of the compound identifications, periodic injections of key qualitative standards were performed daily prior to sample batch analysis and at additional intervals during analysis as necessary.

- Duplicate analyses were run for every tenth (10th) field sample.

- Laboratory blanks of nitrogen gas (99.999%) were analyzed prior to sample batch analysis and after every tenth (10th) field sample.

- All chromatograms were interpreted by qualified professionals.

- Following the project or job analysis phase, all samples were archived for a period of at least ten (10) days to allow for further analysis.

- Accuracy and precision with regards to data quality were documented in reports with the results of QA/QC procedures.

7.0 SOIL BORING AND SAMPLING

Confirmatory soil borings and sampling were conducted in order to reconfirm the significant levels of contamination that were detected in the soil gas survey as well as the results of analytical tests of soil samples collected in previous soil investigation. Since the deepest borings previously drilled reached 20 feet only, the present boring target was 80 feet. This will enable the determination of the extent of contamination and probably assess its possible impact on the ground water system in the area.

7.1 Location and Number of Borings

Five (5) borings were drilled at various locations where significant levels of contamination and peaks of certain analytes were identified from the soil gas survey. Since these peaks conform in general with the findings from previous borings, the confirmatory borings were sited adjacent to previous borings.

Table 3 shows the list of boring data. The location of these borings are shown in Figure 2.

Table 4: Soil Boring Data

Boring No.	Location	Drilling Period	Depth (Feet)
CSB-1	Near Sump	Nov. 14, 1991	80
CSB-2	Adjacent to SB-50 & HB-4	Nov. 14, 1991	80
CSB-3	Wash down concrete pad	Nov. 15, 1991	80
CSB-4	South of concrete pad	Nov. 14, 1991	80
CSB-5	Adjacent to SB-49	Nov. 15, 1991	80

7.2 Drilling Procedures and Methodology

Drilling of all borings were undertaken by West Hazmat under the direction of ALB. The soil boring was started on November 14, 1991 and completed on November 15, 1991.

7.2.1 Soil Boring Protocols

The field procedure and methodology were in accordance with the attached Appendix 4, Field Procedures and Measurements, prepared by ALB. This site investigation approach was based on the requirements and protocols by the California Regional Water Quality Control Board - Los Angeles Region (CRWQCB-LA) and other regulatory agencies.
West Hazmat employed a Hollow-Stem Auger drilling using truck-mounted CME 75 drill rig with a capacity of 200 feet. Stem augers used were the 5-foot section auger with an inside and flighting diameters of 4-1/4 and 7-5/8 inches, respectively. The outside diameter was measured from the tip of the drilling auger flights which are welded onto the augers. The auger sections were joined together by pin connectors. The borehole was advanced through a pilot bit assembly coupled to the center rod which rotated together with the augers. Both the bit and the auger flights cut into the subsoils as they rotated and mechanically pressed downward. In the process, the drill cuttings were carried upward to the surface by the auger flights. The cuttings were stored in a 55-gallon DOT drum. No drilling muds or any other fluids were used in the drilling operations.

7.2.2 Soil Sampling and Standard Penetration Tests (SPT)

In conjunction with the drilling operations, SPT was also undertaken in collecting soil samples at 5-foot interval. The hollow-flight auger allowed the insertion of a 2-1/2-inch diameter, 18-inch long, split-type soil sampler. Three-piece brass tubes (2-1/2 inches diameter, 6 inches long) were placed inside the sampler where soil samples were collected. The spilt-spoon sampler (with brass tubes) was driven into the subsoils by dropping a 40-pound slide hammer, 30 inches high. The number of blows (NB) to effect every 6 inches penetration (for a total of 18 inches) was recorded. SPT was terminated after 18-inch penetration or after recording 50 blows without effecting a 6-inch penetration. The SPTs reflect the relative densities of the subsoils. The NB per 6-inch penetration is indicated on the boring logs.

Following retrieval from the boreholes, the brass tubes containing the soil samples were removed from the split-spoon sampler. The middle brass tube, with soil sample intended for laboratory analysis, was first segregated from the upper and lower tubes. The soils or rock chips protruding from the ends of the tube were trimmed with a pocket knife, which was (duly decontaminated between uses). Both ends of the brass tube were covered with a piece of teflon and then capped with plastic covers. The sample was labeled with sample number and depth taken. The tube was then placed inside a ziploc plastic and stored in a cooler containing blue ice for shipment to the laboratory after each working day. A chain-of-custody form entry was prepared for each sample batch and together with the samples, were picked-up by a representative-technician of Curtis and Tompkins, Ltd., a Department of Health Services (DOHS)-certified laboratory.

The upper most and the lowermost brass tubes were also removed from the split-spoon sampler. The soil sample in the upper tube was tested for OVA measurements. The soil sample from the lower brass tube was removed and spread on a plastic sheet. The Field Geologist then examined and logged the soil materials. (The description of the subsoils is shown on the boring log). After logging, the materials were disposed/stored in the 55-gallon DOT drums. The split-spoon sampler and the brass tubes were then cleaned and decontaminated using trisodium phosphate detergent (TSP). The sampler was then rinsed with distilled water for the next sampling round.

7.3 Vapor Monitoring

Organic vapor emission from each of the sample was monitored by the use of a thermoluminescent vapor meter (Model TLV Sniffer United Technologies Bacharach Portable Gas Detector Alarm System Catalog #0023-7356). The probe was inserted into the ziploc containing the soil samples and readings were noted on the read-out of the meter. The OVA measurements were indicated on the boring logs. Significant OVA reading of more than 50 ppm were recorded in only one boring, SCB-1, drilled adjacent to the sump.

7.4 Lithologic Logging

The soil samples were examined by the Field Geologist and described in accordance with the United Soil Classification System (USCS). In addition, other geologic characteristics and description, such as structure, minerals, relative densities, plasticity, etc. were also observed. Any peculiar odor or color of the subsoil were noted and indicated on the boring logs. The descriptive and graphical logs of each boring are attached as Appendix 5.

7.5 Decontamination

Decontamination of the hollow-stem augers and other sampling equipment was accomplished on-site after completion of soil borings and prior to the drilling of each new borehole. Hollow flight augers, overshot assembly and other drilling accessories were steam-cleaned using a high pressure water spray from the assembly mounted on the trailer. The wash water was collected at the bottom of the trailer. The split-spoon sampler and the brass tubes containing the upper and the lower samples were also cleaned and decontaminated prior to their use. They were thoroughly scrubbed by a Site Technician with water containing tri sodium phosphate, and double-rinsed with distilled water prior to each sampling reassembly on site in the restricted area, near the drilling rig. All wash water used in the decontamination of the sampling tubes was stored/placed in the collecting assembly of the trailer.

7.6 Abandonment of Boreholes

All completed borings were backfilled using bentonite clay grout (Volclay Grout), a high solid, fast-mix and low-permeability grout material which set up to form a solid clay plug. The backfilling was carried out from the bottom of the boring up to about 6 to 12 inches from the round surface. The remaining 6 to 12 inches were also backfilled using a ready mixed asphalt and/or concrete (Red-E-Crete #0090), after the volclay grout had set.

7.7 Disposal of Cuttings

The drilled cuttings were placed in the 55-gallon drums. All the drums were labeled as to the boring number, depth the cuttings were obtained, date of drilling and the name of the company which collected the samples. The drum were stored at the Maintenance Yard of the Airport Authority. The cuttings were disposed of as indicated by the results of the analytical tests. Only five drums required disposal as hazardous waste.

8.0 LABORATORY ANALYSIS OF SOIL SAMPLES

8.1 Summary of Sampling/Testing Schedule

A total of 90 soil samples were collected from the 5 borings. These include the 5 duplicate samples, one (1) sample from each hole. Soil samples were analyzed for chlorinated and aromatic volatiles, metals and total petroleum hydrocarbon. As shown in Table 5, Sampling and Analytical Tests Schedule, there were 90 EPA 8010/8020, 37 EPA 418.1 and 15 CAM Metals analyses.

Table 5: Sampling and Analytical Tests Schedule

Boring No.	Depth	Analysis (EPA Method)			
CSB-1	2.5	8010,	8020,	418.1	
	4	8010,	8020,	418.1,	CAM Metals
	9	8010,	8020,	418.1	
	14	8010,	8020,	418.1,	CAM Metals
	19	8010,	8020,	418.1,	CAM Metals
	24	8010,	8020,	418.1	
	29	8010,	8020		
	34	8010,	8020		
	39	8010,	8020,	418.1	
	44	8010,	8020		
	49	8010,	8020		
	54	8010,	8020,	418.1	
	59	8010,	8020		
	64	8010,	8020		
	69	8010,	8020		
	74	8010,	8020		
	79	8010,	8020		
	DS-001-24'	8010,	8020		
CSB-2	1	8010,	8020,	418.1,	CAM Metals
	5	8010,	8020,	418.1	
	10	8010,	8020,	418.1,	CAM Metals
	15	8010,	8020,	418.1	
	20	8010,	8020,	418.1,	CAM Metals
	25	8010,	8020,	418.1	
	30	8010,	8020		
	35	8010,	8020		
	40	8010,	8020		
	45	8010,	8020,	418.1	
	50	8010,	8020		
	55	8010,	8020		
	60	8010,	8020		

Continued

Boring No.	Depth	Analysis (EPA Method)			
CSB-2	65	8010,	8020,	418.1	
	70	8010,	8020		
	75	8010,	8020		
	80	8010,	8020		
	DS-003-5'	8010,	8020,	418.1	
CSB-3	1	8010,	8020,	418.1	
	5	8010,	8020,		CAM Metals
	10	8010,	8020,	418.1	
	15	8010,	8020,		CAM Metals
	20	8010,	8020,	418.1	
	25	8010,	8020		
	30	8010,	8020,	418.1	
	35	8010,	8020		
	40	8010,	8020		
	45	8010,	8020		
	50	8010,	8020,	418.1	
	55	8010,	8020		
	60	8010,	8020		
	65	8010,	8020		
	70	8010,	8020		
	75	8010,	8020		
	80	8010,	8020		
	DS-004-10'	8010,	8020,	418.1	
CSB-4	1	8010,	8020,		CAM Metals
	5	8010,	8020,	418.1	
	10	8010,	8020,		CAM Metals
	15	8010,	8020,	418.1	
	20	8010,	8020		
	25	8010,	8020,	418.1	
	30	8010,	8020		
	35	8010,	8020,	418.1	
	40	8010,	8020		
	45	8010,	8020		
	50	8010,	8020		
	55	8010,	8020		
	60	8010,	8020		
	65	8010,	8020		
	70	8010,	8020		
	75	8010,	8020		
	80	8010,	8020		
	DS-002-20'	8010,	8020,	418.1,	CAM Metals

Continued

Boring No.	Depth	Analysis (EPA Method)			
CBS-5	1	8010,	8020,	418.1,	CAM Metals
	5	8010,	8020,	418.1,	CAM Metals
	10	8010,	8020,	418.1,	CAM Metals
	15	8010,	8020,	418.1	
	20	8010,	8020,	418.1	
	25	8010,	8020		
	30	8010,	8020,	418.1	
	35	8010,	8020		
	40	8010,	8020		
	45	8010,	8020		
	50	8010,	8020,	418.1	
	55	8010,	8020		
	60	8010,	8020		
	65	8010,	8020,	418.1	
	70	8010,	8020		
	75	8010,	8020		
	80	8010,	8020		
	DS-005-10'	8010,	8020,	418.1,	CAM Metals

Note: DS-001-24' - Duplicate sample indicating sample number and depth the sample was collected

8.2 Quality Assurance/Quality Control Program

The analytical tests were conducted by a local laboratory duly authorized by the Department of Health Services (DHS) to do such analyses. All analyses were conducted in accordance with EPA requirements, including the current CPL protocols, 40 CFR 136, EPA-600/4-79-020 (1983), EPA-600/4-82-057 (1982), SW-846 and other requirements which may be required by other regulatory agencies. All these regulatory requirements are normally included and formed the basis for the QA/QC Program of the duly certified laboratories. A brief enumeration of a QA/QC Program is included as Appendix 6.

9.0 DISCUSSION AND INTERPRETATION OF RESULTS

9.1 Results of the Soil Gas Survey

The soil gas survey was documented in the report by Target and appended herewith as Appendix 2. The following discussion was based on this report.

Elevated levels of 1,1,1-TCA, PCE and t-1,2-DCE and the lower concentration of TCE, MTBE/pentane, acetone, benzene, toluene and xylenes were detected within the area. The iso-concentration maps (Figures 2-8 in Appendix 2) generated for these solvents showed patterns which suggested that soil contaminations occurred at the immediate vicinity of the concrete wash down area. The highest levels of concentrations were found near the sump at the southeast corner of the east concrete pad. This suggests that the most probable source of contamination was the sump/drain. These findings are, in general, consistent with the results of analyses of soil samples collected from borings in the area.

a) Petroleum-based Compounds

Of the 9 standardized analytes, only 4 compounds were found above the detection limit in 43% of the vapor samples. These are MTBE/Pentane, xylenes, toluene and acetone. Table 6 lists the samples where these analytes were detected.

Table 6: Analytes Concentrations By GC/FID, (ug/l)

Sample No.	Location	MTBE/ Pentane	Xylenes	Toluene	Acetone
605	Near sump	19	3.1	1.9	<1
1005	Near sump	23	2.6	1.2	<1
1505	Near sump	18	<1	<1	<1
2005	Near sump	12	<1	<1	<1
606	SE of concrete pad	<1	<1	<1	<1
1006	SE of concrete pad	<1	<1	<1	<1
1506	SE of concrete pad	<1	<1	<1	<1
2006	SE of concrete pad	<1	<1	<1	<1
607	South of service road	<1	3	1.9	1.9
1007	South of service road	<1	2.8	1.7	1.6
1507	South of service road	<1	<1	<1	<1
2007	South of service road	<1	<1	<1	<1
610	South of service road	<1	1.2	1.1	<1
614	South of concrete pad	<1	<1	<1	<1
1014	South of concrete pad	<1	<1	<1	<1
1514	South of concrete pad	1.8	<1	<1	<1
2014	South of concrete pad	2.0	<1	<1	<1
615	South of concrete pad	<1	<1	1.2	1.2
1015	South of concrete pad	<1	<1	<1	<1
1515	South of concrete pad	<1	<1	<1	<1
2015	South of concrete pad	<1	<1	<1	<1
620	Concrete pad	<1	<1	<1	<1
621	Concrete pad	<1	<1	<1	<1
1021	Concrete pad	<1	2.5	1.2	<1
1521	Concrete pad	<1	<1	<1	<1
2021	Concrete pad	2.1	<1	<1	<1

Continued

Sample No.	Location	MTBE/ Pentane	Xylenes	Toluene	Acetone
622	West of concrete pad	<1	<1	<1	<1
1022	West of concrete pad	<1	<1	<1	<1
1522	West of concrete pad	<1	<1	<1	<1

Note: Sample No. indicates sampling location and depth where sample was taken. The first one or 2 digits correspond to depth sample was taken, i.e., "5", "10", "15" and "20" feet. The last 2 digits represent the sampling point number, i.e., "07", "10", "14", etc.

The highest concentration of MTBE/pentane was near the southeast sump or drain of the east concrete pad (Samples 605 to 2005). Sample 620 and 621 to 2021 were obtained from the subsoil beneath the concrete pad. Samples 614 to 2014 were collected near the new service road south of the concrete pad. The pattern of these concentrations suggested that source of contamination is the vicinity of the wash down concrete containment, most likely the source point was the sump or drain probably due to overspill or leakages.

Total FID plots (Figure 4 of Appendix 2) showed the same pattern as that of MTBE/pentane. Xylenes, however, were found in 2 general vicinities: at the wash down area near the sump and at the area south of the service road where it curves from a northwesterly to westerly direction. Borings of Lockheed (BH 24, SB-16, SB-49 and SB-51, Tables 1 and 2) show TPH from 320 to 3468 mg/kg near the sump and as much as 500 mg/kg south of the service road. These are consistent with the distribution pattern of Xylenes.

Toluene were found in lower concentration and appeared to be scattered throughout the area. Because of the lack of certain pattern, it may be deduced that this aromatic may be related to vehicular use.

b) ECD Compounds

Of the 11 chlorinated solvents which may be identified by the GC/ECD, only 4 solvents were found above their detection limits. These compounds are t-1,2-DCE, 1,1,1-TCA, TCE and PCE. While the concentration values of these compounds are relatively low, the iso-concentration maps indicate certain pattern or trend.

Table 7 indicates the samples where the analytes where found.

Table 7: Analyte Concentrations By GC/ECD, (ug/l)

Sample No.	Location	t-1,2-DCE	1,1,1-TCA	TCE	PCE
601	Service road	<1	0.93	0.14	0.92
602	North service road	<1	4.0	0.35	2.0

Continued

Sample No.	Location	t-1,2-DCE	1,1,1-TCA	TCE	PCE
603	North of concrete pad	<1	10	0.30	3.3
604	North of concrete pad	2.4	11	0.15	3.0
605	Near sumps	20	82	0.77	14
1005	Near sumps	38	135	0.46	16
1505	Near sumps	30	109	0.38	1
2005	Near sumps	23	75	0.32	9.7
606	SE of concrete pad	<1	3.8	0.11	1.5
1006	SE of concrete pad	<1	2.0	<0.1	0.71
1506	SE of concrete pad	<1	5.0	<0.1	1.5
2006	SE of concrete pad	<1	6.8	0.14	1.8
607	South of service road	1.9	1.2	0.59	2.0
1007	South of service road	<1	0.13	0.16	0.90
1507	South of service road	<1	3.8	<0.10	0.98
2006	South of service road	<1	4.7	0.14	1.1
608	South of service road	<1	1.3	0.22	1.3
609	South of service road	<1	0.60	0.18	1.2
610	South of service road	<1	0.86	0.42	1.8
611	South of service road	<1	0.94	0.23	1.3
1012	North of service road	<1	6.9	0.11	1.7
1512	North of service road	<1	5.6	<0.10	1.2
2012	North of service road	1.5	11	<0.10	1.6
613	South of FAA	<1.0	3.9	0.16	1.
614	South concrete pad	<1.0	14	0.20	2.6
1014	South concrete pad	<1.0	7.9	0.12	2.1
1514	South concrete pad	<1.0	15	0.13	2.5
2014	South concrete pad	<1.0	14	0.13	2.3
615	Service road	<1.0	3.8	0.14	1.3
1015	Service road	<1.0	3.5	0.10	0.87
1515	Service road	<1.0	5.5	<0.10	1.3
2015	Service road	<1.0	5.4	<0.10	1.2
616	South of service road	<1.0	1.3	0.30	1.3
1016	South of service road	<1.0	3.5	<0.10	0.87
1516	South of service road	<1.0	<0.10	<0.10	<0.05
2016	South of service road	<1.0	3.4	0.12	0.9
617	Service road	<1.0	3.8	0.13	1.5
618	Service road	<1.0	2.8	0.19	1.5

Continued

Sample No.	Location	t-1,2-DCE	1,1,1-TCA	TCE	PCE
619	Near sump	1.2	15	0.27	5.3
620	Concrete pad	22	1.3	0.49	9.1
621	Concrete pad	<1	7.5	0.22	2.9
1021	Concrete pad	<1	6.1	0.28	2.4
1521	Concrete pad	1.1	1.9	0.10	0.89
2021	Concrete pad	2.4	12	0.13	2.2
622	West of concrete pad	<1	2.7	0.57	2.7
1022	West of concrete pad	<1	4.5	0.12	1.
1522	West of concrete pad	<1	3.9	0.17	1.4

Plotting of the iso-concentrations showed a pattern of increasing levels toward the vicinity of the sump/drain adjacent to the FAA facilities which was also of the same pattern as the FID compounds. TCE, however, also showed another two peaks in the area south of the service road and also at the area west of the concrete pad.

9.2 Analytical Tests Results

All of the 90 soil samples were analyzed by Curtis and Tompkins, Ltd. (CT), a Los Angeles-based laboratory duly certified by the California Department of Health Services (DOHS). The complete results of analyses were compiled in Volume II of this report.

Tables 8, 9, and 10 show the results of the laboratory tests of some of the organics and other compounds which exceeded the laboratory's detection limits. The major contaminant is petroleum hydrocarbon found in 4 borings. Significant concentration of halogenated volatiles were detected in only one boring, CSB-1.

9.2.1 Total Recoverable Petroleum Hydrocarbon (TRPH)

Table 8 shows the results of the analyses by EPA Method 418.1.

Table 8: Results of Analysis, TRPH

Boring No.	Depth (feet)	Concentration, (mg/kg)
CSB-1	2.5	11,000
	4	68
	9	11
	14	ND

Continued

Boring No.	Depth (feet)	Concentration, (mg/kg)
CSB-1	19	22
	24	ND
	39	ND
	54	ND
CSB-2	1	7,800
	5	ND
	10	ND
	15	ND
	20	45
	25	ND
	45	ND
	65	ND
CSB-3	1	11
	10	29
	20	29
	30	ND
	50	ND
CSB-4	5	ND
	15	ND
	25	ND
	35	ND
CSB-5	1	2,300
	5	ND
	10	190
	15	23
	20	ND
	30	ND
	50	ND
	65	ND

Note: Detection Limit - 10 mg/kg

The significant occurrence of petroleum hydrocarbon was confined within near surface (1 - 2.5 feet), although trace concentrations were found at about 20 feet. A highly contaminated sand layer was found within 1.5 to 3.5 feet in boring CSB-1. The sand materials were black, oily and exuded petroleum odor. The highest concentration value of 11,000 mg/kg found at 2.5 feet may be related to these materials.

Boring CSB-1 was drilled adjacent to the sump/drain at the southeast corner of the east wash down concrete containment pad. Previous borings by McLaren-Hart near the same drain also detected petroleum hydrocarbon at 4 feet and 14 feet with concentration of 320 mg/kg and 3468 mg/kg, respectively (Table 2).

TRPH (7800 mg/kg) was also detected in CSB-2 at 1 foot. While no petroleum hydrocarbon was found between depth of 5 and 15 feet, 45 mg/kg TRPH was found at 20 feet. During ALB shallow soil boring in 1990 (Ref. 5), 15,000 mg/kg and 880 mg/kg TPH was detected at 1 and 5 feet, respectively (Table 3). McLaren-Hart's also reported TPH of 230 mg/kg and 54 mg/kg concentration at 3.5 feet and 10 feet, respectively.

South of the new service road where it turns from a northwest-southeast to east-west direction, TPH was found near the surface with a concentration of 2,300 mg/kg. Previous exploration in the vicinity by McLaren-Hart and Gregg also encountered TPH ranging from trace to about 500 mg/kg with the higher concentration value detected near the surface.

Viewed from the distribution of the concentration values of TPH, it appears that the major source of contamination is the sump/drain at the southeast corner of the concrete pad.

The other 2 areas where contaminations were detected at the vicinity of borings CSB-2 and CSB-5 may be related to the previous spills as manifested by significant surface stains observed prior to the construction of the new service road (Ref. 5).

9.2.2 Aromatic Volatile Organics

Table 9 indicates the aromatics that were detected in the 3 confirmatory borings. Only about 6% of the total samples analyzed for EPA 8020 showed aromatic volatiles.

Table 9: Results of Analysis, Aromatic Volatile Organics

Borings Numbers	Depth (feet)	Analytes (ug/kg)	Concentration (ug/kg)	Detection Limit ug/kg
CSB-1	49	Xylenes (total)	20	10
	59	Xylenes (total)	10	10
CSB-2	1	Ethyl Benzene	12	5
		Xylenes (total)	130	10

Continued

Borings Numbers	Depth (feet)	Analytes (ug/kg)	Concentration (ug/kg)	Detection Limit ug/kg
CSB-4	5	Toluene	8	5
		Ethyl Benzene	12	5
		Xylenes (total)	110	10
	20*	Xylenes (total)	11	10

Note: * - Duplicate sample DS # 002
Method EPA 8020
Extraction EPA 5030 Purge and Trap

Based from the analytical results, the presence of xylenes, ethyl benzene and toluene may not be an area of concern. The concentration values of these volatiles were too low when compared with the DOHS State Action Level (SAL). SAL, for xylenes, ethyl benzene and toluene in the ground water are 620, 680 and 100 ug/l, respectively.

9.2.3 Halogenated Volatile Organics

Table 10 shows the solvents found in borings CSB-1 and CSB-2.

Table 10: Results of Analysis, Halogenated Volatile Organics

Borings Numbers	Depth (feet)	Analytes	Concentration (ug/kg)	SAL (ug/l)	Detection Limit (ug/kg)
CSB-1	2.5	1,1-DCE	1,200	6	25*
		1,1-DCA	62	20	25*
		1,1,1-TCA	96	200	25*
		PCE	390	4	25*
	4	1,1,1-TCA	21	200	
	5				
		PCE	73	4	5
	24	PCE	34	4	5

Continued

Borings Numbers	Depth (feet)	Analytes	Concentration (ug/kg)	SAL (ug/l)	Detection Limit (ug/kg)
CSB-2	1	1,1,1-TCA	11	200	5
		PCE	19	4	5

Note: 1,1-DCE - 1,1-Dichloroethene
1,1-DCA - 1,1-Dichloroethane
1,1,1-TCA - 1,1,1-Trichloroethane
PCE - Tetrachloroethene
SAL - State Action Level of analytes in drinking water
* - Raised detection limit due to higher presence of target analytes
Analyses by EPA Method 8010 and extraction by EPA 5030 Purge and Trap

In the absence of regulatory limits of the detected solvents in soils, the concentrations of these solvents may be compared with the drinking water standards for the purpose of assessing the impact of these compounds.

As shown in Table 10, 1,1-DCE exceeded SAL by a factor of 200, 1,1-DCA by 3 and PCE by about 100. While the compounds' concentrations decreased at depth, PCE extended to about 24 feet. The other solvent, 1,1,1-TCA detected was below SAL. Beyond 24 feet down to 80 feet, no halogenated solvents were found above detection limits.

Of the 90 soil samples analyzed for EPA 8010, the target analytes were found in about 4% of the samples.

These contaminants were found within the immediate vicinity of the wash down concrete pad adjacent to the sumps/drains and extended into the FAA facilities. This disposition may suggest that contamination was related to the washing operations by Lockheed.

9.2.4 CAM Metals

Analytical results of CAM metals, as shown in Table 11, indicated that the concentration values are insignificant and within the natural concentration of these elements (Table 12). Except for lead (Pb) in one soil sample in CSB-5, which was detected above the STLC, all of the other elements did not exceeded the STLC. Lead was detected at 9.4 mg/kg; however, it is less than 10 times STLC to which would have required a determination of the solube fraction.

Table 11: Analytical Results, CAM Metals (mg/kg)

Soil Borings	Depth (Ft.)	Sb	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Va	Zn
CSB-1	4	ND	39	0.11	ND	3.8	4.2	9.5	ND	ND	2.5	13	24
	14	ND	30	0.12	ND	5.1	3.7	6.3	ND	ND	2.2	15	14
	19	ND	44	0.11	ND	3.2	3.5	17	ND	ND	2.3	11	26
CSB-2	1	3.3	55	0.13	0.71	9.4	5.7	14	ND	0.82	6.8	20	120
	10	ND	32	ND	0.25	2.6	3.6	11	ND	ND	2.3	8.6	17
	20	ND	36	ND	ND	5.6	4.5	0.2	ND	0.74	3.6	14	18
CSB-3	5	ND	45	ND	ND	6.7	3.3	ND	1.2	ND	2.6	11	24
	15	ND	36	0.10	ND	4.8	3.0	ND	2.0	ND	2.5	10	20
CSB-4	1	ND	77	0.20	ND	8.3	8.0	11	ND	0.90	4.4	24	31
	10	ND	44	0.14	ND	5.0	4.5	11	ND	0.81	2.7	17	16
CSB-5	1	ND	60	0.13	0.28	6.9	4.7	ND	9.4	ND	7.2	19	38
	5	ND	50	0.11	ND	4.4	3.4	ND	1.5	ND	2.4	12	21
	10	ND	43	0.10	ND	4.4	3.2	ND	1.7	ND	2.6	10	19

Note: As, Hg, Se, Ag and Tl were not found above the limit of detction.
ND - Non detected.

Table 12: CAM Metals Limits and Natural Concentration Ranges

Analyte	STLC (mg/l)	10 x STLC (mg/kg)	TTLC (mg/kg)	Natural Conc. Range (mg/kg)
Sb - Antimony	15	150	500	0.2-500
As - Arsenic	5	50	500	0.2-97
Ba - Barlum	100	1000	10,000	70-5,000
Be - Beryllium	0.75	7.5	75	0.1-40
Cd - Cadmium	1	10	100	1.01-10
Cr - Chromium (T)	560	5600	2,500	1-1,000
Cr - Chromium (VI)	5	50	500	
Co - Cobalt	80	800	8,000	1/70
Cu - Copper	25	250	2,500	2-300
Pb - Lead	5	50	1,000	1-700
Hg - Mercury	0.2	2	20	0.01-4,6
Mo - Molybdenum	240	3500	3,500	0.2-7
Ni - Nickel	20	200	2,000	<3-700
Se - Selenium	1	10	100	0.05-60
Ag - Silver	5	50	500	0.001-5
Tl - Thallium	7	70	700	0.1-3
Va - Vanadium	24	240	2,400	7-500
Zn - Zinc	250	2500	5,000	10-2,000

10.0 CONCLUSION AND RECOMMENDATION

10.1 Summary of Geologic Findings

1) The area investigated is underlain primarily of the silty to gravelly, fine to coarse sands, either poorly to well graded, clean materials (SP/SW). Coarse subsoils (GP/GW) occur at depth of 70 to 80 feet. The subsoils are characteristically permeable. This condition could enhance vertical rather than lateral migration of contaminants within the unsaturated (vadose) zone at least within the depth (80 feet) explored.

2) The fine subsoils, silts and very fine sands, occur as thin and discontinous lenses this occurrence could not significantly retard downward migration of the contaminants.

3) The interlayering (intertongueing) of the different types of materials is suggestive of the varying environmental conditions during deposition.

4) Drilling for monitoring wells in the general vicinity of the Lockheed facilities established the ground water table within the airport to be between 200 to 230 feet below the existing ground surface.

10.2 Summary of Analytical Results

1) The major contaminants are petroleum hydrocarbons. TPH is in the order of 2,300 - 11,000 mg/kg. While the highest concentration values were detected within the upper 5 feet, contamination in the order of 45 mg/kg was found at depth of 20 feet. Beyond this depth to 80 feet, no TPH was detected.

2) Of the target halogenated analytes, 1,1-DCE, 1,1-DCA and PCE were detected at levels exceeding the DOHS action limit. These solvents, were only found in two boring locations, CSB-1 and CSB-2.

3) While xylenes, ethyl benzene and toluene were detected in 3 borings, their concentrations were low as compared with the DOHS standards.

4) CAM metals, while present in the soil samples, were below the STLC.

10.3 Conclusion and Recommendations

The results of the present soil investigation and study have confirmed that the subsoils beneath the property formerly leased to Lockheed were impacted by petroleum hydrocarbons, 1,1-DCE, 1,1-DCA and PCE with concentrations exceeding DOHS action levels. Some of these contaminants may be the breakdown products of TCE and PCE, which Lockheed had used as degreasing products (Ref. 6) during its operations.

There are three areas where significant concentrations of these volatiles were found. The most significant is the impacted area related to the sump/drain of the east concrete pad. The pattern of concentrations suggested that the source of contaminations is the sump/drain. The other two areas are located within the immediate vicinity of the sump/drain of the west concrete pad and area where the service road makes a curve. The contamination detected in these three areas may be related to previous spills and/or seepage from the drains.

The occurrence of contamination was confined within the upper 20 feet, decreasing in concentration from the upper 2.5 to 20 feet. With the ground water at 200 to 230 feet beneath the area, the chances of this source currently impacting ground water are low. Contaminants may be adsorbed and/or diffused before they reach the ground water.

Since the subsoils are relatively porous. Contamination was distinctly vertical rather than horizontal. Contaminants were found within the immediate vicinity of the sumps or drains and within areas where indications of previous spills were observed on the surface.

In view of the above, no further investigation is deemed necessary. However, it is recommended that the Airport Authority initiate negotiations with Lockheed concerning the clean-up of the leasehold property. Based on the present findings, it appears that soil excavation may be an appropriate remediation alternative.

The following clean-up levels are proposed for the Lockheed facilities:

1) A clean-up level of less than 1,000 ppm for TPH, as approved by the Los Angeles Department of Public Works for tank removal (Ref. 6)

2) One hundred (100) times the Maximum Contamination Level or State Action Level for volatile halogenated organic compounds and volatile aromatics, non-halogenated volatile organic compounds and semi-volatile organic compounds, as recommended by McLaren-Hart (Ref.4).

3) Ten (10) times Soluble Threshold Limit Concentration for metals. Under this criteria, metals would not be an area of concern.

Since Lockheed is in the process of the remediation study (RI) for its Plant C-1, this leasehold area which has been impacted by its operation should be considered and included as part of this undertaking.

11.0 REFERENCES

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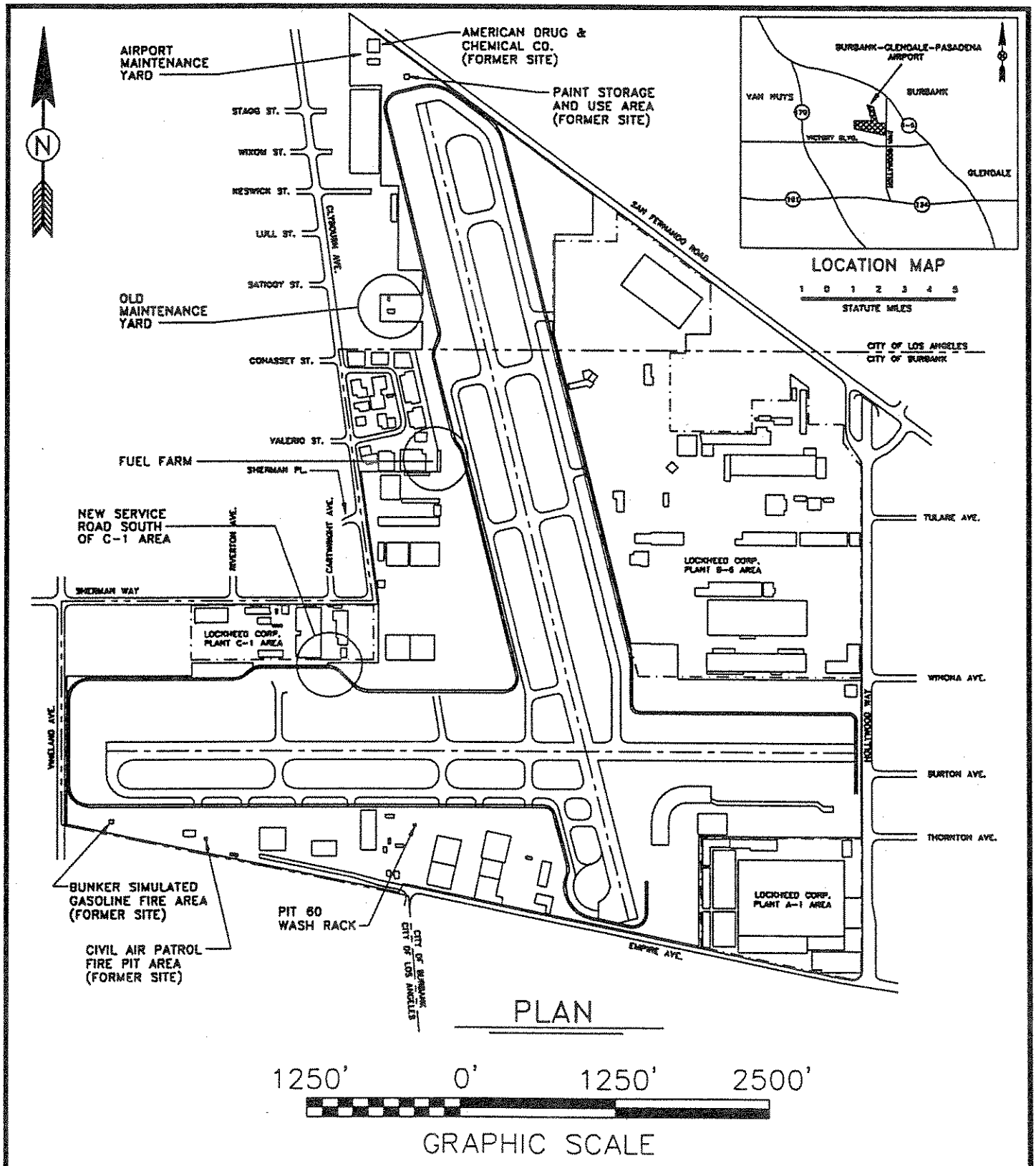
2) California Department of Water Resources, Bril. No. 104, Planned Utilization of the Ground Water Basins of the Coastal Plan of Los Angeles County, Appendix A - Ground Water Geology, June 1961, Reprinted April 1988

3) Gregg and Associates, Inc., Results of Subsurface Investigation Beneath Metal Salvage and Drum Storage Area, Lockheed Aeronautical System Company Plant C-1, Burbank, California, April 4, 1988

4) McLaren-Hart, Soil Investigation Results Round 2 through 6, Lockheed Plant C-1, Burbank, California, May 1991

5) A. L. Burke Engineers, Inc., Site Characterization Service Road, Phase 1: Soil and Soil Gas Sampling, Burbank-Glendale-Pasadena Airport Authority, Burbank, California, July 1990

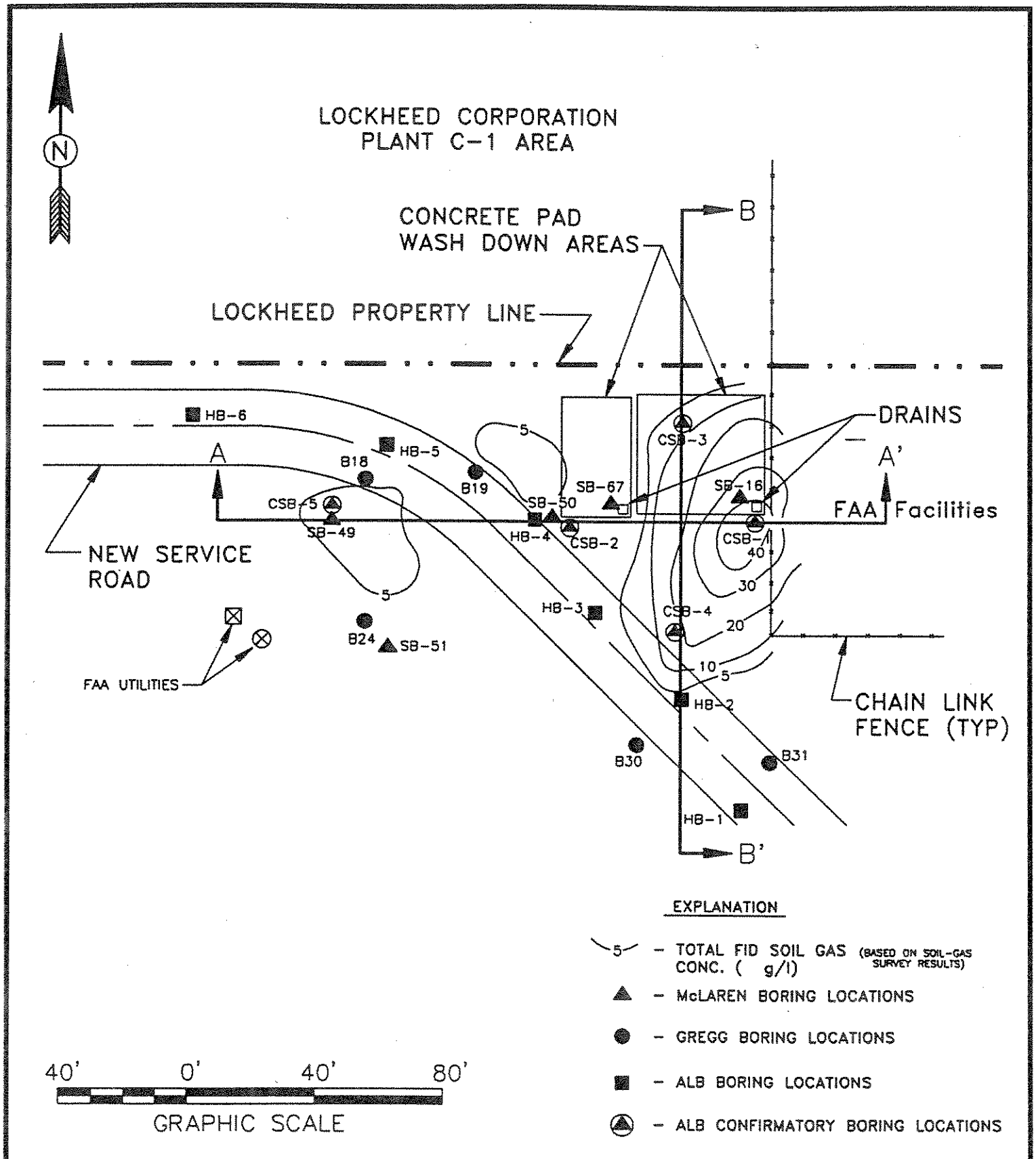
6) URS Consultants, Inc., Site Assessment Report, Vol. 1-Technical Discussion, Lockheed Aeronautical Systems Company, Burbank Facility, September 15, 1989



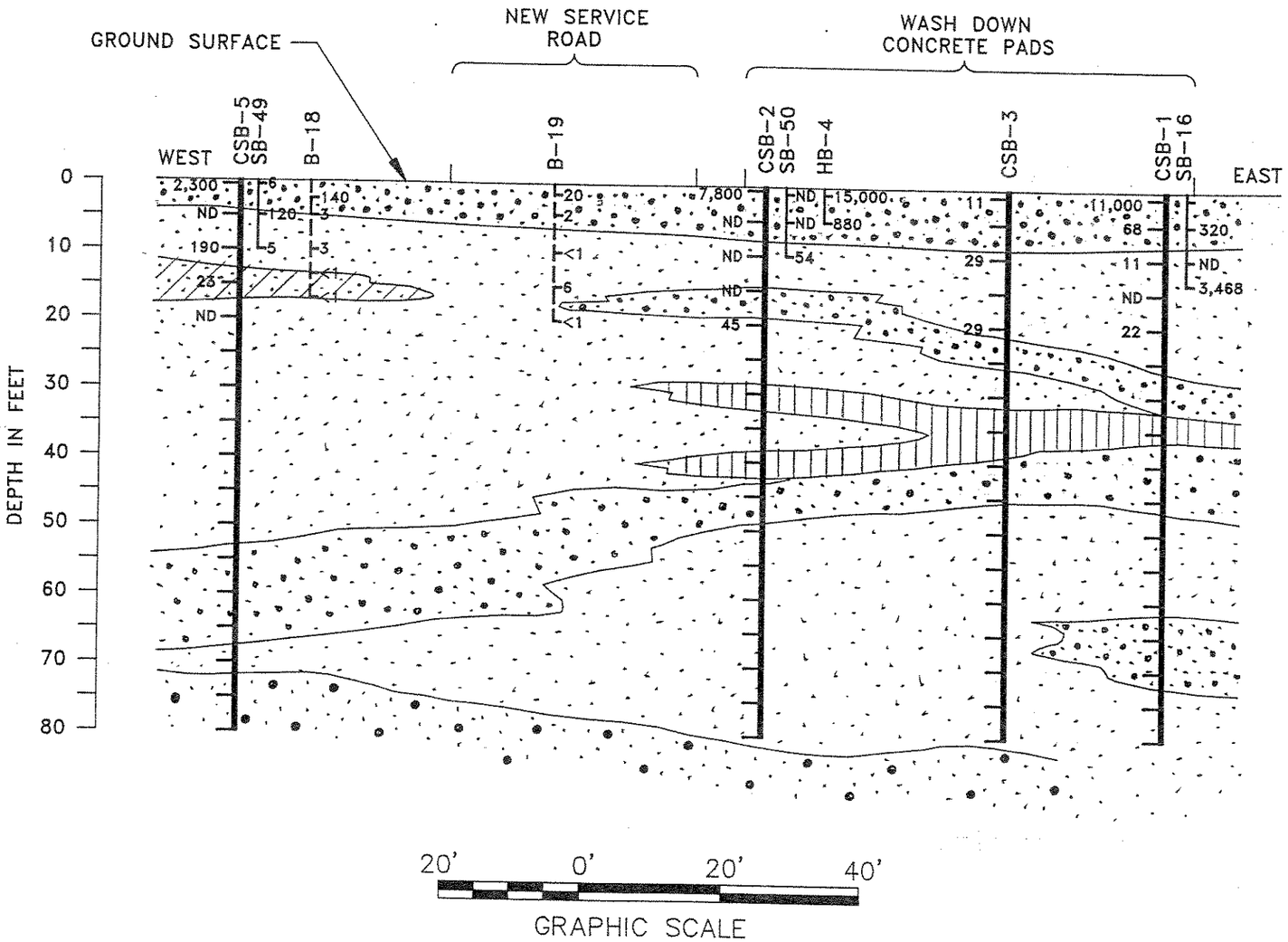
A. L. BURKE ENGINEERS, INC.
451 W. LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

DRAWN	CHECKED	BURBANK–GLENDALE–PASADENA AIRPORT BURBANK, CALIFORNIA
J.T.R. DATE 11/12/91	R.A.A. DATE 11/12/91	
APPR. ALBE	APPR. CLIENT	AIRPORT PLAN
SCALE AS SHOWN	CLIENT DWG. NO. FIGURE 1	ALBE DWG. NO. 90-06-A-26 / REV. NO. 0

11/12/91 9006A26.DWG



A. L. BURKE ENGINEERS, INC. 451 W. LAMBERT RD., SUITE 211 BREA, CALIFORNIA 92621	DRAWN G.H.M. DATE 9/4/91 APPR. ALBE	CHECKED R.A.A. DATE 9/4/91 APPR. CLIENT	BURBANK-GLENDALE-PASADENA AIRPORT BURBANK, CALIFORNIA SERVICE ROAD AREA SOUTH OF LASC PLANT C-1 SOIL BORINGS WHERE PETROLEUM HYDROCARBONS WERE DETECTED
	SCALE AS SHOWN	CLIENT DWG. NO. FIGURE 2	ALBE DWG. NO. 90-06-A-53 / REV. NO. 0



EXPLANATION

SOIL TYPES:

- POORLY GRADED, GRAVELLY SANDS; LITTLE OR NO FINES (SP)
- WELL GRADED, GRAVELLY SANDS; LITTLE OR NO FINES (SW)
- CLAYEY SANDS; POORLY GRADED; SAND-CLAY MIXTURE (SC)
- INORGANIC SILTS – FINE SANDS (ML)
- POORLY GRADED, SANDY GRAVELS (GP)
- WELL GRADED, SANDY GRAVELS (GW)

OTHER SYMBOLS:

- GEOLOGIC CONTACT (EXTRAPOLATED FROM BORING DATA)

CSB-2
7,800
ND
ND
– SOIL BORING (DASH WHEN PROJECTED) SHOWING CONCENTRATION VALUES OF TRPH/TPH IN mg/kg

NOTE:

CSB – CONFIRMATORY SOIL BORINGS CONDUCTED BY A.L.B. IN 1991

SB – SOIL BORING CONDUCTED BY MCLAREN-HART IN 1991

HB – SHALLOW BORING CONDUCTED BY A.L.B. IN 1990

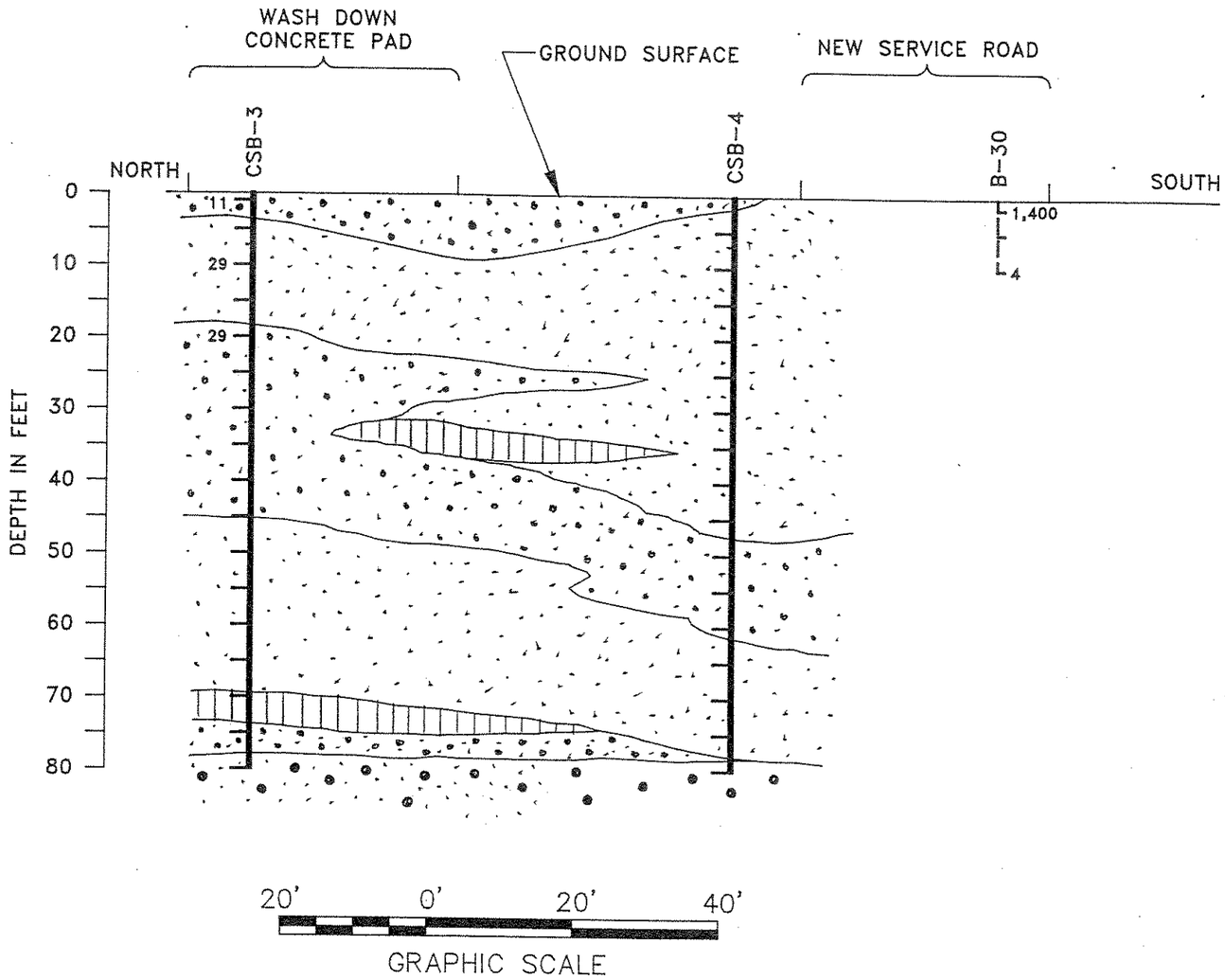
B – SOIL BORING CONDUCTED BY GREGG AND ASSOCIATES IN 1988

DESCRIPTION	LE	PE	CLIENT	REV.	DESCRIPTION	LE	PE	CLIENT	DRAWING NO.	TITLE

A. L. BURKE ENGINEERS, INC.
451 W. LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

DRAWN	CHECKED	BURBANK–GLENDALE–PASADENA AIRPORT BURBANK, CALIFORNIA
G.H.M. DATE 12/19/91	R.A.A. DATE 12/19/91	SERVICE ROAD AREA SOUTH OF PLANT C-1 GEOLOGIC CROSS-SECTION A-A'
APPR. ALBE	APPR. CLIENT	
SCALE AS SHOWN	CLIENT DWG. NO. FIGURE 3	ALBE DWG. NO. 90-06-[illegible] REV. NO.

BGPAA 0853



EXPLANATION

SOIL TYPES:

- POORLY GRADED, GRAVELLY SANDS; LITTLE OR NO FINES (SP)
- WELL GRADED, GRAVELLY SANDS; LITTLE OR NO FINES (SW)
- CLAYEY SANDS; POORLY GRADED; SAND-CLAY MIXTURE (SC)
- INORGANIC SILTS – FINE SANDS (ML)
- POORLY GRADED, SANDY GRAVELS (GP)
- WELL GRADED, SANDY GRAVELS (GW)

OTHER SYMBOLS:

- GEOLOGIC CONTACT (EXTRAPOLATED FROM BORING DATA)

CSB-2
7,800
ND
ND
– SOIL BORING (DASH WHEN PROJECTED) SHOWING CONCENTRATION VALUES OF TRPH/TPH IN mg/kg

NOTE:

CSB – CONFIRMATORY SOIL BORINGS CONDUCTED BY A.L.B. IN 1991

B – SOIL BORING CONDUCTED BY GREGG AND ASSOCIATES IN 1988

DESCRIPTION	LE	PE	CLIENT	REV.	DESCRIPTION	LE	PE	CLIENT	DRAWING NO.	TITLE

A. L. BURKE ENGINEERS, INC.
451 W. LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

DRAWN	CHECKED	BURBANK–GLENDALE–PASADENA AIRPORT BURBANK, CALIFORNIA
G.H.M. DATE 12/19/91	R.A.A. DATE 12/19/91	SERVICE ROAD AREA SOUTH OF PLANT C-1 GEOLOGIC CROSS-SECTION B-B'
APPR. ALBE	APPR. CLIENT	
SCALE AS SHOWN	CLIENT DWG. NO. FIGURE 4	ALBE DWG. NO. 90-06-B-02 REV. NO. 0

BGPAA 0854

APPENDIX - 1

Health and Safety Plan/

Emergency Action Plan

PROJECT HEALTH AND SAFETY PLAN/
EMERGENCY ACTION PLAN

1.0 Introduction

The purpose of this Occupational Health & Safety Plan is to define the potential exposures and exacerbating conditions and to describe, in detail, those activities and procedures required to protect workers from hazardous exposures.

2.0 Job Descriptions

To expedite the sampling program, multiple crews, each with its own equipment, may be operating at the sites at any given time. The job classifications will be the same for each crew. A member of the crew may, in some cases, perform more than one job assignment. For example, because of the small crew size, the site geologist/engineer may function as site safety officer, and the field technician may double as safety technician. Job classifications and their assigned tasks are listed below:

2.1 Project Safety Officer: This classification will be responsible for the overall implementation and auditing of the Health & Safety Program. He/she may visit sites unannounced to evaluate compliance, and, at the end of the project, will complete an evaluation of the overall effectiveness and enforcement of the program. Eugene Port, CIH, will function in this capacity.

2.2 Site Engineer/Geologist: This classification will supervise site activities, including the handling of samples. If a drilling rig is used to obtain subsurface samples, the site engineer/geologist will examine the soil cuttings from each boring and compile a log of the subsurface conditions. He/she will handle the cuttings and work near the drill rig in the restricted area, and will be responsible for the sampling operation which will entail decontaminating (cleaning) and reloading the sampler with brass rings, labeling and packaging samples for transport. This latter activity will be performed in the controlled access area. Mollie Halewijn, P.E.d will function in this capacity.

2.3 Technician: This classification will assist the site engineer/geologist with sample handling in the restricted and controlled access areas. Activities will include sampling, decontamination of sampling equipment, and labeling and preparation of samples for transport.

3.0 Scope and Purpose of Health and Safety Program

3.1 Protect Worker Health and Safety. There may exist situations during site operations where personnel could contact toxic materials. If a drilling rig is used, it may generate a slight amount of dust from its operation and sample extraction.

3.2 Comply With Applicable Regulations. ALB will comply with all Federal and State Occupational Health & Safety regulations specified under OSHA. Specifically, the following General Industrial Safety Orders (GISO) are incorporated into our program.

BGPAA 0856

3.2.1 GISO 3203 Accident And Illness Prevention Program

- Administrative supervision of the health and safety program. The Site Safety Officer, is responsible for the day-to-day implementation of this program. The Project Safety Officer will be responsible for staff and employee training and for auditing compliance with the requirements and intent of the program.

- Task and job safety analyses. These are included as described above.

- Training of workers in specific and general work practices. All supervisory personnel (Project Safety Officer, Site Engineer/Geologist, Site Safety Officer) will be certified under the provisions of 29 CFR 1910. All other personnel, who will work under the direct supervision of one of the aforementioned categories, will have a minimum of eight hours of training prior to the start of field work. This training will cover toxicology, protective equipment, evacuation and emergency response procedures, medical emergency procedures, mechanical and equipment safety, sample handling, decontamination and security measures.

- Work zones (restricted, controlled access and neutral). These are described in Section 4.0.

- Regular periodic inspections of the workplace to discover and correct unsafe conditions and work practices.- The Site Safety Officer will conduct a pre-shift inspection of the facility, machinery, equipment, safety devices and equipment, etc. The Project Safety Officer may inspect the sites at his/her discretion.

- Specific health and safety hazard awareness- as part of the general project and specific task assignments, employees will be informed by ALB of the specific hazards--including toxic exposures, noise, and heat stress--associated with the job and work site prior to start up on each new site.

- Warnings and evacuation routes, plus appropriate health and safety contracts- a list of emergency telephone numbers and site map will be given to personnel working on this project.

- Emergency procedures for:

  Spills: Contaminated bulk materials will be placed in containers, sealed, and held until transport to an approved hazardous waste disposal site. Liquids will be treated with an appropriate spill clean up kit (acids, alkali and organics), and stored as mentioned above.

  Fire: The following steps are to be taken to prevent injury and to limit the spread of the emergency: alert personnel in the immediate vicinity of a fire; confine the fire by removing items which be fuel to the fire, provided this can be done without risking being burned or overcome by smoke; evacuate the area; and summon aid, namely the local fire department.

First aid emergencies: Minor first aids should be treated by the site individual selected and trained in advanced first aid. Emergency victims will be removed from the immediate disaster area, stabilized, and transported by ambulance. ALB has selected the Paramedics as the first stage emergency response for injury and/or chemical exposures, including heat stress.

- Response to extreme weather conditions, such as wind, lightning, floods, etc.- severe winds, flooding or electrical storms will dictate that all site activity be halted.

- Personnel protective clothing and devices, as described under specific requirements for each site, will be used. ALB will supply those items described in the site-specific provisions. Workers will be responsible for providing their own coveralls, prescription eyewear, and safety shoes. Other appropriate clothing, shoes or boots and eye protection, as dictated by this health/safety plan, will be explained by the field supervisor.

- Laundering of contaminated clothing- ALB will be responsible for having contaminated clothing laundered and returned to the employees. Under no circumstances are employees to remove contaminated clothing from the work site.

- Rules regarding eating, drinking and smoking at the job site-- these activities are limited to the neutral area.

- Medical surveillance, including post job and emergency medical care (emergency treatment facilities). Employees will be examined, where required, to establish blood chemistry profiles and to determine liver and kidney function. Other tests will be included as determined by site-specific requirements. The nearest medical facilities are listed in the Emergency Action Plan.

- Emergency site evacuation, including transport of victims - paramedics emergency response team will be available to move victims to emergency care facilities.

- "Buddy system"- this system is designed to establish working partners who will observe physiological and behavioral changes in each other which may be attributed to an occupationally related illness.

- Environmental surveillance- to the extent that we have been able to specifically identify chemical toxicants, continuous area air monitoring may be conducted to quantify exposures.

3.2.2 GISO 5194 Material Safety Data Sheets. All employees will be notified of all hazardous substances present in the workplace. Material Safety Data Sheets and potential toxic effects of substances that may be encountered during operations will be explained to the field personnel by ALB.

3.2.3 GISO 3204 Access To Medical And Exposure Records. Each person assigned to the field will be provided with a copy of his or her own medical records and records of exposures to toxic substances or harmful physical agents; and MSDS or other information available on the hazardous substances associated with the site activities.

3.2.4 GISO 5155 Control Of Airborne Contaminants. Every effort will be made to limit the generation of airborne contaminants, including water sprays where necessary.

3.2.5 GISO 3220 Emergency Action Plan. The emergency action plan (Appendix 2) describes procedures for reporting fire and other emergencies, emergency procedures, escape routes, accounting for all workers after an emergency evacuation, personnel assigned to rescue and medical duties, alarm systems, and an evacuation plan. Training in this plan will be conducted as part of the pre-work session.

3.2.6 GISO 5144 Respiratory Protection Program. This program will cover the following subjects:

- selection and use of air purifying respirators, and air supplied, if necessary;
- medical clearance for personnel required to wear negative pressure air purifying respirators;
- instruction and training in use of respirator;
- cleaning, sanitizing, repair and storage of respirators;
- respirator fit testing;
- posting of required respirator usage; and
- quantification of potential exposures.

4.0 Work Area Descriptions

4.1 Restricted Area. That area around the drill rig or other sampling center from 10 to 25 feet radius, depending on site conditions. This perimeter may be extended, depending upon winds and dust blowing.

Employees in this area will wear protection consisting of hard hat or cap; gloves; long-legged pants; and closed-toed shoes. At the direction of the Site Safety Officer, or the Project Geologist/Engineer, all personnel in the restricted zone shall don a full-face respirator, or safety glasses/goggles with half-face respirator, and continue to wear this equipment until otherwise directed.

4.2 Controlled-Access Area. The area extending away from the perimeter of the restricted area to an additional distance of 10 to 25 feet, depending on conditions. This area may be eliminated for small sites, depending on the nature of operations being conducted. Clothing for employees in this zone shall consist of long-legged pants, short- or long-sleeved shirt, and closed-toed shoes. Hard hats and respiratory protection equipment shall be kept in ready-to-use condition in this zone.

4.3 Neutral Area. That area used for tasks not required to be preformed in the restricted or controlled-access areas, and extending out from the perimeter of the controlled-access area. Clothing requirements are the same as for the controlled-access zone.

5.0 Respiratory Protection Program

5.1 Qualification To Wear Negative Pressure Respirator. All personnel required to wear a negative pressure, air purifying respirator will have to display a minimum pulmonary function of 75% of predicted for FEV_1, FVC, FEF_{25-75} and FEF_1/FVC Ratio. Each individual will otherwise have to be physically fit to wear such a device, as determined by an examination by a physician.

5.2 Respirator Selection And Fit Testing. Each individual assigned to a "restricted" or "controlled access" area will be properly fitted with a full- or half- mask face piece air purifying respirator. Air purifying cartridges will meet the NIOSH Approval TC-23C-79/161/243/244/201 or 286.

Fit the facepiece on the nose bridge, making sure that you are able to breathe through the nose. Then swing the bottom of the facepiece into contact with the chin. Position the head-bands with longest straps above the ears over the crown of the head, and the shortest straps below the ears, around the nape of the neck; then adjust for comfort by moving adjustment slides to lengthen or shorten straps. Adjust the straps just snug enough so that no air leaks around the facepiece. It is not necessary to pull the straps so tight that the respirator digs into the face.

The respirator must be subjected to the following tightness test before selection and each use. Test respirator for leakage using a positive pressure method. Lightly place palm over exhalation valve cover. Gently exhale. A slight pressure should build up inside the respirator. If any leakage is detected around the facial seal, readjust the head harness straps, and repeat the test until there is no leakage. If other than facial leakage is detected, the condition must be investigated and corrected before another test is made. A negative pressure test will be performed. Lightly place palms over cartridge or filter holders. Gently inhale and the facepiece should collapse against the face. The respirator must pass the tightness tests before the respirator is used. The respirator will not furnish protection unless all inhaled air is drawn through a suitable cartridge or filter, as described above.

The respirator must pass a qualitative fit test for final selection prior to each shift's use. This will be done by generating an irritant smoke (for filter cartridges) or amyl acetate banana odor (for organic cartridges). Generate the smoke or odor under the chin and around the bridge of the nose (keeping the eyes tightly closed). During this test, the individual should undergo various facial expressions, including grimacing and smiling. If the wearer passes this type of qualitative fit test, the respirator can be worn in atmospheres up to 10 times the respective threshold limit values (TLV).

5.3 Preparation For Respirator Use. There are five inspection points, listed below, that should be checked before donning the respirator. Under no circumstances should a respirator that fails inspection be used. The respirator should be repaired or replaced.

5.3.1 Headbands: Check to see that the headbands still have their elasticity. Inspect for breaks or tears in the material and make sure all clips, fasteners, and adjusters are in place and working properly.

5.3.2 Facepiece: Check facepiece for dirt, cracks, tears, or holes. Inspect the shape of the facepiece for possible distortion that may occur from improper storage. Make sure that rubber is flexible, not stiff. Check the aluminum yoke for cracks.

5.3.3 Inhalation and Exhalation Valves: Check for cracks, tears, distortion, dirt, or build-up of material between valve and valve seat.

5.3.4 Cartridge Holders: Check to make sure gaskets are in place; check for cracks and damage to threads.

5.3.5 Cartridge and/or Filters: Make sure cartridges and filters are clean. Never try to clean a filter or cartridge by washing it or using compressed air. Inspect the cartridge, particularly the metal sealing band around the bottom, for dents, scratches, or other damage.

Thread cartridges into receptacles carefully. Hand tighten to prevent damage to threads and to insure a good seal against the gaskets. Insert appropriate filters into the appropriate filter cover. Never load a filter into the receptacle. Snap filter covers onto both receptacle or cartridges taking care not to damage filters.

The following conditions are indications that the cartridge or filters have served their useful life and should be replaced. Cartridges: Odor or taste of gases or vapors; eye, nose, or throat irritation. Filters: Excessive breathing resistance upon inhalation.

5.4 Respirator Maintenance And Cleaning. The facepiece (with cartridge removed) should be cleaned and sanitized after every use. A light dish soap solution followed by a blotting action and air drying will suffice. Never exceed 120° F temperature in order to avoid facepiece distortion. After cleaning and maintenance, and when not in use, each respirator should be stored in an air tight bag, such as a plastic refrigerator bag with twist-seal.

The respirator must be kept in good condition to function properly. When any part shows evidence of excessive wear or failure, it should be replaced immediately with the proper part. Extra parts will be readily available. Do not use parts from a different brand or type of respirator.

5.5 Contraindications For Chemical Cartridge Use. Many chemicals do not have an odor at a level low enough to give adequate warning of cartridge failure. All personnel must consult the manufacturer's instructions for a specific list of materials for which that respirator and cartridge should not be used.

5.6 Recordkeeping/Program Administration. The project supervisor will maintain a list of respirators assigned to each individual. Each individual will acknowledge in writing that they have received respiratory protection training, including the selection, care and maintenance of their respective respirators.

The project safety officer will be responsible for assuring that all individuals comply with the requirements of the program. He/she will randomly check each individual's respirator to assure compliance with the proper care and maintenance of the respirator and cartridge.

Employees found violating the terms of this implementation program will be issued a written warning upon first violation, followed by disciplinary action on the second violation and release from the project upon the third violation.

5.7 Program Audit. The Project Safety Officer will check records and may observe actual program compliance to assure that the terms and intent of the respiratory protection program are being followed.

EMERGENCY ACTION PLAN

Notification and Summoning Assistance. The following procedures should be used to summon assistance in case of emergency:

Fire: Dial 911 to call Firefighters in case of fire. A fire extinguisher is available with the drill rig for use in case of small fires. The first consideration will be personnel safety, and crews will be instructed not to attempt to handle emergencies where possible injury would result.

Medical Emergency: Dial 911 to summon the paramedics for situations requiring medical attention (serve bleeding, shock, heat stroke, major injuries, etc.). Administer first aid and institute emergency actions until paramedics arrive.

Medical Non-emergency: Patient should drive (or be driven) to Burbank Community Hospital at the intersection of Glenoaks Boulevard and Olive Avenue. From the Airport, turn right (south) on Hollywood Way, turn left (east on Empire Avenue, bear right (south) on Victory Boulevard to Olive Avenue. Turn left (northeast) on Olive and proceed over the I-5 Freeway to the Hospital. The telephone number is (818) 953-6500.

Other Non-emergency: Dial (714) 990-3382 for A. L. Burke Engineers, Inc.

Evacuation Procedures: In case of emergency requiring evacuation, notify SSP personnel immediately and follow their evacuation plan. Personnel shall assemble outside the plant gate after the evacuation to be accounted for and receive further instructions. No one shall reenter an evacuated site until the Site Safety Officer has given clearance to return.

Intra-Site Communications: Because of the small size of the crews and the work areas, oral communications shall be used to minimize the potential for confusion during and emergency. Where a telephone is not easily accessible from the work locations, ALB will provide a portable cellular telephone.

Documentation: The Site Safety Officer shall prepare a complete report on any emergency incident including the date, time, nature of the incident, action taken and final outcome. This information shall also be entered in the field log.

APPENDIX - 2

Soil Gas Survey, Burbank-Glendale-Pasadena

Airport, Burbank, California: Report Prepared

by Target Environmental Services, Inc.,

October 1991

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

TARGET ENVIRONMENTAL SERVICES, INC.

SOIL GAS SURVEY

BURBANK-GLENDALE-PASADENA AIRPORT

BURBANK, CALIFORNIA

PREPARED FOR

A.L. BURKE ENGINEERS, INC.

451 WEST LAMBERT ROAD, SUITE 211

BREA, CALIFORNIA 92621

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.

9180 RUMSEY ROAD

COLUMBIA, MARYLAND 21045

(301) 992-6622

OCTOBER 1991

EXECUTIVE SUMMARY

On September 11 and 12, 1991, **TARGET** Environmental Services, Inc. (**TARGET**) conducted a soil gas survey at Burbank-Glendale-Pasadena Airport, Burbank, California in an area south of the Lockheed Corporation Area C-1. Samples were collected at 6 feet in all sampling locations and at multiple depths in nine locations and were analyzed by GC/FID and GC/ECD for petroleum and halogenated hydrocarbons, respectively.

Elevated levels of 1,1,1-TCA, PCE and t-1,2-DCE and lower levels of TCE, MTBE/pentane, acetone, benzene, toluene, and the xylenes were observed within the survey area. Map patterns of the halogenated hydrocarbons and MTBE/pentane suggest that the contaminants originated in or near the wash down areas. The low levels of petroleum hydrocarbons present in scattered locations around the survey are probably related to vehicular use. While the concentrations of halogenated hydrocarbons were typically of similar magnitude at all depths, the occurrences of non-halogenated hydrocarbons, with the exception of MTBE/pentane, were limited to the shallower samples.

BGPAA 0866

Introduction

A. L. Burke Engineers, Inc. contracted **TARGET** Environmental Services, Inc. (**TARGET**) to perform a soil gas survey in an area south of the Lockheed Corporation Area C-1 at the Burbank-Glendale-Pasadena Airport in Burbank, California. The purpose of the soil gas survey was to determine the presence and extent of volatile hydrocarbons in the subsurface. Ground water and soils information were not reported. The field phase of the soil gas survey was conducted September 11 and 12, 1991.

Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

The terms "elevated" and "significant" are used to describe concentrations of analytes which indicate the existence of a potential problem in the soil or ground water.

Field Procedures

Soil gas samples were collected at a total of 49 locations, as shown in Figure 1. Samples were collected at multiple depths at most of the locations. The first one or two digits in the sample numbers represent the sampling depth, i.e., "6", "10", "15" and "20". The last two or three digits represent the sample location number.

To collect the samples, a van-mounted hydraulic probe was used to advance connected 3' sections of 1" diameter threaded steel casing down to the sampling depth. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge. A teflon line was inserted into the casing to the bottom of the hole, and the bottom-hole line perforations were isolated from the up-hole annulus by an inflatable packer. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and taken to **TARGET**'s on-site mobile laboratory for analysis. When equipment malfunctioned, the remaining samples were shipped to **TARGET**'s corporate headquarters and analyzed in the home laboratory.

At sampling locations where samples were collected from more than one depth, the shallow sample was collected first, and then the probe was further advanced to collect deeper samples in the same manner as above.

Prior to the day's field activities all sampling equipment and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities and after every twentieth soil gas sample. These QA/QC samples were obtained by inserting the probe tip into a tube flushed by a 20 psi flow of pre-purified nitrogen and collecting in the same manner as described above.

Three sample locations (Stations 1007, 1516 and 1521) were sampled a second time after the initial sample vials were broken during analysis.

Laboratory Procedures

The samples collected during the field phase of the survey were subjected to both of the following analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

1,1-dichloroethene (1,1-DCE)
methylene chloride (MC)
trans-1,2-dichloroethene (t-1,2-DCE)
1,1-dichloroethane (1,1-DCA)
cis-1,2-dichloroethene (c-1,2-DCE)
chloroform (CF)
1,1,1-trichloroethane (1,1,1-TCA)
carbon tetrachloride (CT)
trichloroethene (TCE)
1,1,2-trichloroethane (1,1,2-TCA)
tetrachloroethene (PCE)

The halogenated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), but using direct injection instead of purge and trap. The analytes selected for standardization in this analysis were:

acetone
methyl tertiary butyl ether (MTBE)
methyl ethyl ketone (MEK)
benzene
toluene
chlorobenzene
ethylbenzene
meta- and para- xylene
ortho-xylene

These compounds were chosen because of their utility in evaluating the presence of fuel products, or petroleum-based solvents.

The Total FID Volatiles values were generated by summing the areas of all chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of the Total FID Volatiles (Totals) values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples and their response factors were used to calculate the analyte concentrations. The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter (μg/l) in Tables 1 and 2. The first one or two digits in the sample numbers represent the sampling depth; i.e., "6", "10", "15" and "20". The last two or three digits represent the sample location number. Although "micrograms per liter" is equivalent to "parts per billion (v/v)"

in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. Because pentane and MTBE co-elute, they are listed together in the table. The xylenes concentrations reported in Table 1 are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas (99.999%) were also analyzed after every tenth field sample.

A total of five samples vials (Samples 612, 1007, 1516, 1521, and 2022) were broken during analysis. Samples were recollected at three of the locations, as mentioned in the Field Procedures section; however, analytical data are not available for Samples 612 and 2022.

Discussion and Interpretation of Results

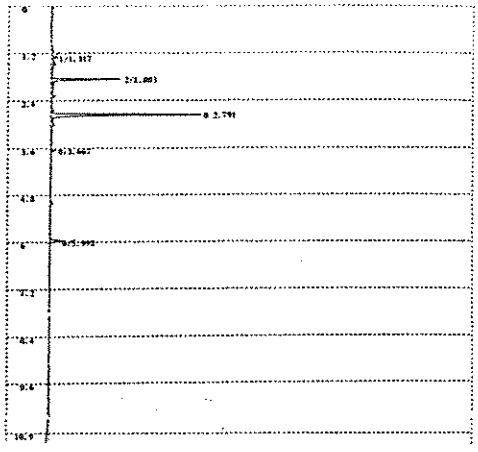
In order to provide graphic presentation of the results, individual data sets in Tables 1 and 2 have been mapped to produce Figures 2 through 8. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the detection limit. Analytical data for all sampling depths are shown on the maps; however, contours respect the data obtained from the 6' sampling depth.

GC/ECD analysis revealed that 1,1,1-trichloroethane (1,1,1-TCA, Figure 2) was the most prominent halogenated hydrocarbon on the site. Concentrations of 1,1,1-TCA were highest beneath (Station 620) and south of the wash down areas (location 5). Concentrations in the soil gas were elevated at all depths (Stations 605, 1005, 1505, and 2005). Lower levels were present at all other sampling locations and at all depths. The tetrachloroethene (PCE) and trichloroethene (TCE) map patterns resemble the 1,1,1-TCA features and are not mapped separately. PCE and TCE were observed in all samples, with the highest concentrations observed in samples collected south of and beneath the wash down areas. The trans-1,2-dichloroethene occurrence (t-1,2-DCE, Figure 3) was limited to the area in and around the wash down area and to several isolated samples to the west and south.

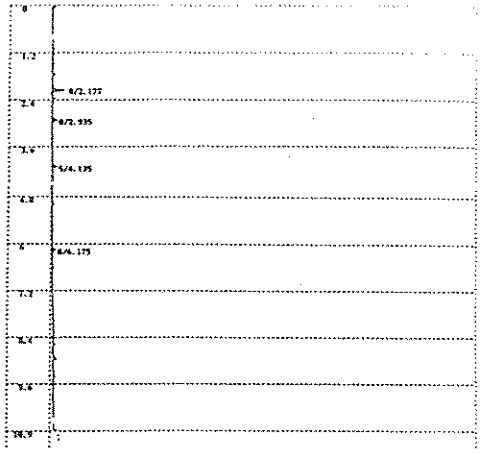
GC/FID analysis indicated that Total FID Volatiles (Figure 4) were highest in and beneath the wash down areas. Low levels occurred at most of the remaining sampling locations. MTBE/pentane (Figure 5) were highest in and around the wash down areas. Xylenes (Figure 6) were present in low levels in several samples around the

wash down areas and in some samples across the service road. Low levels of acetone (Figure 7) occurred in several samples in and near the service road. A low level of benzene (Figure 8) was present at one sampling location (Station 607) near the service road.

The FID chromatogram signatures of samples with elevated levels of volatile hydrocarbons show isolated peaks typical of halogenated hydrocarbons, as exemplified by Chromatogram 1, Sample 2005. Peaks indicative of low levels of petroleum hydrocarbons are evident in the chromatograms of a number of samples, as exemplified by Chromatogram 2, Sample 617.



CHROMATOGRAM 1. GC/FID SIGNATURE OF SAMPLE 2005



CHROMATOGRAM 2. GC/FID SIGNATURE OF SAMPLE 617

Elevated levels of 1,1,1-TCA, PCE and t-1,2-DCE and lower levels of TCE, MTBE/pentane, acetone, benzene, toluene, the xylenes were observed within the survey area. Map patterns of the halogenated hydrocarbons and MTBE/pentane suggest that the contaminants originated in or near the wash down areas. The low levels of petroleum hydrocarbons present in scattered locations around the survey are probably related to vehicular use. While the

concentrations of halogenated hydrocarbons were typically of similar magnitude at all depths, the occurrences of non-halogenated hydrocarbons, with the exception of MTBE/pentane, were limited to the shallower samples, i.e., samples collected at 6' and 10'.

TABLE 1

ANALYTE CONCENTRATIONS VIA GC/FID (ug/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
601	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
602	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
603	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
604	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
605	<1.0	19	<1.0	<1.0	1.9	<1.0	<1.0	3.1	50
1005	<1.0	23	<1.0	<1.0	1.2	<1.0	<1.0	2.6	59
1505	<1.0	18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
2005	<1.0	12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	27
606	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1006	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	3.2
1506	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
607	1.9	<1.0	<1.0	1.0	1.9	<1.0	<1.0	3.0	6.6
1007	1.6	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	2.8	5.9
1507	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
2007	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
608	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
609	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
610	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	1.2	4.8
611	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
1512	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
613	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
614	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.4
1014	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
1514	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9
2014	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8
615	1.2	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	2.8
1015	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
1515	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
2015	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
616	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	2.6	3.4
1016	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
1516	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
2016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
617	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
618	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6

MEK = Methyl ethyl ketone

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 1 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (ug/l)

SAMPLE	ACETONE	PENTANE/ MTBE[1]	MEK	BENZENE	TOLUENE	CHLORO-BENZENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
619	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9
620	<1.0	17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	26
621	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0
1021	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.5	3.8
1521	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2021	<1.0	2.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
622	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.0
1022	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	2.3
1522	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
FIELD CONTROL SAMPLES									
101	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
102	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
103	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
104	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
105	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
106	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY DUPLICATE ANALYSES									
1005	<1.0	23	<1.0	<1.0	1.2	<1.0	<1.0	2.6	59
1005R	<1.0	23	<1.0	<1.0	1.1	<1.0	<1.0	2.6	58
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
2006R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7
613	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
613R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
1021	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.5	3.8
1021R	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	2.3
LABORATORY BLANKS									
1005B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2006B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
613B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1021B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

MEK = Methyl ethyl ketone

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2

ANALYTE CONCENTRATIONS VIA GC/ECD (ug/l)

SAMPLE	11DCE	MC	t12DCE	11DCA	c12DCE	CF	111TCA	CT	TCE	112TCA	PCE
601	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.93	<0.05	0.14	<0.10	0.92
602	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.0	<0.05	0.35	<0.10	2.0
603	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	10	<0.05	0.30	<0.10	3.3
604	<1.0	<1.0	2.4	<1.0	<1.0	<0.10	11	<0.05	0.15	<0.10	3.0
605	<1.0	<1.0	20	<1.0	<1.0	<0.10	82	<0.05	0.77	<0.10	14
1005	<1.0	<1.0	38	<1.0	<1.0	<0.10	135	<0.05	0.46	<0.10	16
1505	<1.0	<1.0	30	<1.0	<1.0	<0.10	109	<0.05	0.38	<0.10	13
2005	<1.0	<1.0	23	<1.0	<1.0	<0.10	75	<0.05	0.32	<0.10	9.7
606	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.11	<0.10	1.5
1006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.0	<0.05	<0.10	<0.10	0.71
1506	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.0	<0.05	<0.10	<0.10	1.5
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.8	<0.05	0.14	<0.10	1.8
607	<1.0	<1.0	1.9	<1.0	<1.0	<0.10	1.2	<0.05	0.59	<0.10	2.0
1007	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.13	<0.05	0.16	<0.10	0.90
1507	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	<0.10	<0.10	0.98
2007	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.7	<0.05	0.14	<0.10	1.1
608	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.3	<0.05	0.22	<0.10	1.3
609	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.60	<0.05	0.18	<0.10	1.2
610	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.86	<0.05	0.42	<0.10	1.8
611	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.94	<0.05	0.23	<0.10	1.3
1012	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.9	<0.05	0.11	<0.10	1.7
1512	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.6	<0.05	<0.10	<0.10	1.2
2012	<1.0	<1.0	1.5	<1.0	<1.0	<0.10	11	<0.05	<0.10	<0.10	1.6
613	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.16	<0.10	1.9
614	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	14	<0.05	0.20	<0.10	2.6
1014	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	7.9	<0.05	0.12	<0.10	2.1
1514	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	15	<0.05	0.13	<0.10	2.5
2014	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	14	<0.05	0.13	<0.10	2.3
615	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.14	<0.10	1.3
1015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.5	<0.05	<0.10	<0.10	0.87
1515	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.5	<0.05	<0.10	<0.10	1.3
2015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	5.4	<0.05	<0.10	<0.10	1.2
616	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.3	<0.05	0.30	<0.10	1.3
1016	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	1.8	<0.05	0.14	<0.10	0.96
1516	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
2016	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.4	<0.05	0.12	<0.10	0.99
617	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.8	<0.05	0.13	<0.10	1.5

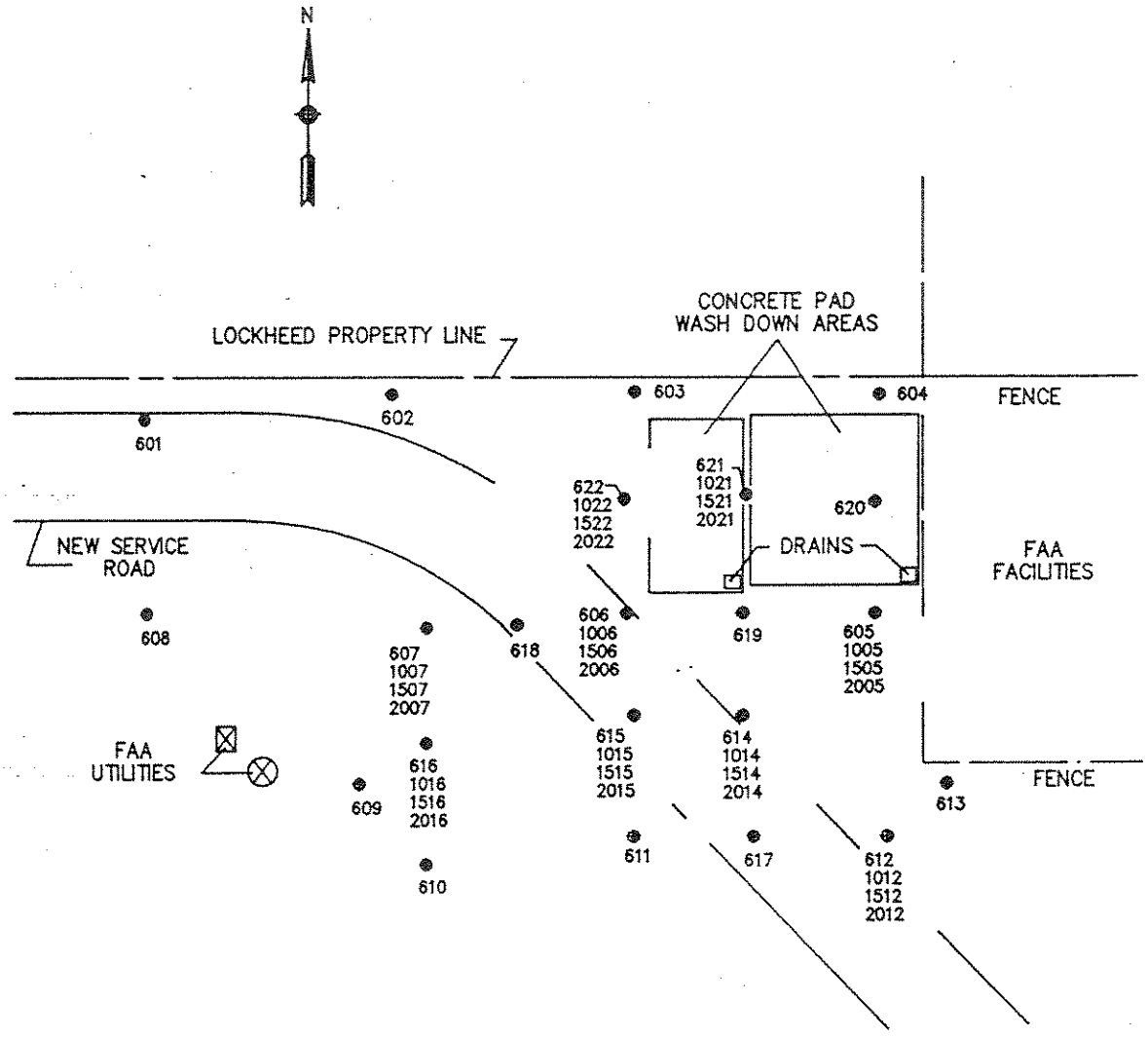
11DCE	=	1,1-dichloroethene	MC	=	methylene chloride
t12DCE	=	trans-1,2-dichloroethene	11DCA	=	1,1-dichloroethane
c12DCE	=	cis-1,2-dichloroethene	CF	=	chloroform
111TCA	=	1,1,1-trichloroethane	CT	=	carbon tetrachloride
TCE	=	trichloroethene	112TCA	=	1,1,2-trichloroethane
PCE	=	tetrachloroethene			

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (ug/l)

SAMPLE	11DCE	MC	t12DCE	11DCA	c12DCE	CF	111TCA	CT	TCE	112TCA	PCE
618	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.8	<0.05	0.19	<0.10	1.5
619	<1.0	<1.0	1.2	<1.0	<1.0	<0.10	15	<0.05	0.27	<0.10	5.3
620	<1.0	<1.0	22	<1.0	<1.0	<0.10	113	<0.05	0.49	<0.10	9.1
621	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	7.5	<0.05	0.22	<0.10	2.9
1021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.1	<0.05	0.28	<0.10	2.4
1521	<1.0	<1.0	1.1	<1.0	<1.0	<0.10	1.9	<0.05	0.10	<0.10	0.89
2021	<1.0	<1.0	2.4	<1.0	<1.0	<0.10	12	<0.05	0.13	<0.10	2.2
622	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	2.7	<0.05	0.57	<0.10	2.7
1022	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.5	<0.05	0.12	<0.10	1.5
1522	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.17	<0.10	1.4
FIELD CONTROL SAMPLES											
101	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.29
102	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.11
103	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
104	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.23
105	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	0.06
106	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
LABORATORY DUPLICATE ANALYSES											
1005	<1.0	<1.0	38	<1.0	<1.0	<0.10	22	<0.05	0.46	<0.10	8.8
1005R	<1.0	<1.0	35	<1.0	<1.0	<0.10	22	<0.05	0.44	<0.10	8.8
2006	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.8	<0.05	0.14	<0.10	1.8
2006R	<1.0	<1.0	2.1	<1.0	<1.0	<0.10	6.9	<0.05	0.14	<0.10	1.7
613	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	3.9	<0.05	0.16	<0.10	1.9
613R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	4.0	<0.05	0.11	<0.10	1.4
1021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.1	<0.05	0.28	<0.10	2.4
1021R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	6.0	<0.05	0.28	<0.10	2.4
LABORATORY BLANKS											
613B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
1005B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
1021B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05
2006B	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05

11DCE	=	1,1-dichloroethene	MC	=	methylene chloride
t12DCE	=	trans-1,2-dichloroethene	11DCA	=	1,1-dichloroethane
c12DCE	=	cis-1,2-dichloroethene	CF	=	chloroform
111TCA	=	1,1,1-trichloroethane	CT	=	carbon tetrachloride
TCE	=	trichloroethene	112TCA	=	1,1,2-trichloroethane
PCE	=	tetrachloroethene			



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

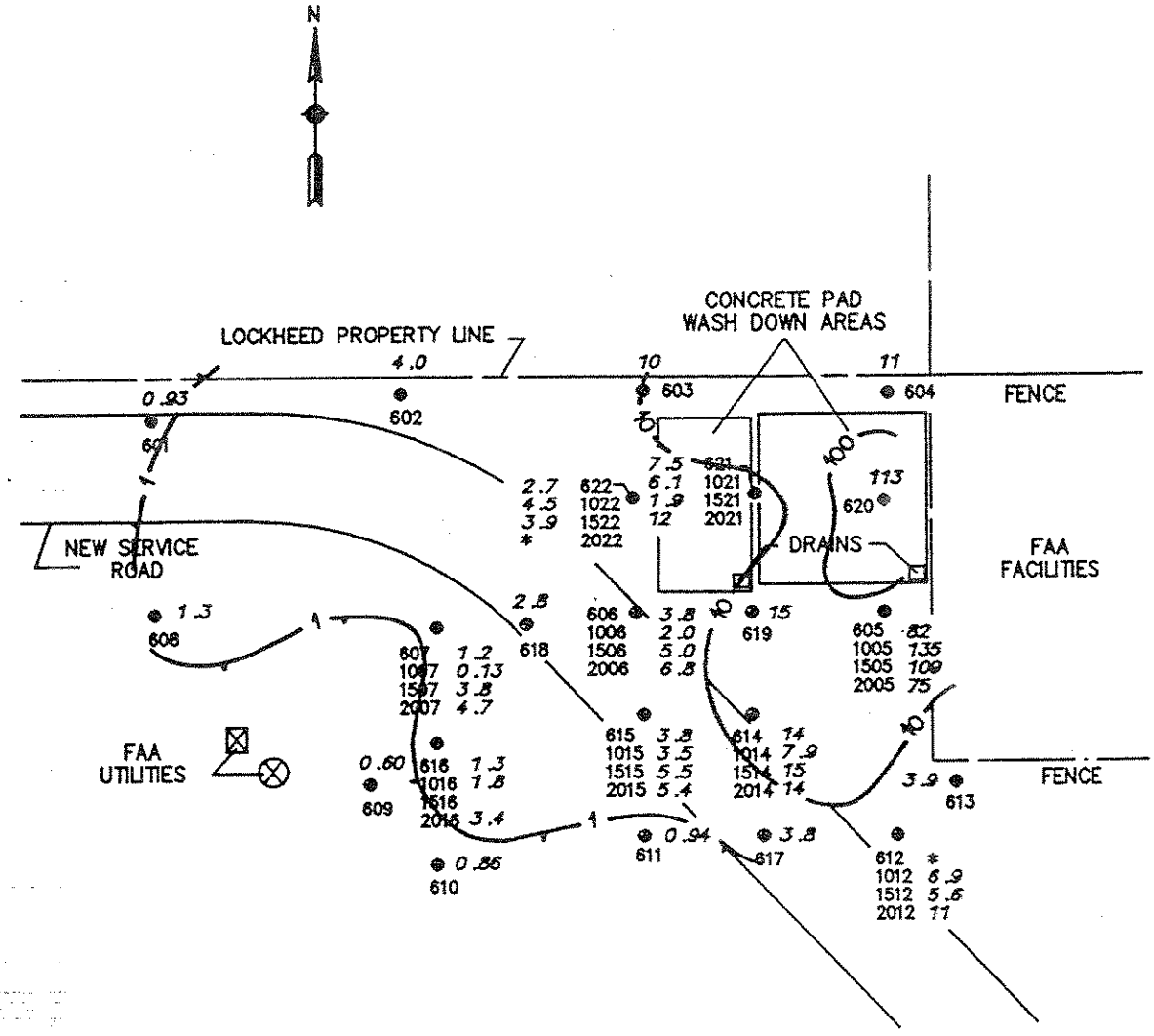
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 1. Sample Locations

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

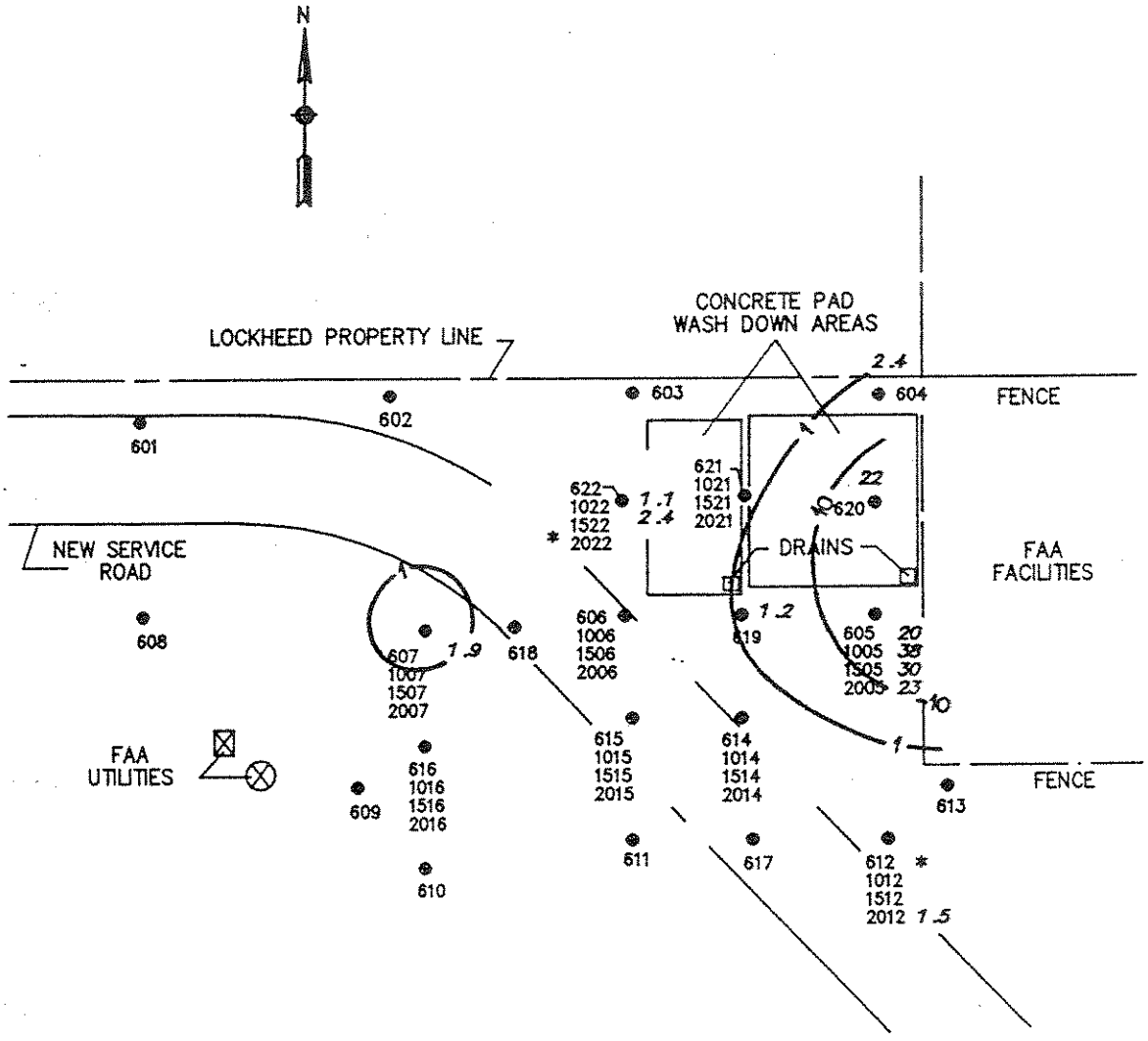
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 2. 1,1,1–trichloroethane (1,1,1–TCA) (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

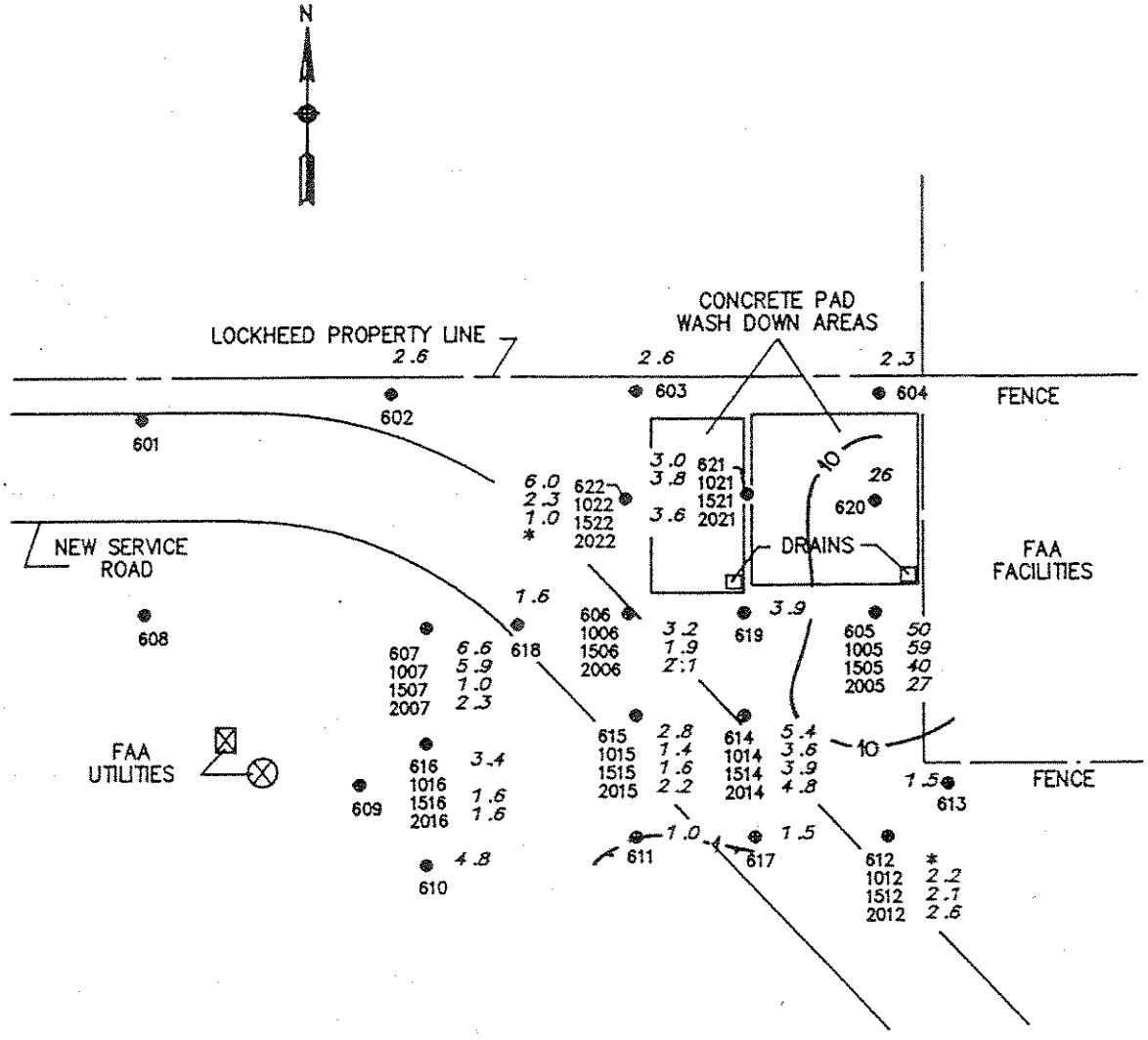
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 3. trans-1,2-dichloroethene (t-1,2-DCE) (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK-GLENDALE-PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 4. Total FID Volatiles (calc'd µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

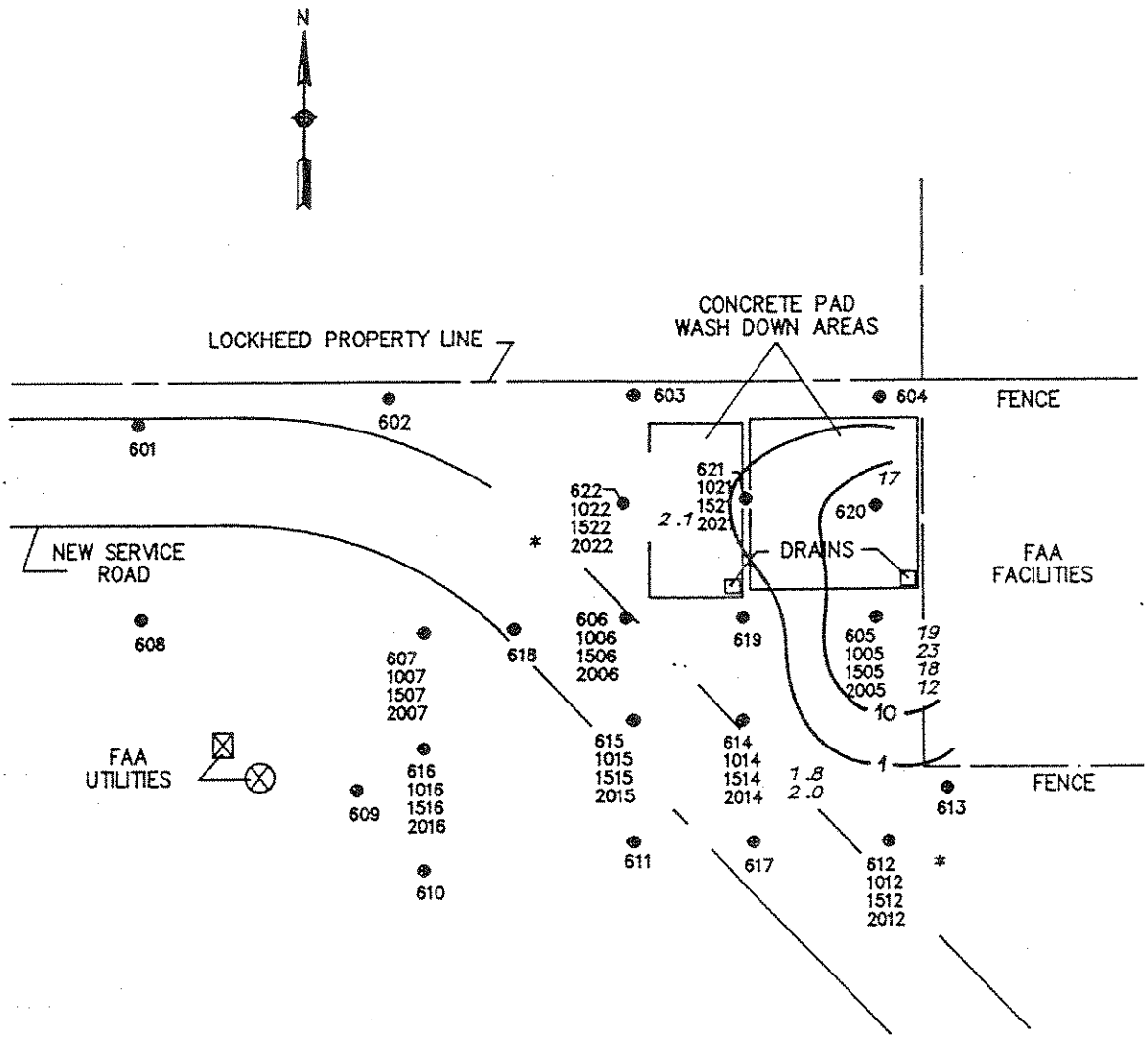
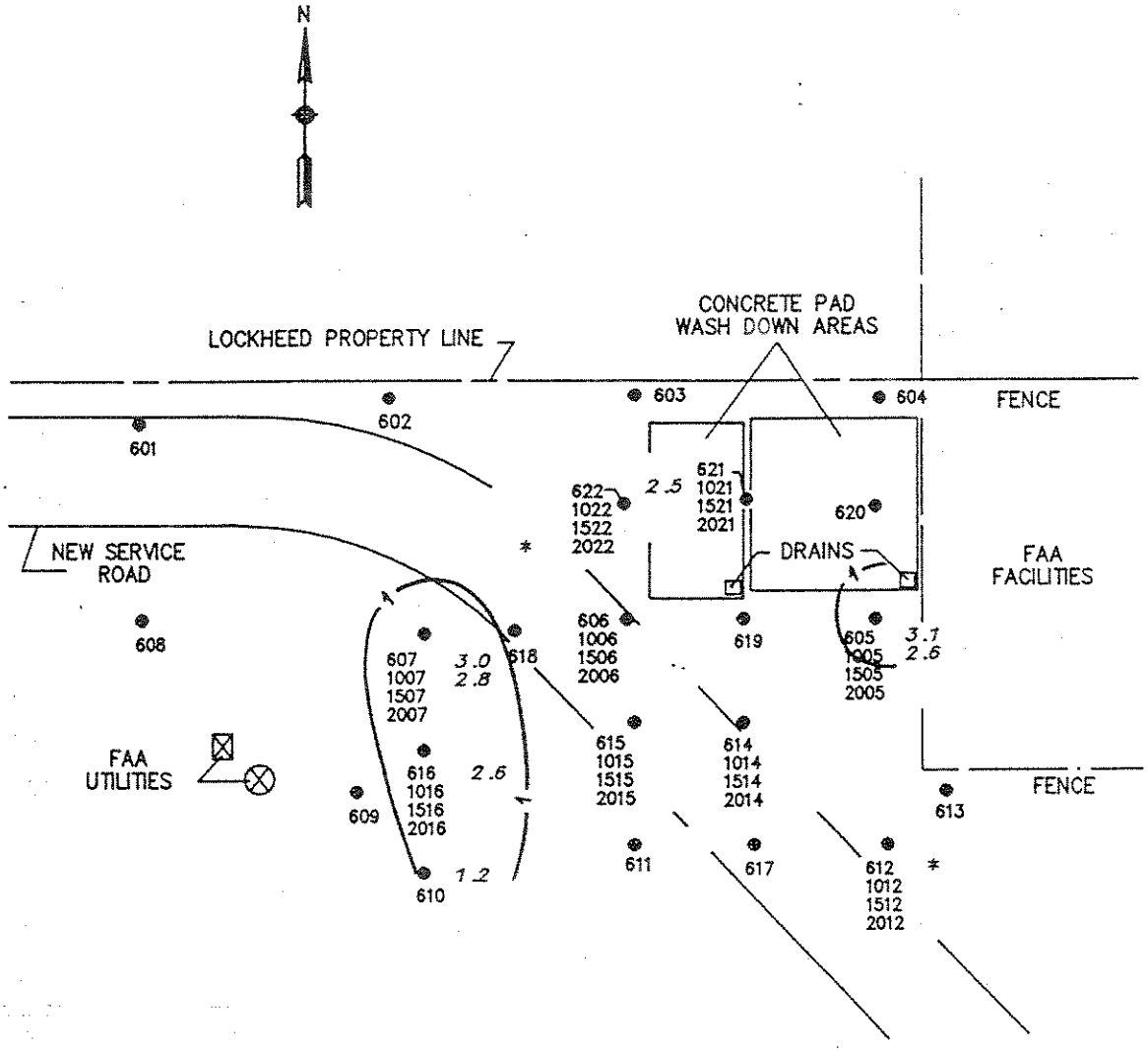


FIGURE 5. Pentane/Methyl Tertiary Butyl Ether (MTBE) ($\mu g/l$)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

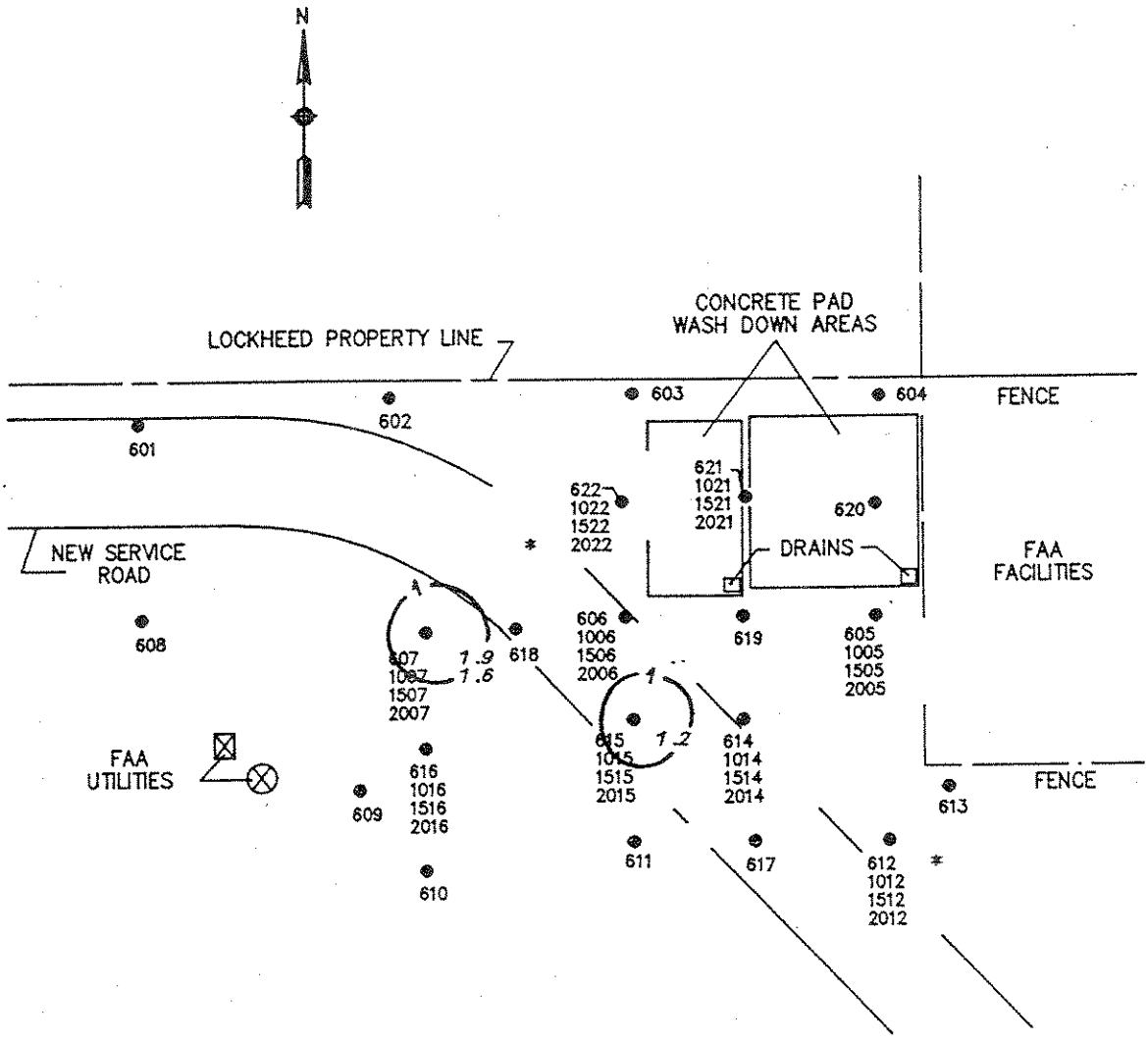
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 6. Xylenes (µg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

● SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

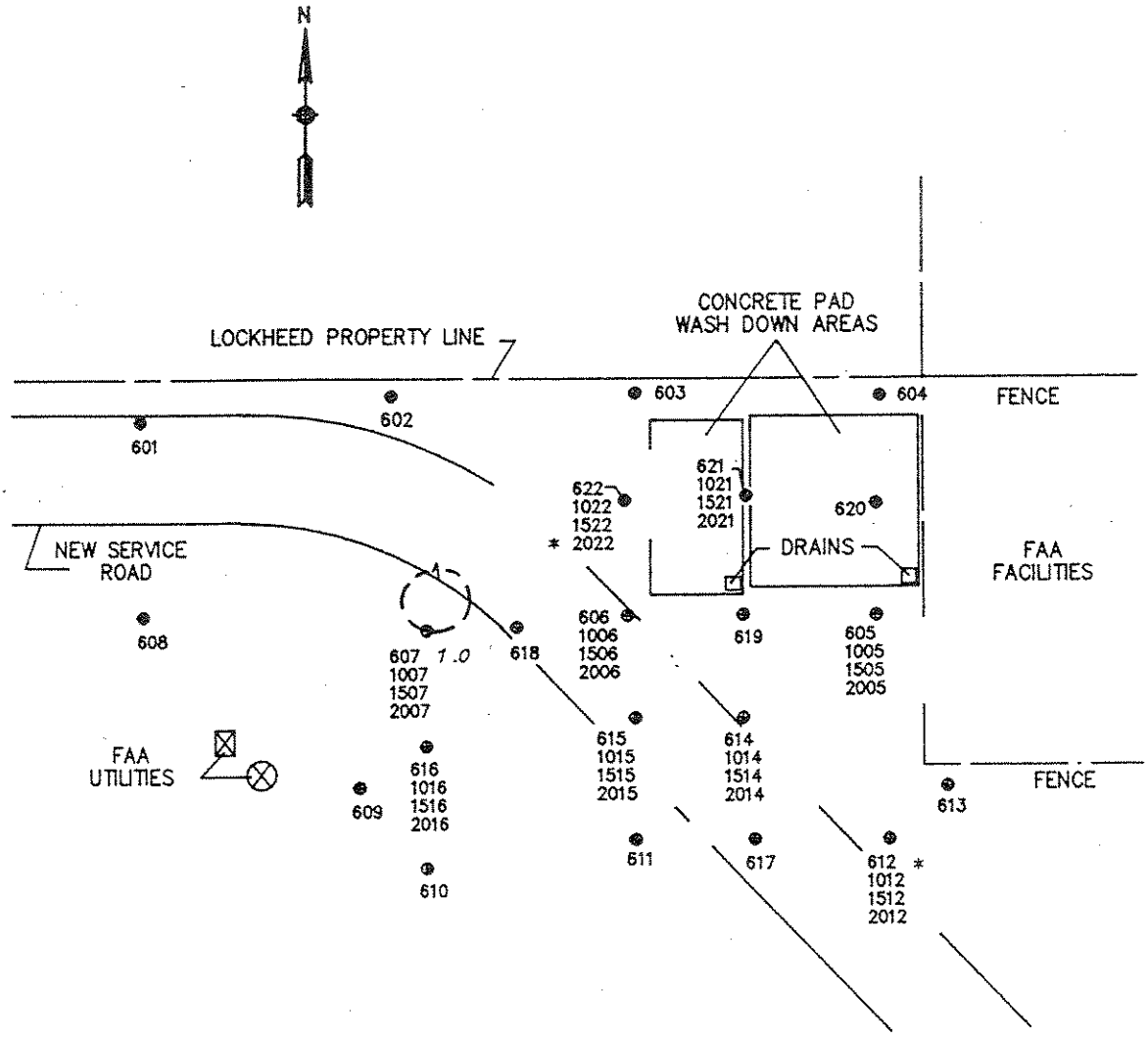
CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 7. Acetone (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.



0 25 50

FEET

⊗ SOIL GAS SAMPLE LOCATION

* DATA NOT AVAILABLE

CONTOUR LINES RESPECT DATA OBTAINED AT THE 6' DEPTH.

FIGURE 8. Benzene (μg/l)

TARGET ENVIRONMENTAL SERVICES, INC.

BURBANK–GLENDALE–PASADENA AIRPORT
BURBANK, CALIFORNIA

This map is integral to a written report and should be viewed in that context.

APPENDIX - 3

Quality Assurance Project Plan for

Soil Gas Sampling Under Mobile Conditions,

Prepared by Target Environmental Services, Inc.

TARGET ENVIRONMENTAL SERVICES, INC.

QUALITY ASSURANCE PROJECT PLAN
for
SOIL GAS SAMPLING
UNDER MOBILE LABORATORY CONDITIONS

Prepared by
TARGET ENVIRONMENTAL SERVICES, INC.
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5932 BOLSA AVE #103 HUNTINGTON BEACH, CALIF 92649 714/373-6050 FAX 714/373-6055

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3.0 Project Description

Samples will be subjected to analysis for the compounds specified by client.

Samples will be analyzed on a high quality gas chromatograph equipped with capillary columns, thermal oven, and with a data processor and associated hardware. Each instrument is appropriately calibrated at the beginning of the project, and as needed for the duration of the project using an instrument-response curve and injection of standards of known concentrations. Retention times of the compounds in the standards are used to identify the unknown compounds in field samples, and their response factors are used in calculating actual concentrations. Duplicate analyses will be performed on at least every tenth field sample (see QA/QC section).

This level of GC not only provides reliable identification and quantification of standard analytes, it also produces a chromatogram with enough resolution to match sample signatures with known contaminant signatures and determine (in many cases) the nature of the original product and its relative age.

We use both FID and ECD detectors for obtaining the best information on the compounds of interest. When assessing petroleum hydrocarbons we have found that a full signature analysis on a FID provides much more information than the results from a PID or any other detector. Since older spills are often degraded, analyzing for only a limited number of compounds may result in an occurrence being missed whereas a full analytical signature will allow successful identification and mapping of the spill. TARGET will use a GC/ECD for analysis of halogenated compounds.

Some compounds will coelute with other compounds. When this happens, the results will be reported as a coelutant pair. If further resolution is desired, a representative sample from any given area of interest will be selected for analysis by GC/MS. All GC/MS analyses will be performed by **Maryland Spectral Services, Inc.**, Baltimore, Maryland.

4.0 Project Organization And Staffing Plan

This section presents TARGET's organizational structure and processes which are in place to successfully complete the project. Our management approach establishes well defined areas of responsibility, accountability and authority. Each person's charter relates to specific functional areas and prevents the potential confusion of overlapping responsibilities while covering all areas of necessary activity. The following is a concise description of the key project management team.

4.1 Project Manager

The Project Manager will have day to day responsibility for the work and is primarily responsible for technical scheduling and cost performance. He also will be the primary focal point for day to day communications with client's program management.

4.2 Health & Safety Director

The Health & Safety Director has responsibility for risk assessment and management, the design and documentation of all health and safety plans, supervision of all corporate health and safety concerns and requirements, instruction of the 40-hour health and safety course for field personnel, and first-aid training of all TARGET employees.

GREGORY A. BEAL is TARGET's Health and Safety Director for this project. His professional experience includes air monitoring using photoionization detectors, organic vapor analyzers, colorimetric devices, explosimeters and oxygen meters. He also has extensive experience in the operation of gas chromatographs.

4.3 QA/QC Director

The QA/QC Director is responsible for ensuring the integrity of all data collected during the screening process. He will also ensure that TARGET's QA policies and standards are upheld, and review the analysis, interpretation and draft final reports for QA.

4.4 Senior Technical Review

TARGET is committed to providing clients with responsive high quality screening services. To assure this commitment, our sampling procedures, analysis, and final work product will be reviewed by a senior technical review committee. Members of the committee include:

JEFFREY T. SIMS is the Chief Scientist with TARGET. With expertise in soil, water and soil gas sampling and analysis methodology and statistical analysis, Sims is responsible for directing the research, development and evaluation of the soil gas technology used by the company. He also manages the implementation of computerized analytical and data processing systems. Prior to joining TARGET, he spent 6 years in the Geochemistry Division of Gulf Oil Corporation's Research and Development Company developing sample collection techniques, conducting domestic and international sampling surveys, and evaluating analytical results. He also has investigated the effects of environment, climate and compound interactions on soil gas

measurements. Sims is currently a member of AARST, AAPG, COGS, and AEG.

PATRICIA M. STEINHILBER, Ph.D. Her areas of expertise include soil chemistry, land management of municipal and industrial wastes, and environmental organic chemistry. She has brought with her to TARGET 11 years of experience in soil science investigations. For 7 years, she managed a soil testing laboratory engaged in soil analysis by atomic absorption spectrophotometry. Many of the soil investigation projects undertaken by this facility were for both private companies and government agencies. Dr. Steinhilber has also conducted extensive research on municipal and industrial waste, evaluating the toxic element concentrations in numerous soil samples.

J. EDWARD TILLMAN is the founder and President of The TARGET Companies, Inc. and its subsidiary, TARGET Environmental Services, Inc. Geochemistry and environmental project management are Mr. Tillman's areas of expertise. The 18 years of experience in these fields has afforded him the opportunity to develop and refine various forms of surface and subsurface sampling technologies which have been instrumental in the development of TARGET's full range of soil gas surveying methods. Prior to founding TARGET in 1981, Mr. Tillman's professional and management experience included serving as senior consultant for several major geotechnical consulting firms on numerous projects in the Middle East, Canada and most parts of the U.S. Tillman has published and presented numerous papers on the investigation of contaminants in the subsurface and has conducted seminars on environmental issues. He has chaired a committee on ground water problems for the State of Maryland and holds certifications from the American Association of Petroleum Geologists (#3159) and the American Institute of Professional Geologists (#6245). He is a registered geologist in the state of Delaware.

4.5 Laboratory Personnel

4.5.1 Target Personnel

ELIZABETH J. TIERNEY is Laboratory Director for TARGET. She directs all in-house laboratory operations. She also oversees the maintenance and calibration of the various gas chromatographs. Her duties include method development and implementation of new chromatographic technologies. Before coming to work for TARGET she was employed in the GC-MS Laboratory for the State of Maryland Department of Health and Mental Hygiene. She was responsible for the analysis of water, sediment, and hazardous waste samples utilizing EPA methodologies to insure compliance with state and federal regulations.

RUSSELL C. URICH III serves as Manager in TARGET's environmental mobile

laboratory. His responsibilities include overall coordination of mobile lab scheduling, maintenance and servicing of GC's, troubleshooting, R & D and supervision of lab personnel. Mr. Urich was employed by Shimadzu Scientific Instruments for eight years as a Quality Assurance Engineer and supervised the assembly and QA of Gas Chromatographs. In this position, he implemented QA and manufacturing procedures for the Transformer Gas Analysis System which is in use worldwide for the analysis of dissolved gases in transformer oil. He also designed, fabricated and tested the "Weasel" gas manifold system for delivery of carrier gas. His degree is in Marine Engineering from Florida Institute of Technology.

SCOT E. REYNOLDS is the GC Supervisor in the environmental laboratory. His responsibilities are sample scheduling, operation of GC equipment, standards preparation, writing SOP's, calibrating instruments, data processing and maintenance of GC's. Mr. Reynolds majored in Chemistry at Rochester Institute of Technology. Before joining TARGET, he worked for three years as a Chemical Technician for Eastman Kodak Co.

MICHAEL MARRALE is the In-Field Analysis Coordinator for TARGET's Columbia office, the California Regional Office, and the St. Louis/Dallas Regional Office. He is responsible for the daily operations of the mobile laboratories as well as maintaining standard operating procedures and quality assurance/quality control procedures for field analysis. Mr. Marrale has a B.A. in Environmental Science from the University of Virginia.

5.0 Quality Assurance Objectives

5.1 Precision

Precision will be assessed by the comparison of duplicate samples. A duplicate analysis will be obtained for every tenth sample. Coefficients of variation of 75% will be achieved for every duplicate pair.

If the coefficient of variation exceeds 75% for any analyte in that pair, the cause will be determined.

5.2 Accuracy

Accuracy will be determined by the analysis of field blanks, lab blanks and check standards. The data quality objective with respect to field and lab blanks is to achieve analytical concentrations below the detection limit for all analytes. Percent recovery will be determined for each analyte in each check standard.

When contamination is determined to be present in a field blank, it will be

acknowledged in the quality assurance report. An explanation will be given as to the cause of the contamination. An assessment as to the effect of the contamination on the validity of the data from any field sample locations will be made.

5.3 Representativeness

Representativeness of data collection will addressed by careful preparation of the sampling program which specifies sufficient and proper numbers, frequency and location of samples, so as to assure that sample data accurately and precisely represent selected characteristics of the soil gas.

5.4 Completeness

Valid data will be obtained for at least 90% of the sampling locations.

5.5 Comparability

The duration of soil gas sampling activities will be minimized. Because meteorological conditions can affect analyte concentrations in soil gas samples, meteorological information will be collected in the field so that its possible effect on the soil gas data obtained can be addressed.

6.0 Calibration

6.1 GC/FID and GC/ECD Calibration

FID analysis is conducted at Range One. ECD analysis is conducted at Range Zero. In both cases, a three-point least squares linear regression calibration curve is generated daily and the correlation coefficients are examined for each standardized analyte. Its correlation coefficient must be greater than 0.99. The curve is then used to quantify the concentration of analytes in samples. Alternatively, a one-point calibration at a higher range may be conducted when responses have exceeded the linear range of the detector's electrometer (using the highest standard concentration for the type of analysis standard to be analyzed, i.e., either FID standard #3 or ECD standard #3). This one-point calibration is used to quantify the total volatiles of any sample if the original analysis was not quantifiable. Furthermore, a check standard is analyzed at the end of each day to ensure retention time and response stability. Windows for retention times will be set in the time band method, i.e. $\pm$ a value. The value used will be the narrowest possible (usually 0.05 - 0.1) without including non-standardization peaks.

See Appendices I-IV for FID and ECD standard preparation protocol, calibration

check sheet and gas conversion factors.

The FID and ECD stock standards are replaced form pre-prepared (Scott Specialty Gases) cylinders that contain a mix of our standard analytes. A volume of gas is extracted from the main pressurized cylinder. The line is purged to eliminate contamination and then a one litre Tedlar bag with a teflon lined septa is filled. Each Tedlar bag is used only once.

Aliquots from the Tedlar bags are withdrawn using Hamilton gas tight glass syringes. The volumes of each standard (as indicated with concentrations on the included calibration standard concentration sheets) are then injected into 30 ml pre-capped, pre-cleaned (EPA protocol B Level II) evacuated glass vials. Each standard has its owned designated syringe which is cleaned daily with ultra-pure nitrogen before the standards are prepared.

7.0 Analytical Procedures

7.1 Quantification Limits

The "Quantification Limit" is a concentration level at which the degree of confidence in the actual presence of a compound becomes statistically valid and meaningful. Properly stated, a quantification limit should not be confused with the concentration represented by the smallest detectable chromatogram peak area. The importance of quantification limits should also be weighed in the context of acceptable exposure levels and the general levels of contamination on a site. The quantification levels for compounds to be identified on the GC/FID (petroleum hydrocarbons) will range from .1 to 10 μg/l and for compounds identified on the GC/ECD (halocarbons) from .05 to 1 μg/l.

The following tables list the minimum concentrations (the quantification limits) of selected compounds reported using TARGET's soil gas analyses.

VOLATILE ORGANIC COMPOUNDS	REPORTED QUANTIFICATION LIMITS (µg/l)
acetone	1.0
benzene	1.0
ethylbenzene	1.0
carbon tetrachloride	0.05
methylene chloride	1.0
methyl ethyl ketone	1.0
chlorobenzene	1.0
1,1,2,2-tetrachloroethane	0.05
tetrachloroethene	1.0
chloroform	0.10
trichlorofluoromethane	0.05
toluene	1.0
1,1-dichloroethane	1.0
1,1,1-trichloroethane	0.10
1,1,2-trichloroethane	0.10
1,1-dichloroethane	1.0
trichloroethene	1.0
trans-1,2-dichloroethene	1.0
methyl-tert-butyl-ether	1.0
meta-&para-xylene	1.0
ortho-xylene	1.0
cis-1,2-dichloroethene	1.0

7.2 Run Log Data Entry Procedure

RUN PROCEDURE

1. The analysis order for the 1st day is as follows:

A standard FID analysis	FID STD#1 FID STD#2 FID STD#3 Nitrogen Blank 10 Actual Job Samples 1 Nitrogen Blank Duplicate of 10th Sample Analyzed 10 Actual Job Samples 1 Nitrogen Blank Duplicate of 20th Sample Analyzed FID CHK STD

A standard ECD analysis would be as indicated above with ECD standards and an ECD Check Standard.

Dual Analysis (FID/ECD)	ECD STD#1 ECD STD#2 ECD STD#3 FID STD#1 FID STD#2 FID STD#3 Nitrogen Blank 10 Actual Job Samples 1 Nitrogen Blank Duplicate of 10th Sample Analyzed 10 Actual Job Samples 1 Nitrogen Blank Duplicate of 20th Sample Analyzed ECD CHK STD FID CHK STD

The analysis order for the 2nd, 3rd, 4th, and 5th days is as follows:

Dual Analysis (FID/ECD)	ECD CHK STD
	FID CHK STD
	1 Nitrogen Blank
	10 Actual Job Samples
	1 Nitrogen Blank
	Duplicate of 10th Sample Analyzed
	10 Actual Job Samples
	1 Nitrogen Blank
	Duplicate of 20th Sample Analyzed
	ECD CHK STD
	FID CHK STD

2. The run log book should be kept current AT ALL TIMES. Entries should be as follows:

DATE	ATTENUATION	METHOD	JOB CODE	CR4A[Data File]

DATE:	Date run and initials of technician who ran job
ATTENUATION:	Attenuation of sample during run
METHOD:	Method of analysis performed
JOB CODE:	See following example
CR4A:	Up to six-digit job code used as the base file name followed by .C and the sequential set of numbers.

Job Code Entry (example)

```
Standards are entered as:      FID 1<----Standard #
                               FID 2
                               FID 3

Blank after standard:          B-1

Actual Samples:                MWDW-1
                               MWDW-10<----Sample #
                Job Code  ---> MWDW-20

Blanks after Samples are entered as follows:

                               MWDW-10   MWDW-20
                               B-10 MWDW B-20 MWDW
```

```
Check Standards:                    CHK STD-1

Duplicates:                         R-10 MWDW<----Job Code
                Sample #  ----> R-20 MWDW
```

3. Any entry errors should be crossed out once, initialed by the person who made the mistake, dated, and explained as per usual GLP guidelines.

4. A copy of each run log should be placed with the raw data in the manilla folder at the conclusion of each run.

5. During a run, the calibration of the standards should be checked immediately if any analytes are not identified. Check raw data and either adjust retention times or broaden or narrow the bands so as to enable the analyte to be identified. If retention time shifts and standardized analytes fall outside of window, the pattern of the shifts will be examined. If the pattern is discernible and predictable, the time band or retention time in the ID table will be changed as necessary.

6. If analyte is identified but the areas of all three concentrations do not produce an acceptable linear regression, re-analyze and re-calibrate. Adjust either the minimum area slope or drift accordingly prior to re-calibration. (See Linear Regression Check Sheets in Appendices V and VI)

7. During the analysis if needed the attenuation can be changed and if such a change is necessary it should be indicated in the run log book immediately. FID analysis is usually run at Attenuation 1 and ECD analysis is run at Attenuation 6.

8. At the conclusion of the run the Raw Data Sheet Information for Reprocessing should be completed. All chromatograms should be checked for septa bleed, ghost peaks, background noise and other spurious peaks. (See Appendix VII)

9. Indicate any attenuation changes needed, and if any analyte has exceeded the linear dynamic range of the electrometer indicated by an integration error. (See Quantitative Calculation Report Mark Sheet in Appendix XIII) If they are in error, the Sample Re-shoot Check List (See Appendix IX) should be completed and the samples will be re-analyzed later at a higher range.

10. Sign and complete all necessary forms used for analysis then submit all

data and forms to be reprocessed. The Tracking Sheet must be kept current at all times, signed, and dated after each entry. Indicate any problems or changes in any manner in the notes space provided on the Raw Data Sheet Information for Reprocessing form.

8.0 Data Reduction, Validation, and Reporting

CR42 RPT is a data conversion program in which the data files generated on the CR4A during the actual run are converted to a report table format on an IBM compatible PC. To initialize this procedure the data files of the CR4A are converted to MSDOS by an MS conversion program which transfers the data from the original data disk to a shuttle disk. Groups of these data files are then converted and combined by the CR42 TBL program. CR4A information is stored on a 3.5" data disk. The RPT 2 TBL is stored on a 5.25" floppy disk in tabular format.

Data for the standard calibration is then retrieved in DOS format. The information retrieved in DOS format is then printed out via Word Perfect. The subsequent data is reviewed to ensure all analytes are identified and their concentrations are within acceptable criteria. The data and chromatograms are then submitted to the report writing group.

The final data packet will consist of chromatograms and report sheets for all samples analyzed, including those for initial calibrations, check standards, laboratory blanks, field samples, field blanks and sample duplicates.

9.0 Internal QC Checks

9.1 GC/FID and GC/ECD Analysis

See Section 6.1 for calibration and check standards.

10.0 Audits

The performance audit consists of laboratory blanks (every 10 samples), duplicate analysis of every tenth sample, check standards (at the beginning and the end of every job after the initial calibration), and field blanks (at the beginning and end of each day's sampling and after every 20 samples).

Data from quality control samples (laboratory blanks, field blanks, check standards), standards and soil gas samples, including soil gas sample duplicates, are reviewed by a mobile lab operator, by a project scientist in the report writing group, and by a QA assistant.

11.0 Preventive Maintenance

There is a maintenance book for each system. Maintenance is conducted on a daily basis and all information is recorded in the system maintenance book. Daily checks include: purge and flow rates, gas pressure readings to the GC, the FID is checked to ensure it is lit, and the HSS sufficient pressure warning light is checked. The columns are conditioned daily at 200°C; the ECD is baked off at 345°C. Injection septa are replaced on a daily basis.

The carrier gases are checked twice daily, on arrival in the morning and on departure in the evening. They are replaced when necessary or if there is a problem with the analysis on the GCs (e.g., if there is any baseline drift which is recurring and increasing in intensity, the carrier gas cylinder is replaced automatically and the supplier of the carrier gas is notified).

Other maintenance checks include: the replacement of columns as required based on loss of resolving capability or decrease in Retention Times (all other parameters constant) of more than five minutes.

All tubing is replaced when necessary. TARGET Environmental uses Supelco conditioned stainless steel premium grade 304 (1/8"OD x 2.1 mm ID).

12.0 SOP for Precision, Accuracy and Completeness

12.1 Precision

Precision will be determined by comparing the duplicate samples. Coefficient of variation (CV) will be used to estimate precision. The following equation will be used:

$$CV\ (\%) = (s/x) \times 100$$

where s = standard deviation of the analyte concentrations for the duplicate pair
x = mean of the analyte concentrations for the duplicate pair

12.2 Accuracy

Accuracy means the nearness of a result to the true or expected value. Accuracy will be estimated in terms of average percent recovery (P) of standardized analytes in the check standards. The following equation will be used:

$$P\ (\%) = (Q/T) \times 100$$

where Q = analyte concentration measured in the check standard
T = expected analyte concentration in the check standard

12.3 Completeness

All data will be reviewed for validity. Completeness (C) will be estimated as follows:

$$C\ (\%) = (\text{valid data obtained/total data needed}) \times 100$$

13.0 Corrective Action

13.1 Analytical Phase

For GC/FID or GC/ECD analyses corrective action, see Section 5.

14.0 APPENDICES

APPENDIX I

CALIBRATIONS STANDARD CONCENTRATIONS

FID

Volume of the injection of stock standard into 30ml vial

Compound Name	STD#1 130µL	STD#2 232µL	STD#3 680µL	CHKSTD 232µL
ACETONE	1·12	2·01	5·9	2·01
METHYL-TERT-BUTYL ETHER (MTBE)	2·49	4·45	13·0	4·45
METHYL ETHYL KETONE (MEK)	1·46	2·59	7·6	2·59
BENZENE	1·50	2·67	7·8	2·67
TOLUENE	1·78	3·18	9·3	3·18
CHLOROBENZENE	2·22	3·96	11·6	3·96
ETHYLBENZENE	2·12	3·78	11·1	3·78
META-& PARA-XYLENE (M&P-XYLENE)	4·24	7·56	22·2	7·56
ORTHO-XYLENE (O-XYLENE)	2·13	3·81	11·1	3·81

APPENDIX II

CALIBRATION STANDARD CONCENTRATIONS

ECD

Volume of the injection of stock standard in to 30 ml vial

Compound Name	STD#1 1000μL	STD#2 2000μL	STD#3 STOCK	CHKSTD 2000μL
TRICHLOROFLUOROMETHANE (TCFM)	0·16	0·32	4·78	0·32
1,1-DICHLOROETHYLENE (1,1-DCE)	0·40	0·79	11·86	0·79
METHYLENE CHLORIDE (CH_2CL_2)	0·26	0·52	7·74	0·52
trans-1,2-DICHLOROETHYLENE (t-1,2-DCE)	0·46	0·92	13·76	0·92
1,1-DICHLOROETHANE (1,1-DCA)	0·47	0·93	14·01	0·93
cis-1,2-DICHLOROETHYLENE (c-1,2-DCE)	0·59	1·18	17·70	1·18
CHLOROFORM	0·05	0·10	1·44	0·10
1,1,1-TRICHLOROETHANE (1,1,1-TCA)	0·05	0·09	1·38	0·09
CARBON TETRACHLORIDE (CARBON TETT)	0·23	0·45	6·80	0·45
TRICHLOROETHYLENE (TCE)	0·04	0·09	1·34	0·09
1,1,2-TRICHLOROETHANE (1,1,2-TCA)	0·08	0·16	2·40	0·16
TETRACHLOROETHYLENE (PCE)	0·06	0·12	1·73	0·12
1,1,2,2-TETRACHLOROETHANE (TECA)	0·05	0·09	1·36	0·09

APPENDIX III

CALIBRATION CHECK CHART

AB TECHNICIAN:

ATE:

JOB CODE:

CR4A: .C .C

SYSTEM:

DATE INJECTED:

FID STANDARD AREA'S				
GASES	1	2	3	C-S
ACETONE				
MTBE				
MEK				
BENZENE				
TOLUENE				
CHLBENZENE				
ETHYLBEN				
M&P-XYLENE				
O-XYLENE				

IF FACTOR (1)
RESULTS ARE POSITIVE (check):____

ECD STANDARD AREA'S				
GASES	1	2	3	C-S
1. TCFM				
2. 1,1-DCE				
3. CH_2CL_2				
4. T-1,2-DCE				
5. 1,1-DCA				
6. C-1,2-DCE				
7. CHLOROFORM				
8. 1,1,1-TCA				
9. CARBON TETT				
10. TCE				
11. 1,1,2-TCA				
12. PCE				
13. TECA				

IF FACTOR (1)
RESULTS ARE POSITIVE (check):____

* IF GASES NOT IDENTIFIED OR PROBLEM WITH AREA

APPENDIX IV

STP CONVERSION FACTORS

COMPOUND	f
MTBE	254.1
BENZENE	286.8
TOLUENE	243.1
ETHYLBENZENE	211.0
XYLENE	211.0
DICHLOROETHENE	231.1
DICHLOROETHANE	226.4
TRICHLOROETHENE	170.5
TRICHLOROETHANE	167.9
TETRACHLOROETHENE	135.1
TETRACHLOROETHANE	133.5
METHYLENE CHLORIDE	457.1
CHLOROFORM	350.0
CARBON TETRACHLORIDE	280.0

$$f \times \mu g/L = PPB\ (V/V)$$

$$f = \frac{(22.4)\ (1000)}{MW}$$

CONVERSION FROM PPB TO $\mu g/L$

The conversion from PPB to $\mu g/l$ is accomplished by using the following equation.

$$F = (22.4)\ (1000)/\text{molecular weight}$$

$$PPB/F = \mu g/l$$

The molecular weight is that of the individual compound for which the conversion is being made.

Dilutions are prepared at three concentrations. The first concentration is at or near the detection limit of the compound which has the smallest concentration in the stock standard. The second dilution is a middle range concentration. The third dilution concentration is near the off-scale concentration of the compound with the greatest peak area in the stock standard.

The concentration of the dilutions are calculated using the following equation.

concentration of dilute standard =

$$\text{stock concentration } (\mu g/l) \times \frac{\text{injection } (\mu l) \times 10^6}{\text{volume of sample vial } (.03)L}$$

APPENDIX V

FID LINEAR REGRESSION CHECK

NAME	CONC	AREA	LINEAR REGRESSION
ACETONE	1-12	_____	
	2-01	_____	
	5-9	_____	_____
MTBE (Methyl-Tert-Butyl-Ether)	2-49	_____	
	4-45	_____	
	13	_____	_____
MEK (Methyl Ethyl Ketone)	1-46	_____	
	2-59	_____	
	7-6	_____	_____
BENZENE	1-50	_____	
	2-67	_____	
	7-8	_____	_____
TOLUENE	1-78	_____	
	3-18	_____	
	9-3	_____	_____
CHLOROBEN (Chlorobenzene)	2-22	_____	
	3-96	_____	
	11-6	_____	_____
ETHYLBEN (Ethylbenzene)	2-12	_____	
	3-78	_____	
	11-1	_____	_____
M&P-XYLENE (Meta-&Para-Xylene)	4-24	_____	
	7-56	_____	
	22-2	_____	_____
O-XYLENE (Ortho-Xylene)	2-13	_____	
	3-81	_____	
	11-1	_____	_____

JOB CODE:_____ DATE:_____ TECHNICIAN:_____

APPENDIX VI

ECD LINEAR REGRESSION CHECK

NAME	CONC	AREA	LINEAR REGRESSION
TCFM (Trichoroflouromethane)	0-16		
	0-32		
	4-78		_____ . _____
11 DCE (1,1-Dichloroethylene)	0-40		
	0-79		
	11-86		_____ . _____
CH_2CL_2 (Methylene Chloride)	0-26		
	0-52		
	7-74		_____ . _____
t12 DCE (trans-1,2-Dichloroethylene)	0-46		
	0-92		
	13-76		_____ . _____
11 DCA (1,1-Dichloroethane)	0-47		
	0-93		
	14-01		_____ . _____
C12 DCE (cis-1,2-Dichloroethylene)	0-59		
	1-18		
	17-70		_____ . _____
CHLOROFORM	0-05		
	0-10		
	1-44		_____ . _____
111 TCA (1,1,1-Trichloroethane)	0-05		
	0-09		
	1-38		_____ . _____
CARBON TETT (Carbon Tetrachloride)	0-23		
	0-45		
	6-80		_____ . _____
TCE (Trichloroethylene)	0-04		
	0-09		
	1-34		_____ . _____
112 TCA (1,1,2-Trichloroethane)	0-08		
	0-16		
	2-40		_____ . _____
PCE (Tetrachloroethylene)	0-06		
	0-12		
	1-73		_____ . _____
TECA (1,1,2,2-Tetrachloroethane)	0-05		
	0-09		
	1-36		_____ . _____

JOB CODE:_____ DATE:_____ TECHNICIAN:_____

APPENDIX VII

Circle Applicable: FID ECD BOTH

RAW DATA SHEET INFORMATION FOR REPROCESSING

DATE ANALYZED: *CALIBRATION OK:

__SYSTEM #: *RE-CALIBRATED BEFORE RUN:

____

JOB CODE: *RE-CALIBRATED AFTER RUN: _____

CR4A: .C .C

INITIALS OF PERSON WHO RAN JOB:

MINIMUM AREA: RANGE:

ATTENUATION	ERROR ON GAS	ATTENUATION	ERROR ON GAS

NOTES: (Attenuation changes during run, etc.)

TECHNICIAN:_____ DATE:_____

APPENDIX VIII

Quantitative Calculation Report Marks

The marks written in the MK column of the quantitative calculation report indicate the peak processing (chromatogram) states, and include:

No mark: Independent peak or the first incompletely separated peak

S: Main peak with tailing

V: Second or subsequent incompletely separated peak

T: Tailing-processed peak

TV: Second or subsequent incompletely separated peak on a tailing

L: Leading-processed peak

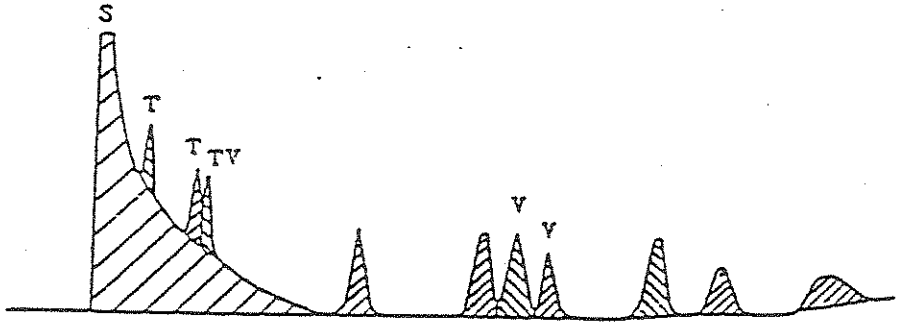
LV: Second or subsequent incompletely separated peak on a leading

E: Error peak (at an input voltage of below −5mV or above 1V)

H: Horizontal baseline-processed peak

R: Internal standard peak or reference peak in the relative retention time method

EX.)



Peak Processing Marks

APPENDIX IX

SAMPLE RE-SHOOT CHECK LIST

JOB CODE	SAMPLE #	RAN ON SYSTEM #	DATE RUN	FID/ECD	TO BE RUN @ RANGE

ECHNICIAN:_____ DATE:_____

APPENDIX - 4

A. L. B.'s Field Procedure and Methodology

FIELD PROCEDURES AND MEASUREMENTS

1.0 Drilling and Soil Sampling Procedures

The drilling and sampling procedures outlined in this document describes the typical and standard procedures used in the collection of representative soil samples for the evaluation of the subsurface materials and the prevailing site conditions of the area under investigation.

1.1 Drilling Method, Equipment and Procedure

The most frequently used and most accepted drilling method is the hallow-stem auger boring. This method is very effective for drilling unconsolidated materials up to a maximum depth of 200 feet.

The equipment used for hallow-stem auger drilling includes either a mechanically or hydraulically-powered drilling rig which are usually truck-mounted to permit easy and rapid mobilization and demobilization.

Dry drilling methods are employed at most locations for soil borings. The rig simultaneously rotates and advances the hollow-stem auger columns. These columns serve not only as casings to prevent "cave-in" or collapse of bore walls but also as medium to carry soil cuttings towards the surface thru the auger flights.

1.1.1 Equipment Preparation and Decontamination

Prior to every drilling and sampling operations, all drilling and sampling equipment and accessories are decontaminated by steam cleaning or by scrubbing by hand with trisodium phosphate (TSP) in distilled water, rinsed with tap water, rinsed with deionized water and air dried.

To prevent cross-contamination between soil samples obtained at different depths and at different borings, additional decontamination procedures for the sampling equipment are performed after every sampling run and for the drilling accessories upon completion of every hole. All steam cleaning condensate and wash water is contained pending proper transport and disposed of at an approved disposal site.

1.1.2 Auger Boring (For Shallow and Deep Borings)

Shallow soil borings are drilled using a smaller model truck-mounted hallow-stem augers. Soil samples are generally collected at 5-foot intervals using a spilt-spoon sampler with a hydraulic piston hammer. For deep soil borings, bigger rigs are usually used such as B-53 or bigger, depending on the target depth of the borehole. Soil samples are, likewise, collected using a split-spoon sampler driven ahead of the auger bit at the desired sampling depth. With the bigger rigs, sampling is usually done using the standard 140-pound drive hammer.

BGPAA 0918

1.1.3 Abandonment of Borehole

Upon completion of drilling and soil sampling, the borehole is backgrouted to the surface with cement grout. To abandon, the borehole is grouted with Volclay Grout by pumping the grout slurry into the hole. The borehole is filled from the bottom to about a foot below the ground surface. After the grout fill has hardened, the one-foot space is filled up with Ready Mix Concrete.

1.1.4 Drill Cuttings Disposal

Drill cuttings are usually stockpiled or stored in a suitable container such as sealed drums or wrapped in a 4 mil polyethylene plastic sheets. The cuttings are disposed of accordingly depending on the analytical tests results conducted. If concentrations are below hazardous levels, the drill cuttings will be removed to a pre-arranged receptor. If concentrations are above hazardous levels, the cuttings will be removed to a certified Class 1 facility.

1.2 Soil Sampling Procedure

In conjunction with the drilling, Standard Penetration Test (SPT) or drive sampling is generally undertaken at 5-foot intervals. Soil samples are taken at the desired depth using split-spoon drive sampler either thru hydraulic piston hammer or the standard 140-pound drop hammer. Portions of the collected soil samples are used for lithologic loggings while the relatively undisturbed ones are sent to analytical laboratories for analyses.

1.2.1 Decontamination of Sampling Devices

Prior to the start of the sampling operations and after completion of every sampling round, the sampling devices such as the split-spoon sampler and the Shelby tubes (brass rings) are decontaminated by scrubbing them by hand with trisodium phosphate in distilled water and then rinsed with tap water, rinsed three times with deionized water and air-dried prior to the sampler's reassembly.

1.2.2 Split-Spoon Sampling and SPT Measurements

The split-spoon sampler is lined with three 6-inch shelby tubes (brass cylinders) with a diameter that ranges from 1-1/4 inches for shallow holes to 3 inches for deeper holes. The sampler is lowered into the borehole, either on a wire line or at the end of the drill pipe, and driven 18 inches into the subsoils with the use of the standard 140-pound drop hammer or with the hydraulic piston hammer respectively. The number of blows (NB) to effect every 6 inches penetration for the entire 18 inches of sampling, using the 140-pound drop hammer, are recorded. SPT is terminated after penetrating 18 inches into the subsoils or after registering 50 blows without effecting a 6-inch penetration. After the sampler is pulled out, the drilling is resumed for the next drilling interval. The sequence of drilling and SPT is repeated until the target sampling depth for the borehole is reached.

1.2.3 Sample Collection

Upon retrieval of the split-spoon sampler from the borehole, the sampler is split longitudinally. The middle portion cylinder is saved for laboratory analyses. It is trimmed at both ends of any protruding materials. The ends are then covered by teflon sheeting and sealed with tight fitting plastic end caps. The end caps are further sealed to the brass tube with the use of an electrical or other appropriate adhesive tapes. The sample is properly labeled as to sample and boring number, depth and date collected. The sample is then placed in a Ziploc plastic bag and stored in a cooler containing ice.

The lower most end cylinder (near the drive shoe) is either archived for future reference or examined by the field geologist for lithological logging. The upper most end is normally discarded and/or examined by the field geologist in case the lower most end sample is kept as duplicate sample.

Prior to lithological logging, the drive samples are monitored for off gassing of volatile organic compounds using organic vapor analyzer (OVA) or any other equivalent monitoring devices.

1.3 Lithologic Logging

Both the drill cuttings and the drive samples are examined by the field geologist as they are collected. The soil materials are described in accordance with the ASTM Unified Soil Classification System (USCS), as to the soil type, grain size, color, presence of fines, relative densities and descriptions and characteristics which may infer presence of contaminations such as discoloration and odor. All these features including the location of the borehole, the name of the contractor, drilling method and equipment used, SPT measurements, TLV readings, sample number and other information pertaining to these soil investigation are incorporated in the boring logs for each of the borehole.

2.0 Sample Handling and Custody

Protocols for handling samples which include sample preparation, labeling, preservation and chain-of-custody documentation are strictly observed from the moment of its collection through analysis and reporting of analytical values.

2.1 Sample Documentation

Immediately after sample collection, the sample container is properly labeled indicating sample identification number, borehole number depth sample taken and date collected. Sample lithologic descriptions, measurements and other relevant information regarding the on-going soil investigation are indicated in the corresponding borehole log.

2.2 Sample Preservation

For sample preservation purposes while in the field, the sample containers are placed in a Ziploc plastic bag and stored in an ice chest with ice to keep the samples cooled at approximately 2° to $4^{o}C$ until delivered to a DHS certified analytical laboratories where samples are stored in cold storage units.

2.3 Chain-of-Custody Transfer

The collected samples are either shipped by express courier or hand delivered to the analytical laboratories for analyses within 48 hours of sampling.

All samples submitted to laboratory for chemical analyses are accompanied by chain-of-custody record. The record includes information such as sample identification number, sampling date and time, sample location, type of analysis required, special instructions for the laboratory. This record or form is checked for accuracy and completeness, and then signed and dated by the laboratory sample custodian accepting the sample.

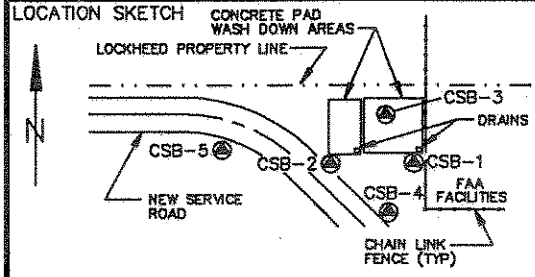
APPENDIX - 5

Boring Logs

A. L. BURKE ENGINEERS
451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

SHEET 1 OF 2

LOCATION OF BORING: NEW SERVICE ROAD AREA – BURBANK AIRPORT	JOB NO. 90-06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB-1
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME-75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



WATER LEVEL					START TIME	FINISH TIME
TIME					7:30 AM	10:15 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/91	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt-paved Surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				0			3" ASPHALT
CSB-1 2.5'	3/3/4	80			ML		FINE TO COARSE, SILTY SANDS; DARK BROWN; STRONG HYDROCARBON (PETROLEUM) ODOR; POORLY GRADED; HIGHLY CONTAMINATED ZONE – 1.5 TO 3.5 FT.
CSB-1 4'	9/11/15	–		5			
CSB-1 9'	33/25/30	10		10	SW		GRAVELLY; FINE TO COARSE SANDS; GRAYISH BROWN; MAX. SIZE 1-1/2 INCHES; WELL GRADED; VERY DENSE; NO ODOR.
CSB-1 14'	9/15/18	20		15			PEBBLY; FINE TO COARSE SANDS; GRAYISH BROWN; LITTLE SILTS; WELL GRADED; VERY DENSE; ALLUVIAL DEPOSITS.
CSB-1 19'	28/50	20		20			GRAVELLY TO COBBLY; FINE TO COARSE SANDS; GRAY; FINES LESS THAN 10%; MAX. SIZE OF SUBROUNDED GRAVELS – 2 INCHES; WELL GRADED; VERY DENSE; ALLUVIUM.
CSB-1 24'	13/24/30	–		25			
CSB-1 29'	23/31/40	25		30	SP		FINE TO COARSE SANDS; GRAY; UNIFORMLY GRADED; VERY DENSE MATERIALS.
CSB-1 34'	13/19/25	25		35	ML		CLAYEY SILT; BROWNISH GRAY; SLIGHTLY PLASTIC.
CSB-1 39'	14/19/25	50		40	SP		FINE SANDS; GRAY; UNIFORMLY GRADED; VERY DENSE.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

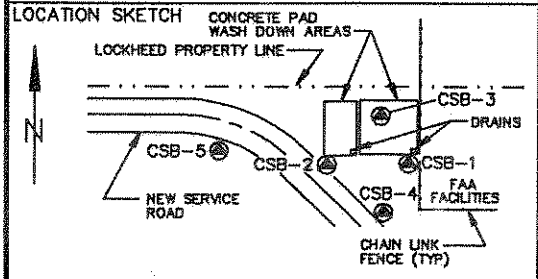
REGISTERED PROFESSIONAL ENGINEER MOLLIE E. HALEWIJN Exp 3-3-93 No. 38200 CIVIL STATE OF CALIFORNIA

12/13/91 CSB1.DWG

A. L. BURKE ENGINEERS

451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

LOCATION OF BORING: BUNKER–SIMULATED GASOLINE FIRE AREA	JOB NO. 90–06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB–1
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME–75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



WATER LEVEL					START TIME	FINISH TIME
TIME					7:30 AM	10:15 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/91	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt–paved Surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				40			
					SP		
CSB–1 44'	23/25/32	25		45			GRAVELLY, FINE SANDS; MAX. SIZE 1/2 INCH; GRAVELS ONLY ABOUT 10%; GENERALLY UNIFORMLY GRADED; LITTLE SILTS; NO ODOR.
CSB–1 49'	32/50	18		50			GRAVELLY, FINE TO COARSE SANDS; GRAYISH BROWN; LITTLE FINES; MAX. SIZE 1–1/2 INCHES; ANGULAR TO SUBANGULAR GRANULES; VERY DENSE; WELL GRADED.
CSB–1 54'	50/50–2'	52		55	SW		PEBBLY, FINE TO COARSE SANDS; GRAYISH BROWN; MAX. SIZE 1/2 INCH; ANGULAR TO SUBROUNDED; WELL GRADED; VERY DENSE.
CSB–1 59'	34/50	45		60			PEBBLY, FINE TO COARSE SANDS; GRAYISH BROWN; MAX. SIZE 1/2 INCH; ANGULAR TO SUBROUNDED; WELL GRADED; VERY DENSE.
CSB–1 64'	50	12		65			FINE TO COARSE SANDS; GRAY; UNIFORMLY GRADED; VERY DENSE.
					SP		
CSB–1 69'	19/25/40	18		70			FINE SANDS; GRAY; VERY FEW SUBROUNDED GRAVELS (1/2 INCH MAX.); UNIFORMLY GRADED; DENSE MATERIALS.
CSB–1 74'	50	20		75			FINE TO COARSE SANDS; GRAY; SOME ROCK CHIPS RECOVERED (2 INCHES); WELL GRADED; VERY DENSE.
					SW		FINE TO COARSE SANDS; GRAY; SOME GRAVELS (1/2 INCH); LITTLE FINES; WELL GRADED; VERY DENSE; ALLUVIAL DEPOSITS.
CSB–1 79'	50	10		80			

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

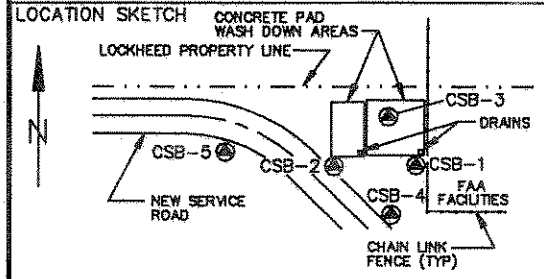
DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

12/13/91 CSB1.DWG

A. L. BURKE ENGINEERS

451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

LOCATION OF BORING: NEW SERVICE ROAD AREA – BURBANK AIRPORT	JOB NO. 90–06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB–2
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME–75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



					START TIME	FINISH TIME
WATER LEVEL						
TIME					12:25 PM	2:40 PM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/91	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt–paved Surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
CSB–2 1'	19/23/25	8		0			2" ASPHALT
					SP		FINE TO COARSE SANDS; GRAYISH BROWN; UNIFORMLY GRADED; VERY FEW PEBBLES; MEDIUM TO DENSE; NO ODOR; ALLUVIUM.
CSB–2 5'	13/17/18	9		5			FINE TO COARSE SANDS; GRAYISH BROWN; UNIFORMLY GRADED; VERY FEW PEBBLES; MEDIUM TO DENSE; NO ODOR; ALLUVIUM.
CSB–2 10'	12/19/30	10		10	SW		GRAVELLY, FINE TO CAORSE SANDS; GRAY; MAX. SIZE – 2 INCHES OF SUB–ROUNDED GRAVELS; WELL GRADED; DENSE MATERIALS.
CSB–2 15'	23/27/40	2		15	SP		FINE TO COARSE SANDS; GRAY; VERY FEW GRAVEL–SIZED MATERIALS (LESS 10%); UNIFORMLY GRADED; DENSE.
CSB–2 20'	18/33/50	2		20	SW		PEBBLY, FINE TO COARSE SANDS; GRAY; MAX. SIZE – 1/2 INCHES; GRANULES ARE SUBANGULAR TO SUBROUNDED; WELL GRADED AND CLEAN SANDS.
CSB–2 25'	23/30/41	2		25			PEBBLY, FINE TO COARSE SANDS; GRAY; MAX. SIZE – 1/2 INCHES; GRANULES ARE SUBANGULAR TO SUBROUNDED; WELL GRADED AND CLEAN SANDS.
CSB–2 30'	20/25/37	0		30	ML		CLAYEY SILTS; BROWNISH; DENSE MATERIALS.
CSB–2 35'	50	48		35	SW		GRAVELLY, FINE TO COARSE SANDS; GRAY; MAX. SIZE – 3/4 INCHES; SUB–ANGULAR TO SUBROUNDED; WELL GRADED SANDS.
CSB–2 40'	20/28/28	20		40	ML		CLAYEY SILTS; BROWNISH; DENSE MATERIALS.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

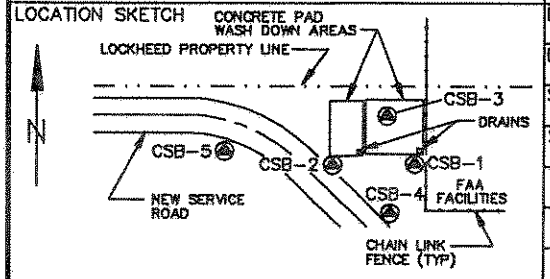
DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

REGISTERED PROFESSIONAL ENGINEER MOLLIE E. HALEWICH Exp 3-3-93 No. 32200 STATE OF CALIFORNIA

12/18/91 | V CSB2.DWG

A. L. BURKE ENGINEERS
451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

LOCATION OF BORING: BUNKER-SIMULATED GASOLINE FIRE AREA	JOB NO. 90-06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB-2
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME-75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



					START TIME	FINISH TIME
WATER LEVEL						
TIME					12:25 PM	2:40 PM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/91	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt-paved Surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				40			
CSB-2 45'	32/50	4		45	SP		FINE SANDS; GRAY; VERY FEW GRANULES; UNIFORMLY GRADED SANDS; VERY DENSE.
CSB-2 50'	28/50	2		50	SW		GRAVELLY, FINE TO COARSE SANDS; GRAY; ANGULAR TO SUBROUNDED; MAX. 3/4 INCHES; LITTLE FINES; WELL GRADED; VERY DENSE.
CSB-2 55'	50	2		55			GRAVELLY, FINE TO COARSE SANDS; GRAY; ANGULAR TO SUBROUNDED; MAX. 3/4 INCHES; LITTLE FINES; WELL GRADED; VERY DENSE.
CSB-2 60'	50	0		60			PEBBLY, FINE TO COARSE SANDS; GRAY; ANGULAR TO SUBROUNDED; MAX. 1/2 INCH; WELL GRADED, CLEAN SANDS.
CSB-2 65'	50	0		65			GRAVELLY, COARSE SANDS; LITTLE FINES; SUBANGULAR TO SUBROUNDED; MAX. 1 INCH; WELL GRADED, CLEAN SANDS.
CSB-2 70'	50	2		70			COBBLY, SANDS; GRAY; ONE COBBLE – 3 INCHES; WELL GRADED MATERIALS; VERY DENSE.
CSB-2 75'	41/50'-0"	0		75			COBBLY, SANDS; GRAY; ONE COBBLE – 3 INCHES; WELL GRADED MATERIALS; VERY DENSE.
CSB-2 80'	46/50	0		80			

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S. R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

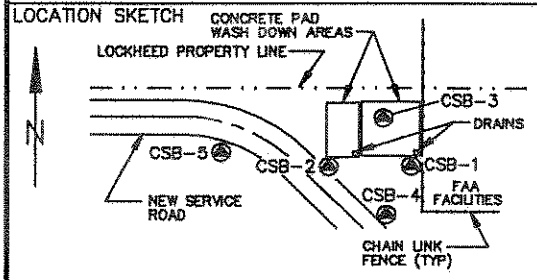
12/16/91 CSB2.DWG

A. L. BURKE ENGINEERS

451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

SHEET 1 OF 2

LOCATION OF BORING: NEW SERVICE ROAD AREA – BURBANK AIRPORT	JOB NO. 90-06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB-3
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME-75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



					START TIME	FINISH TIME
WATER LEVEL						
TIME					7:20 AM	9:00 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/15/91	11/15/91

DATUM: ELEVATION:

SURFACE CONDITION: Concrete-paved (wash down concrete pad)

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				0			CONCRETE – 2 TO 3 INCHES THICK
CSB-3 1'	13/15/17	0			SP		FINE TO MEDIUM SANDS; BROWNISH; VERY FEW COARSE GRANULES; UNIFORMLY GRADED; NO ODOR; LOOSE TO MEDIUM DENSE.
CSB-3 5'	14/19/27	12		5	SW		GRAVELLY; FINE TO COARSE SANDS; GRAYISH BROWN; MAX. SIZE OF GRAVEL 1-1/4 INCHES; SUBANGULAR TO SUBROUNDED; LITTLE FINES; WELL GRADED AND CLEAN SANDS.
CSB-3 10'	8/11/12	0		10			GRAVELLY; FINE TO COARSE SANDS; GRAYISH BROWN; MAX. SIZE OF GRAVEL 1-1/4 INCHES; SUBANGULAR TO SUBROUNDED; LITTLE FINES; WELL GRADED AND CLEAN SANDS.
CSB-3 15'	12/22/27	2		15			GRAVELLY; FINE TO COARSE SANDS; GRAYISH BROWN; SUBROUNDED; MAX. SIZE 1 INCH; LITTLE SILTS (10%); WELL GRADED; MEDIUM TO DENSE MATERIALS.
CSB-3 20'	19/30/39	5		20	SP		FINE TO COARSE SANDS; BROWNISH; MUCH SILTS AND CLAYS; VERY FEW GRAVELS; POORLY GRADED.
CSB-3 25'	20/29/48	4		25			FINE TO COARSE SANDS; BROWNISH; LITTLE SILTS; UNIFORMLY GRADED SANDS.
CSB-3 30'	20/27/36	0		30			FINE TO COARSE SANDS; BROWNISH; LITTLE SILTS; UNIFORMLY GRADED SANDS.
CSB-3 35'	12/19/25	2		35			FINE SANDS; BROWNISH; SILTY AND CLAYEY; UNIFORMLY GRADED.
CSB-3 40'	14/20/32	0		40			FINE SANDS; BROWNISH; SILTY AND CLAYEY; UNIFORMLY GRADED.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

REGISTERED PROFESSIONAL ENGINEER MOLLIE E. HALEWIJN Exp 3-3-93 No. 38200 CIVIL STATE OF CALIFORNIA

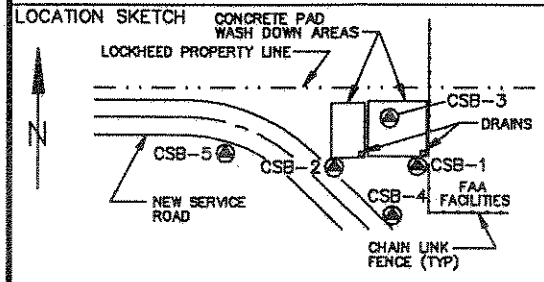
12/16/91 CSB3.DWG

BGPAA 0926

A. L. BURKE ENGINEERS
451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

SHEET 2 OF 2

LOCATION OF BORING: BUNKER–SIMULATED GASOLINE FIRE AREA	JOB NO. 90–06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB–3
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME–75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		
DATUM:	ELEVATION:		



WATER LEVEL					START TIME	FINISH TIME
TIME					7:20 AM	9:00 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/15/91	11/15/91

SURFACE CONDITION: Concrete–paved (wash down concrete pad)

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				40			
CSB–3 45'	12/32/42	2		45			FINE TO COARSE SANDS; GRAYISH; GRAIN SIZE – 1/2 INCH; SUBANGULAR TO SUBROUNDED; LITTLE FINES (LESS THAN 10%); WELL GRADED; DENSE TO VERY DENSE MATERIALS.
CSB–3 50'	32/50	0		50			FINE TO COARSE SANDS; GRAY; MAX. SIZE 1–1/2 INCHES; SUBANGULAR TO SUBROUNDED; LITTLE SILTS; WELL GRADED; VERY DENSE MATERIALS.
CSB–3 55'	50	0		55	SW		FINE TO COARSE SANDS; GRAY; MAX. SIZE 1–1/2 INCHES; SUBANGULAR TO SUBROUNDED; LITTLE SILTS; WELL GRADED; VERY DENSE MATERIALS.
CSB–3 60'	40/50	2		60			FINE TO COARSE SANDS; GRAY; SUBROUNDED GRAVELS; MAX. SIZE 1 INCH; FINES LESS THAN 10%; WELL GRADED AND VERY DENSE.
CSB–3 65'	40/50	0		65			FINE TO COARSE SANDS; GRAY; SUBROUNDED GRAVELS; MAX. SIZE 1 INCH; FINES LESS THAN 10%; WELL GRADED AND VERY DENSE.
CSB–3 70'	25/30/36	2		70	ML		CLAYEY SILT; SLIGHTLY PLASTIC, DENSE MATERIALS.
CSB–3 75'	50	–		75	SP		SILTY FINE SANDS; FEW COBBLE–SIZED PIECES RECOVERED; POORLY GRADED.
CSB–3 80'	80	–		80	GP		COBBLY TO BOULDERY LAYER ENCOUNTERED AT 78 FEET. STRONG VIBRATION OF AUGERS. NO SAMPLE RECOVERED, EXCEPT FOR FEW ROCK PIECES (MAX. SIZE 3 INCHES).

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

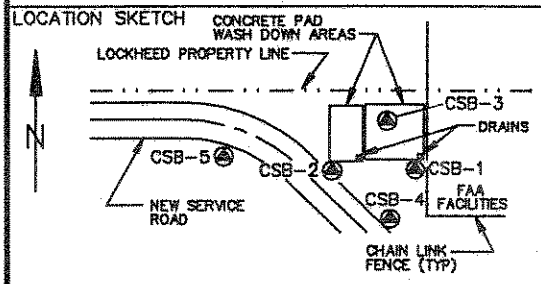
12/17/91 CSB3.DWG

A. L. BURKE ENGINEERS

451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

SHEET 1 OF 2

LOCATION OF BORING: NEW SERVICE ROAD AREA – BURBANK AIRPORT	JOB NO. 90-06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB-4
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME-75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



WATER LEVEL					START TIME	FINISH TIME
TIME					10:30 AM	12:00 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/91	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt-paved

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
							2 INCHES OF ASPHALT
CSB-4 1'	24/25/20	8		0			PEBBLY, FINE TO COARSE SANDS; GRAYISH BROWN; SUBANGULAR TO SUB-ROUNDED; MAX. SIZE 1/2 INCH; LITTLE FINES (LESS THAN 10%); WELL GRADED; NO ODOR; ALLUVIUM.
CSB-4 5'	25/29/23	2		5			GRAVELLY, FINE TO COARSE SANDS; GRAY; 20% GRAVEL (1/2 INCH); WELL GRADED; DENSE MATERIALS.
CSB-4 10'	23/29/35	1		10			GRAVELLY, FINE TO COARSE SANDS; GRAY; 20% GRAVEL (1/2 INCH); WELL GRADED; DENSE MATERIALS.
CSB-4 15'	50	5		15			PEBBLY, FINE TO COARSE SANDS; GRAY; SUBANGULAR TO SUBROUNDED GRANULES; MAX. SIZE 3/4 INCH; WELL GRADED; VERY DENSE.
CSB-4 20'	25/31/34	11		20	SW		GRAVELLY, FINE TO COARSE SANDS; GRAY; LITTLE FINES; SUBANGULAR TO SUBROUNDED; MAX. SIZE 1-1/2 INCHES; WELL GRADED; VERY DENSE.
CSB-4 25'	50	9		25			GRAVELLY, FINE TO COARSE SANDS; GRAY; FINES LESS THAN 10%; WELL GRADED CLEAN SANDS; VERY DENSE.
CSB-4 30'	38/40/44	12		30			GRAVELLY, FINE TO COARSE SANDS; GRAY; FINES LESS THAN 10%; WELL GRADED CLEAN SANDS; VERY DENSE.
CSB-4 35'	25/24/50	18		35			GRAVELLY, FINE TO COARSE SANDS; GRAY; LITTLE FINES; MAX. GRAVEL SIZE 2 INCHES; GRAVELS ABOUT 20%; WELL GRADED AND CLEAN SANDS; DENSE.
CSB-4 40'	25/50	0		40			GRAVELLY, FINE TO COARSE SANDS; GRAY; LITTLE FINES; MAX. GRAVEL SIZE 2 INCHES; GRAVELS ABOUT 20%; WELL GRADED AND CLEAN SANDS; DENSE.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03326

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

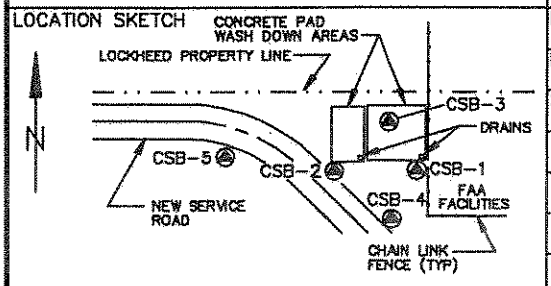
REGISTERED PROFESSIONAL ENGINEER MOLLIE E. HALEWIJN Exp 3-3-93 No. 38600 CIVIL STATE OF CALIFORNIA

12/17/91 CSB4.DWG

BGPAA 0928

A. L. BURKE ENGINEERS
451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

LOCATION OF BORING: BUNKER–SIMULATED GASOLINE FIRE AREA	JOB NO. 90–06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB–4
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME–75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



WATER LEVEL					START TIME	FINISH TIME
TIME					10:30 AM	12:00 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/14/92	11/14/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt–paved

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				40			
					SW		
CSB–4 45'	50	9		45			FINE TO COARSE SANDS; GRAY; SOME GRAVELS (MAX. SIZE 1/2 INCH); SUB–ANGULAR TO SUBROUNDED; LITTLE FINES; WELL GRADED; VERY DENSE.
CSB–4 50'	50	0		50			FINE TO COARSE SANDS; GRAY; POORLY GRADED; VERY FEW GRAVELS; VERY DENSE.
CSB–4 55'	36/50	5		55	SP		FINE TO COARSE SANDS; GRAY; LITTLE FINES; UNIFORMLY GRADED; VERY DENSE MATERIALS.
CSB–4 60'	34/50–5"	6		60			FINE TO COARSE SANDS; GRAY; LITTLE FINES; UNIFORMLY GRADED; VERY DENSE MATERIALS.
CSB–4 65'	50	40		65			GRAVELLY, FINE TO COARSE SANDS; GRAY; FINES ABOUT 15%; MAX. SIZE 1 INCH; SUBANGULAR TO SUBROUNDED; WELL GRADED MATERIALS; VERY DENSE.
CSB–4 70'	20/20/50	12		70	SW		GRAVELLY, FINE TO COARSE SANDS; GRAY; FINES ABOUT 15%; MAX. SIZE 1 INCH; SUBANGULAR TO SUBROUNDED; WELL GRADED MATERIALS; VERY DENSE.
CSB–4 75'	50	5		75			COBBLY; FINE TO COARSE SANDS; GRAY; MAX. SIZE 2–1/2 INCHES; SUB–ROUNDED; WELL GRADED.
CSB–4 80'	50	–		80	GW		COBBLY TO BOULDERY LAYER ENCOUNTERED AT 79 FEET. CHATTERING OF AUGERS.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

12/17/91 CSB4.DWG

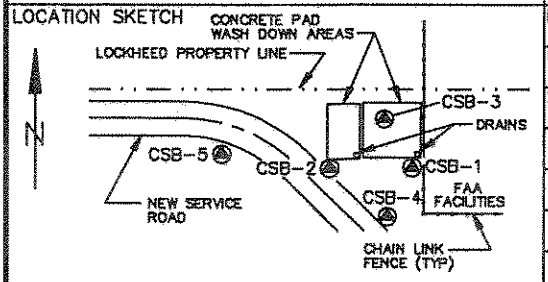
A. L. BURKE ENGINEERS

451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

SHEET 1 OF 2

LOCATION OF BORING: NEW SERVICE ROAD AREA – BURBANK AIRPORT	JOB NO. 90-06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB-5
	PROJECT NAME: Confirmatory Soil Boring and Sampling		

LOCATION SKETCH



DRILLING METHOD: Hollow Stem Auger – 8"

DRILL RIG TYPE: CME-75

SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")

SAMPLE STORAGE METHOD: Blue Ice and Cooler

WATER LEVEL					START TIME	FINISH TIME
TIME					9:35 AM	10:50 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/15/91	11/15/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt-paved surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
							3 INCH ASPHALT
CSB-5 1'	17/23/25	20		0	SP/SM		FINE SANDS; BROWNISH; VERY FEW GRAVELS; MUCH SILTS; POORLY GRADED; NO ODOR.
CSB-5 5'	11/12/14	52		5	SW		FINE TO COARSE SANDS; GRAYISH BROWN; LITTLE SILTS; PEBBLY-SIZED GRANULES 3/4 INCH; DENSE MATERIAL; ALLUVIAL.
CSB-5 10'	14/23/40	12		10			FINE TO COARSE SANDS; GRAYISH BROWN; LITTLE SILTS; PEBBLY-SIZED GRANULES 3/4 INCH; DENSE MATERIAL; ALLUVIAL.
CSB-5 15'	10/10/13	10		15	SC		CLAYEY; BROWNISH; FINE SANDS WITH SOME GRAVELS; MODERATELY PLASTIC; LOOSE MATERIALS.
CSB-5 20'	23/27/32	8		20	SW		FINE TO COARSE SANDS; GRAYISH; SUBANGULAR TO SUBROUNDED GRANULES (MAX. SIZE 1/2 INCH); LITTLE FINES; WELL GRADED; DENSE MATERIALS.
CSB-5 25'	35/33/40	20		25			FINE TO COARSE SANDS; GRAYISH; SUBANGULAR TO SUBROUNDED GRANULES (MAX. SIZE 1/2 INCH); LITTLE FINES; WELL GRADED; DENSE MATERIALS.
CSB-5 30'	25/32/39	0		30			FINE TO COARSE SANDS; GRAYISH; GRAVELLY, MAX. SIZE 3/4 INCH; WELL GRADED; CLEAN SANDS.
CSB-5 35'	36/50	2		35			FINE TO COARSE SANDS; GRAYISH; SUBANGULAR TO SUBROUNDED; MAX. SIZE 1 INCH; FINES LESS THAN 10%; WELL GRADED; VERY DENSE.
CSB-5 40'	39/50	0		40			FINE TO COARSE SANDS; GRAYISH; SUBANGULAR TO SUBROUNDED; MAX. SIZE 1 INCH; FINES LESS THAN 10%; WELL GRADED; VERY DENSE.

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E. Mollie E. Halewijn

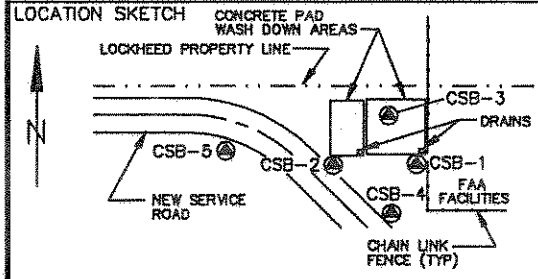
REGISTERED PROFESSIONAL ENGINEER MOLLIE E. HALEWIJN No. 38200 STATE OF CALIFORNIA 3-3-93

12/18/91 CSB5.DWG

BGPAA 0930

A. L. BURKE ENGINEERS
451 WEST LAMBERT RD., SUITE 211
BREA, CALIFORNIA 92621

LOCATION OF BORING: BUNKER–SIMULATED GASOLINE FIRE AREA	JOB NO. 90–06	CLIENT: BURBANK AIRPORT AUTHORITY	BORING NO. CSB–5
	PROJECT NAME: Confirmatory Soil Boring and Sampling		
LOCATION SKETCH	DRILLING METHOD: Hollow Stem Auger – 8"		
	DRILL RIG TYPE: CME–75		
	SAMPLING METHOD: Split Spoon Sampler (2 1/2" x 18")		
	SAMPLE STORAGE METHOD: Blue Ice and Cooler		



					START TIME	FINISH TIME
WATER LEVEL						
TIME					9:35 AM	10:50 AM
DATE					START DATE	FINISH DATE
CASING DEPTH					11/15/91	11/15/91

DATUM: ELEVATION:

SURFACE CONDITION: Asphalt–paved surface

SAMPLE NUMBER	BLOWS PER SIX INCHES	TLV READING (PPM)	TIME AT NOTED DEPTH	DEPTH IN FEET	SOIL TYPE	GRAPHIC LOG	SOIL DESCRIPTION
				40			
CSB–5 45'	40/50	0		45	SW		FINE TO COARSE SANDS; GRAYISH; GRAVELLY; MAX. SIZE 1 INCH OF SUB–ANGULAR TO SUBROUNDED GRAVELS; WELL GRADED; CLEAN SANDS; VERY DENSE.
CSB–5 50'	40/50	0		50			FINE TO COARSE SANDS; GRAYISH; GRAVELLY; MAX. SIZE 1 INCH OF SUB–ANGULAR TO SUBROUNDED GRAVELS; WELL GRADED; CLEAN SANDS; VERY DENSE.
CSB–5 55'	35/50	8		55	SP		FINE SANDS; GRAYISH; MUCH SILTS; VERY FEW GRAVELS; POORLY GRADED; VERY DENSE MATERIALS.
CSB–5 60'	40/50	8		60			FINE SANDS; GRAYISH; UNIFORMLY GRADED; VERY FEW GRANULES; VERY DENSE.
CSB–5 65'	33/50	–		65			FINE SANDS; GRAYISH; UNIFORMLY GRADED; VERY FEW GRANULES; VERY DENSE.
CSB–5 70'	40/40/50	4		70	SW		FINE TO COARSE SANDS; GRAYISH; MAX. GRAVELS (1 INCH); WELL GRADED; VERY DENSE MATERIALS.
CSB–5 75'	40/45/50	4		75	GP		COBBLY TO BOULDERY FORMATION ENCOUNTERED AT 72 FEET. STRONG VIBRATION OF AUGERS. POORLY GRADED COBBLES AND GRAVELS IN SANDY MATRIX; VERY DENSE.
CSB–5 80'	50	–		80			

DRILLING CONTRACTOR: WEST HAZMAT DRILLING CORP. LOGGED BY: R. A. ALMERO, M.S., R.E.A. #03376

DRILLER(S): D. MAROCCHI, B. PINKNEY, E. REID DATE: CHECKED BY R.C.E.

12/18/91 CSB5.DWG

APPENDIX - 6

QA/QC Program

QA/QC PROGRAM

1.0 Field QC Techniques

For all subsurface samples, and where the nature of other materials to be sampled permits, only discrete, undisturbed samples will be taken and prepared for analysis.

Duplicate samples will be taken in a ratio of 1:10 and evaluated for the same analytes as originals.

Where the nature of material to be sampled permits, and certifiably uncontaminated material can be obtained, field blank samples will also be submitted for analyses.

Field instruments will be calibrated using certified standards according to manufacturers' recommendations; preventive maintenance service will be performed by a manufacturer's authorized service center following the manufacturers recommended schedule at servicing.

2.0 Laboratory Calibration Procedures

The laboratory performing the analytical procedures will monitor the quality of all reagents and standard solutions used, and will document this monitoring program. The monitoring program will include screening of reagents for impurities.

Calibration of all analytical instruments used in the performance of the specified procedures will be performed in accordance with manufacturer's guidelines and EPA requirements. Specifically, GC/MS will be turned on a daily basis according to the specifications of the EPA CLP. The instrument will then be calibrated for all target compounds. Each ICP will be calibrated prior to running samples in accordance with EPA CLP protocols. Each AA unit will also be calibrated prior to running of samples. All samples will be spiked to determine whether matrix effects or other interferences are present. Other instruments used for specific procedures will be calibrated according to Manufacturer and EPA guidelines; and as necessitated by specific requirements of the analytical program.

3.0 Laboratory Analytical Procedures

All analyses will be conducted in accordance with relevant EPA requirements, including the current CPL protocols, 40 CFR 136, EPA-600/4-79-020 (1983), EPA-600/4-82-057 (1982), and SW-846.

Analytical procedures performed by EPA Methods 8010, 8020, and 8240, will meet EPA practical quantitation limits of 5 to 10 ug/kg. For EPA Method 8015 for non-halogenicted organics detection limit shall approach 24 ug/kg as required by the CRWQCB-LA. Where it is not possible to achieve these limits, due to matrix properties or required dilutions, these conditions will be noted and described.

4.0 Analytical Data Reduction and Validation

Analytical data will be reviewed inhouse by laboratory staff to ensure accuracy and completeness. Specific items to be verified include: that sample preparation and analysis information are correct and complete; that the appropriate procedures have been followed; that results are correct and complete; that QC samples are within established control limits; that blanks are within appropriate QC limits; that special preparation and analytical requirements have been met; and that documentation is complete.

5.0 Laboratory Inhouse QC Checking

Laboratory performance QC checks will include control samples, and method blanks, along with daily calibration data generation.

Matrix-specific QC procures will include the analysis to matrix spikes, and spike duplicates; monitoring recovery of surrogate compounds; monitoring results of standard additions if applicable; analysis of field blanks; and determination of method detection limits in specific matrices.

A. L. BURKE ENGINEERS, INC.

January 14, 1988

Burbank-Glendale-Pasadena Airport Authority
2627 Hollywood Way
Burbank, CA 91505

Attn: Mr. Jan Garpner

Subject: Environmental Evaluation of "Old Trapper's Property"
Project Report

Gentlemen:

Enclosed is the report describing the recently completed investigation of the "Old Trapper's Property", also known as the "northeast parcel. As indicated to you previously by telephone, the results of the investigation, including sample analysis and geophysical survey, showed find no indication of subsurface contamination. There are, however, several subsurface structures, which have been indicated on the drawings, and which may interfere with future construction activities on the site. It is recommended that, should such construction be planned, removal and demolition of these structures be done at the time of demolition of above-ground structures. It is further recommended that the contractor performing such work have experience with the removal of septic systems or retain a subcontractor with this experience.

If you need additional information or if you have any questions, please feel free to contact me at any time.

Sincerely,

Annie Laurie Burke

Annie Laurie Burke, P. E.
President

Enclosure

OFFICE COPY

1162 NORTH KRAEMER PLACE • ANAHEIM CALIFORNIA 92806 • (714)666-1120 • (714)666-1121

SITE SURVEY OF "OLD TRAPPER'S PROPERTY" (NORTHEAST PARCEL)

FINAL REPORT

Presented to: Burbank-Glendale-Pasadena Airport Authority
2627 Hollywood Way
Burbank, CA 91505

Presented by: A. L. Burke Engineers, Inc.
1162 North Kraemer Place
Anaheim, CA 92806

JANUARY 1988

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1.0 INTRODUCTION

This report presents the results of environmental investigations made on a site known as the "Old Trapper's Property", or "northeast parcel", located near the Burbank-Glendale-Pasadena Airport (hereafter referred to as the Burbank Airport). The site is currently being considered for purchase by the Burbank Airport Authority, and they have requested A. L. Burke Engineers, Inc., to perform a preconveyance audit on it to ensure that the price paid for the property accounts for any additional costs that might be incurred due to site contamination.

1.1 Tenant Leasehold

Most of the site under investigation is currently owned by a Ms. Rosemarie Farish of 10340 Keswick Street, Sun Valley, CA, 91352. Her property is the location of the "Old Trapper's Lodge," an old motel complex now leased individually to tenants as low-income housing. The motel is also a California Historical Landmark (No. 939) due to a large number of folk art statues and carvings presently located on the grounds. Plans are currently underway by the owner to store items from the motel into museums located in other parts of the state.

In addition, a small grocery store exists on the northeast portion of the site and is owned by Ms. Farish's brother-in-law, George Stolpe. The airport is considering buying both properties for its private use sometime after the tenants are moved out and the items of historical significance can be relocated.

1.2 Physical Description of Site

The property is located at 10340 Keswick Street, Sun Valley, CA, along the northeastern portion of Burbank Airport (Fig 1). The property is bounded to the east by Arvilla Avenue which extends northward to San Fernando Road. San Fernando Road forms the border of the property to the north and northeast (Fig. 2). The rest of the site is bounded by the Burbank Airport to the west and northwest, and by the old Hazel Martin Property to the south. Easy access to the site by vehicle is made possible by San Fernando Road, Keswick Street and Arvilla Avenue; both Keswick and Arvilla Avenue are dead end streets. The site is enclosed by a metal chain-link fence to the south and to the west, with numerous other fences dissecting the property at various locations.

The Historic Landmark museum (Boot Hill) and about half of the total apartment houses are located in the "newer" area south of Keswick Street. The triangular-shaped part of the property between Keswick Street and San Fernando Road consists of the older apartment buildings along with an old gas station (to the east) and the small grocery store in the northwest corner.

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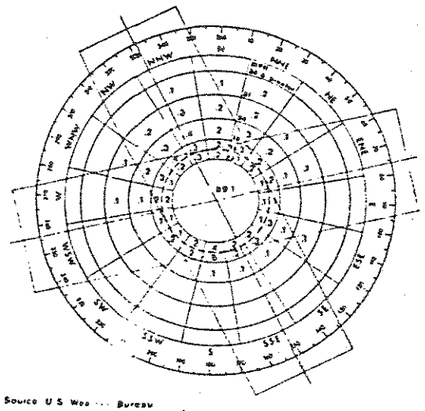
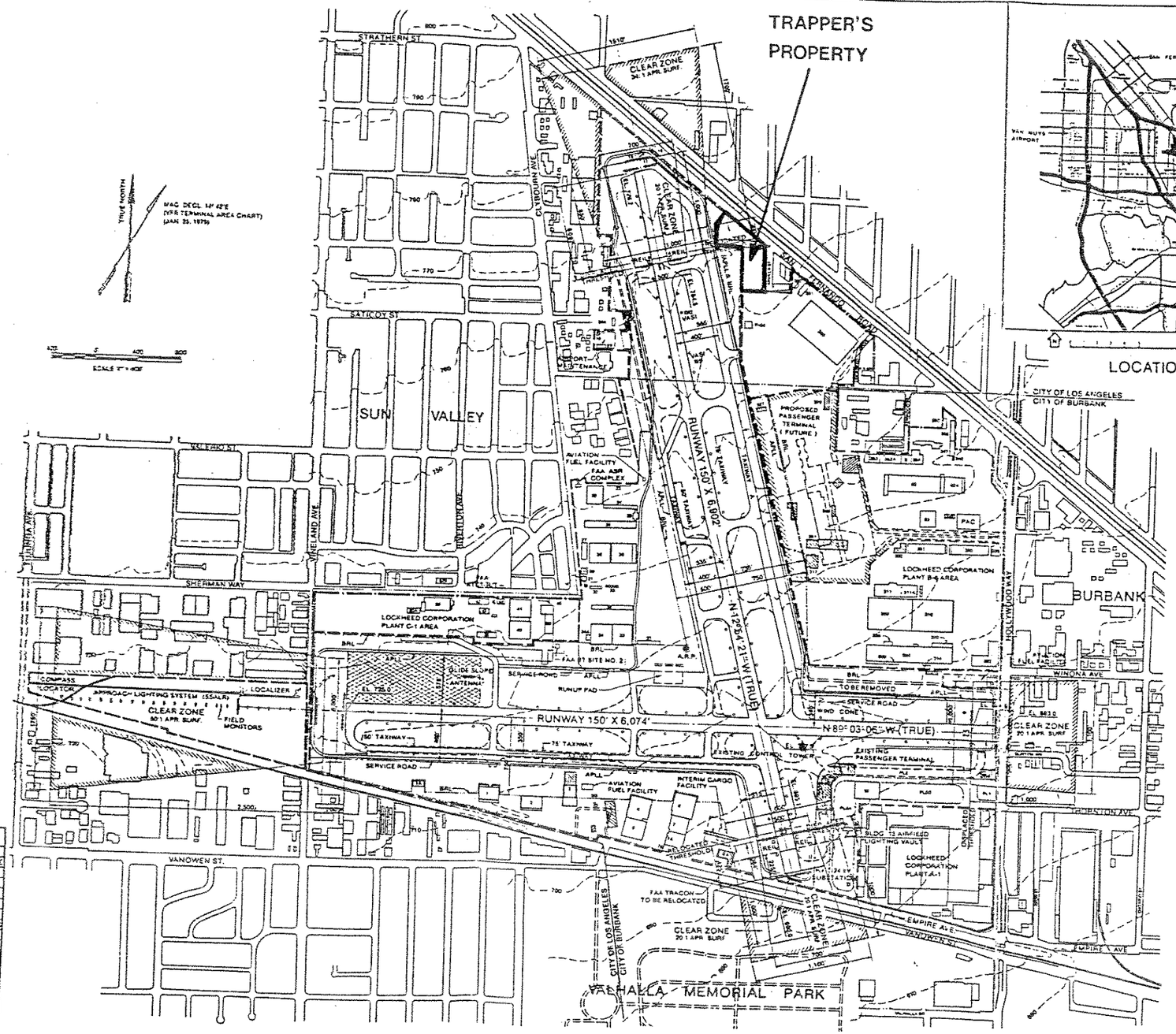


Source U.S. Weather Bureau
Burbank Airport Station

WIND DATA PERIOD:
May 1, 1950 - April 30, 1955

15 MPH Cross-wind Coverage = 99.9%
(For 2 runways)

WIND ROSE



LEGEND

	AIRPORT PROPERTY LINE
	LOCKHEED CORP. PROPERTY LINE
	CITY BOUNDARY LINE
	BUILDING RESTRICTION LINE (BRL)
	AIRCRAFT PARKING LIMIT LINE (APLL)
	EXISTING FACILITIES
	FUTURE FACILITIES
	EXISTING BUILDINGS TO REMAIN
	EXISTING BUILDINGS TO BE REMOVED
	PROPOSED BUILDINGS
	PROPERTY INTEREST TO BE ACQUIRED
	CRITICAL AREA OF THE G.S.
	PERIMETER FENCE
	EXISTING RUNWAY LIGHTING
	EXISTING THRESHOLD LIGHTING
	AIRPORT REFERENCE POINT (A.R.P.)
760	GROUND CONTOUR ELEVATIONS
	BLAST FENCE

AIRPORT DATA

AIRPORT ELEVATION (MSL)	774.7'
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT 34°12'02.1" LONG 118°21'27.2"
AIRPORT AND TERMINAL NAV AIDS	ASR
MEAN MAX TEMP HOTTEST MONTH	93.3 DEGREES F. (JULY 1977)
CRITICAL AIRCRAFT	B-727-200

RUNWAY DATA

	RUNWAY 7		RUNWAY 25		RUNWAY 15		RUNWAY 33	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
EFFECTIVE GRADIENT (IN %)	0.51	SAME	0.51	SAME	1.2	SAME	1.2	SAME
PERCENT WIND COVERAGE (15 MPH)	96.2	SAME	96.2	SAME	97.6	SAME	97.6	SAME
INSTRUMENT RUNWAY	✓	✓				✓		
PAVEMENT STRENGTH	165,000 LBS (DUAL GEAR)				165,000 LBS (DUAL GEAR)			
RUNWAY LIGHTING	MIRL	SAME	MIRL	SAME	MIRL	MIRL	MIRL	MIRL
RUNWAY MARKING	PRECISION	SAME	NON-PREC	SAME	BASIC	PRECISION	BASIC	NON-PREC
NAVIGATIONAL AIDS	SSALR ILS	SAME	NONE	SAME	REIL (ASR)	MALSR	REIL	SAME
RUNWAY TAKEOFF LENGTH	6074'	SAME	6074'	SAME	6903'	SAME	6902'	SAME
RUNWAY LANDING LENGTH	6074'	SAME	5810'	SAME	5993'	6052'	6538'	6477'
DISPLACED THRESHOLD	NONE	SAME	264'	SAME	909'	850'	364'	425'
APPROACH SURFACE	50:1	SAME	20:1	SAME	20:1	34:1	20:1	SAME
RUNWAY THRESHOLD ELEV. (MSL)	725.0	SAME	694.9	SAME	764.5	766.9	695.1	695.3

REVISIONS	DESCRIPTION	BY	APP	DATE	REVISIONS	DESCRIPTION	BY	APP	DATE

FAA APPROVAL

SPONSOR'S APPROVAL

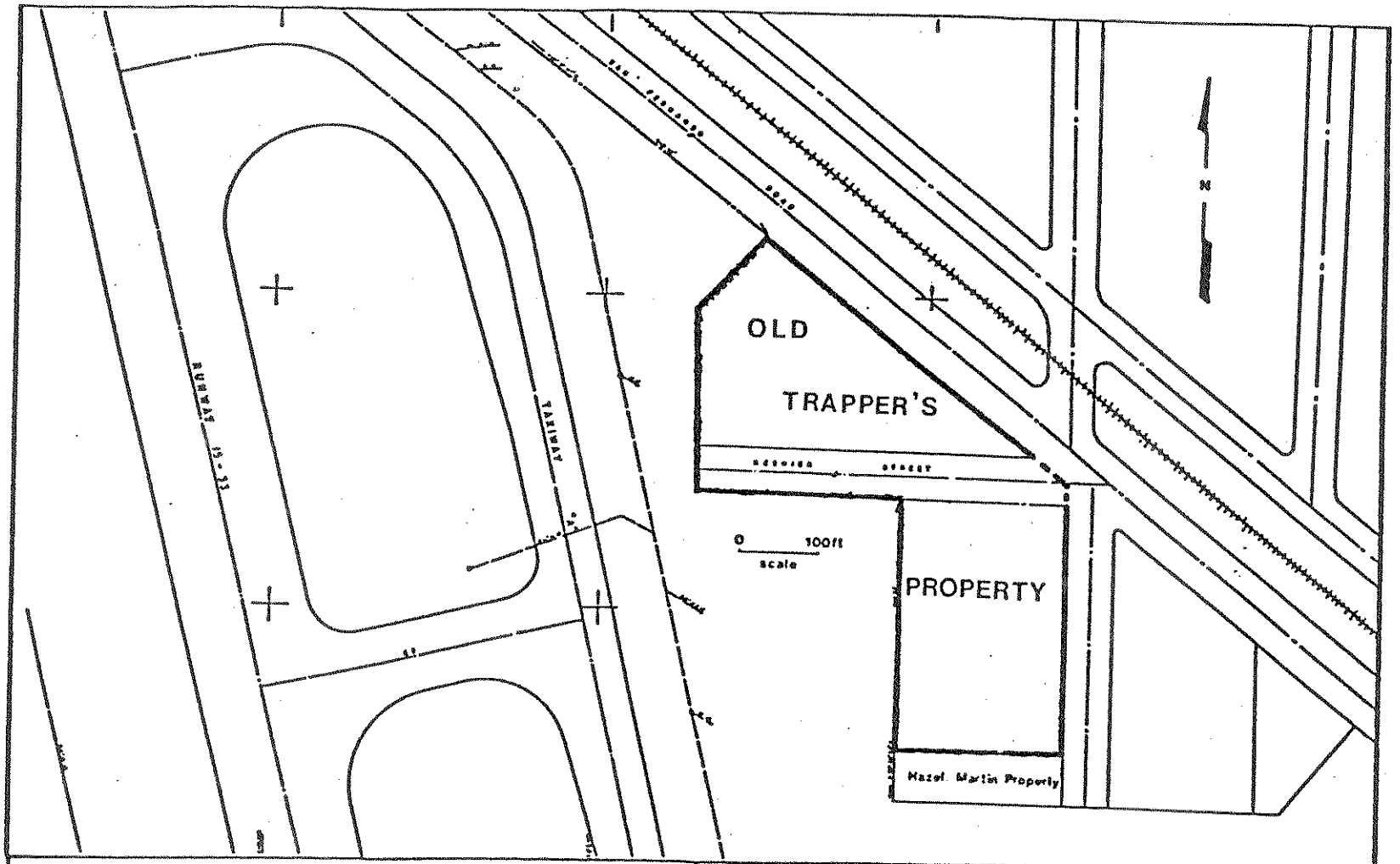
FIG. 1

BURBANK - GLENDALE - PASADENA AIRPORT
BURBANK CALIFORNIA

AIRPORT LAYOUT PLAN

DRAWN BY	JOB NO
CHECKED BY	SHEET NO
APPROVED BY	DATE

BGPAA 0712



INDEX MAP OF OLD TRAPPER'S PROPERTY

DATE: 12/87	PROJ. NO.: 86-06	FIGURE: 2

A.L. BURKE ENGINEERS, INC.
CONSULTING ENGINEERS

Approximately 38 permanent structures, as well as 3 or 4 mobile units (trailers), exist on the property (Figure 1). About 5 abandoned cars are also present. The bulk of the property is relatively free of obstructions with the exception of numerous tenant-owned items (bicycles, cars, grills, toys, swing sets, etc.).

1.3 Previous Related Work

No prior environmental investigations exist for this site. However, in October and November, 1987, A. L. Burke Engineers, Inc. conducted a similar survey for Burbank Airport Authority on a piece of property located directly south of the Old Trapper's Property (previously known as the "Hazel Martin Property"). Results from this investigation showed no significant contamination present.

2. OBJECTIVES OF INVESTIGATION

The objectives for this environmental investigation include the following:

1) Determine the location of possible underground tanks or other structures using current geophysical methods.

2) Identify the contents of any underground tanks and determine the environmental impacts that may exist as a result thereof.

3) Obtain a representative number of air, soil, and other material samples at locations and depths determined by A. L. Burke Engineers, Inc.

4) Analyze the collected samples utilizing procedures determined by A. L. Burke Engineers, Inc.

5) Identify any and all hazardous materials present.

6) Conduct interviews with key personnel.

7) Review appropriate records on the prior and/or current uses of property.

8) Investigate surface conditions for evidence of past contamination.

9) Obtain and review information about the site's geology, soils and ground water.

10) Assess all the data obtained and evaluate alternatives for remediation and recommend a remedial plan if contamination exists.

3.0 METHODOLOGY

The preliminary field investigations consisted of interviews with tenants, owners, workers and airport personnel; a geophysical survey to locate underground tanks; and sifting through old records and available information to assist in the investigation. The information obtained in this initial phase was used to develop a sample plan (see Appendix A) that was delivered to Burbank Airport Authority for their review on December 10, 1987. Sampling was conducted from December 28-30, 1987, and laboratory analysis was conducted from December 28, 1987 to January 11, 1988.

3.1 Interviews

A. L. Burke Engineers staff interviewed Rosemarie Farish (owner), her assistant (Jose), George Stolpe (brother-in-law), and Jan Garpner (Airport Engineer) for information to help determine the presence of any underground tanks and to gather information on the types of contamination that may be present. Appendix B shows the basic format of the questions used in the interviews.

3.2 Geophysical Survey

A. L. Burke Engineers, Inc., performed a geophysical survey of the entire site using an EG & G Geometrics G-856 Memory-Mag Proton precession Magnetometer.

The G-856 magnetometer is a portable, man-carried unit with a built-in digital memory. It is a proton precession magnetometer, i. e., it utilizes the precession of spinning protons in a sample of hydrocarbon fluid to measure the total magnetic intensity. The spinning protons behave as small, spinning magnetic dipoles that are temporarily aligned or polarized by application of a uniform magnetic field generated by a current in a coil of wire. When the current is removed, the spin of the protons causes them to precess about the direction of the ambient or earth's magnetic field, much as a spinning top precesses about the gravity field. The precessing protons then generate a small signal in the same coil used to polarize them, a signal whose frequency is precisely proportioned to the total magnetic field intensity and independent of the orientation of the coil (i.e., sensor of the magnetometer). The precession frequency is measured by a digital counter as the absolute value of the total magnetic field intensity with an accuracy of 0.1 gamma. For reference, the normal magnetic field intensity in southern California is approximately 50,000 gammas.

It should be noted that the proton precession signal from the G-856 is degraded sharply in the presence of a large magnetic field gradient greater than 20.0 gammas per foot. Also, the signal amplitude from the sensor is on the order of microvolts and must be measured to an accuracy of 0.04 Hertz of the precession frequency of several thousand Hertz. This small signal can be rendered immeasurable by the effects of nearby alternating current electrical power sources. For these two reasons, a proton magnetometer cannot be operated within the confines of a typical building.

BGPAA 0716

Before starting the survey, all metal objects, cars, and other equipment were removed wherever possible. A 5-foot grid pattern was marked out on the lot and sample readings were taken to "tune" the magnetometer. The magnetometer itself was carried in a chest harness for mobility and the sensor was mounted on a 6-foot collapsible aluminum staff. A signal cable was attached from the sensor to the magnetometer.

The principal transverse was in a north-south or east-west direction with readings taken every 5 feet as marked on the grid. The property was divided into 17 sections (See Fig 3), with 43 individual surveys being conducted over the whole area. A total of 3329 measurements were recorded for the entire survey.

3.3 Drilling and Sampling Procedures

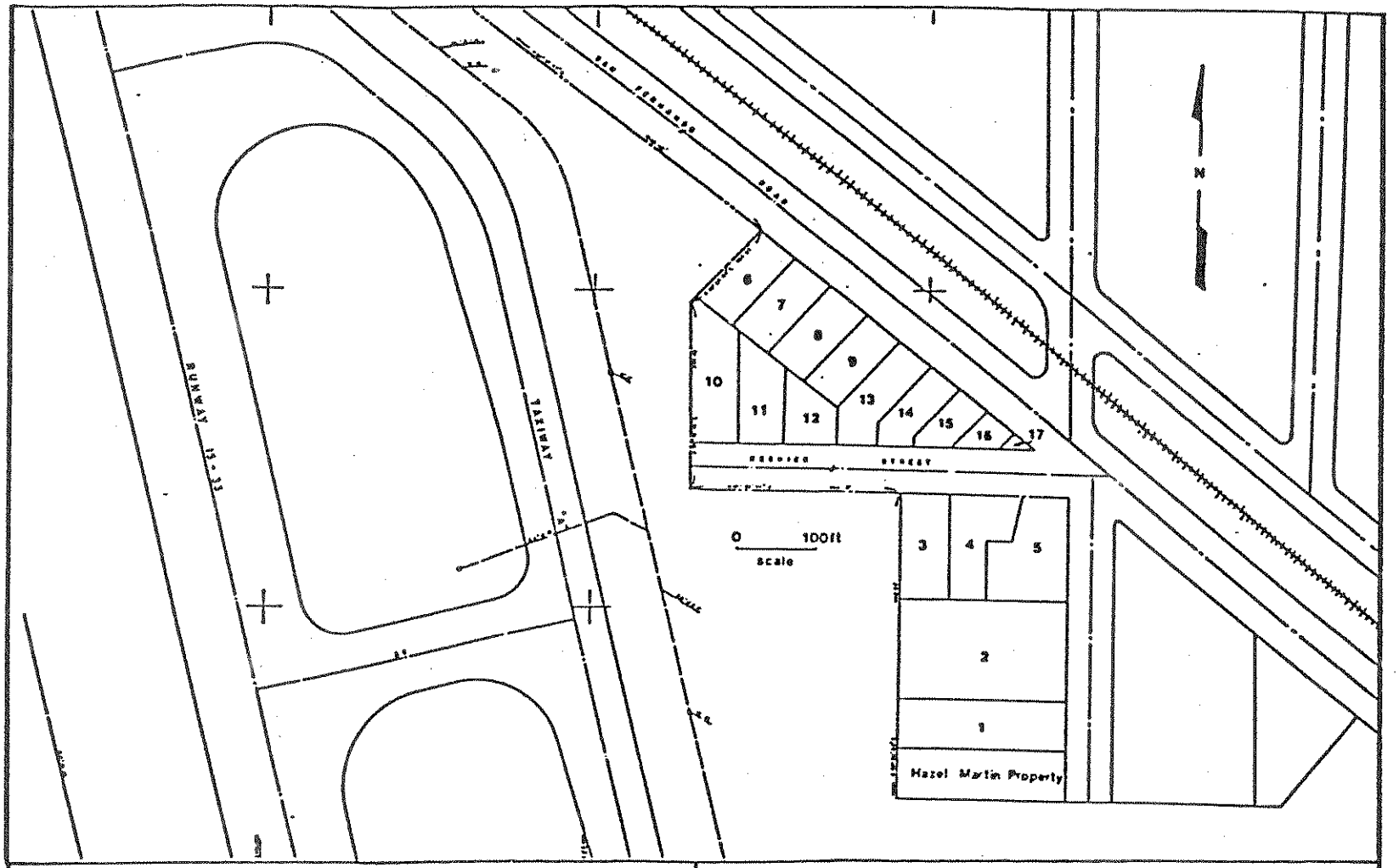
A MOBIL B-61 rotary, hollow-stem flight auger drill rig was used to drill all boreholes for this project. The borings were 7 inches in diameter and 35 feet deep (unless subsurface conditions dictated otherwise). Individual flight augers were 7 inches in diameter and 5 feet in length, with sections being added as the hole was deepened to the desired depth. A cutting bit was attached to the lead auger, and 5 foot lengths of steel rod were placed inside the hollow flight auger to help advance the hole and prevent the formation of a soil plug inside the lead auger. No drilling mud was used to aid in the drilling process.

The hollow flight augers allowed the insertion of a 3.5 inch diameter split tube type soil sampler which passed through the lead auger and into the undisturbed soil beneath the cutting bit. The soil sampler was attached to a waste barrel containing a ball check valve and was filled with a basket retainer to prevent loss of the sample. Four 6 inch (+/- 1/4 inch) long brass sample tubes measuring 2.5 inches in diameter, were placed inside the sampler. A 140 pound outside hammer was used to drive the sampler into the ground.

The steel rods and sampler were subsequently removed at 5 foot intervals. The split tube sampler was disassembled to obtain the required soil samples for laboratory testing. The sample nearest to the driving shoe was used by the site geologist to log the hole, whereas the second sample from the driving shoe was the actual soil sample used for laboratory testing. The 3rd sample from the driving shoe was used to obtain OVA measurements using the site TLV monitor.

3.3.1 Decontamination of Drilling and Sampling Equipment

A Hotsy steam cleaner was stationed near the drill sites in the designated neutral zone for the duration of the job. All hollow flight augers, steel rods, brass sampling rings, and other drilling equipment were steam-cleaned prior to drilling each new borehole. The soil sampler and some brass rings were scrubbed by hand with a detergent in distilled water and then rinsed twice in containers of distilled water prior to each reassembly. The containers of water and detergent were located near the drilling rig in the designated restricted zone.



17 SUBDIVISIONS OF OLD TRAPPER'S PROPERTY

DATE: 12/87	PROJ. NO.: 86-06	FIGURE: 3

A.L. BURKE ENGINEERS, INC.
CONSULTING ENGINEERS

3.3.2 Soil Sample Preparation

After selecting a soil sample for laboratory analysis, the ends of each brass sampling ring were trimmed and covered with aluminum foil. A tight-fitting plastic cap was placed over the aluminum foil and secured firmly with electrical tape. The sample was then placed in a Zip-Loc plastic storage bag and labeled on both the tight-fitting plastic caps and on the Zip-Loc storage bag with an identification number corresponding to the borehole number and site location. The sample was stored in a cooler containing frozen Blue Ice, and was delivered to Chemical Research Laboratories, Inc. at the end of each working day. Chain-of-Custody forms were filled out for each shipment.

3.3.3 Gas Sampling

Five gas samples were also obtained in the field. The samples wee obtained near swelled ground by digging a shallow (1 ft.) 4-5" diameter hole an covering it with plastic. A SKC, Inc., airchuck sampler with plastic tubing was connected into the hole and used to fill an air sample bag to capacity. The airbags were sealed shut, labeled and stored in a cooler with Blue Ice. The samples were delivered to Chemical Research Laboratories at the end of each day with chain-of-custody forms filled out for each shipment, (see Appendix B).

3.4 Laboratory Analysis

Collected soil samples were sent to Chemical Research Laboratory, a state-certified lab, for the following analysis:

1) EPA Method 8015 (Modified for hydrocarbons) - Non-Halogenated volatile organics.

2) EPA Method 9040 - pH

3) EPA Method - Sulfide Gas Analysis

4) EPA Method - Methane Gas Analysis

All of the analysis were performed in accordance with EPA Method SW-846. Quality assurance protocols are in compliance with California Department of Health Services guidelines.

4.0 FINDINGS

4.1 Results of Initial Investigation

As stated in the Tenant Leasehold Section, the property is essentially an apartment complex rented out to individual tenants. No hazardous waste is used or stored on the property by either the owners or the tenants. Two areas are used by the tenants as a junk yard or work area for repairing automobiles. One of the areas is located at the southernmost end of the property while the other is situated at the northeast portion of the site. Both are marked on Figure 1 as "auto yard". A gas station was once located on the property near the auto yard in the northeast corner. Three underground storage tanks were known to exist at this location and remnants of the old pump island still stand today. According to the present occupants, these three tanks are believed to have been excavated over 25 years ago and backfilled with sand and gravel, although this information is questionable. No regulatory requirements existed at that time for removal, existed, and, due to the expense, the common practice at that time was to abandon tanks in place, with or without filling them with sand. The rest of the site is residential, and the only environmental concern is the presence of underground cesspools and septic tanks. Information from the owner indicates the presence of 6 septic tanks, 35 cesspools, and approximately 10-20 leach lines. Results from the magnetic survey and information obtained from old records indicate the existence of 11 septic tanks (and possibly as many as 13 tanks), as well as 49 to 51 old and operational cesspools. These additional septic tanks and cesspools probably indicate that there are additional leach lines as well.

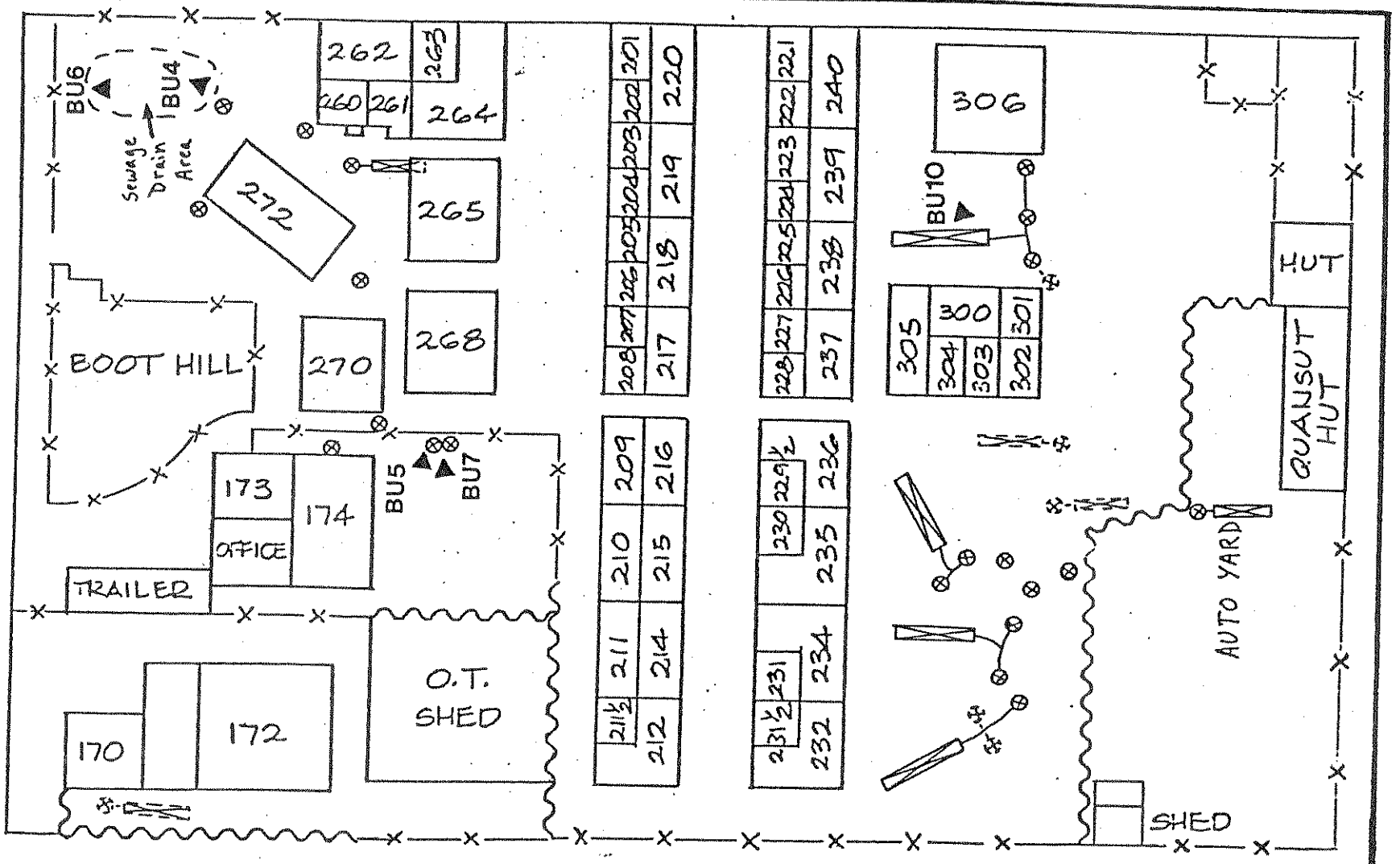
Most of the tanks and cesspools are 15 to 25 feet deep. The cesspools are usually 5 to 8 feet in diameter while the tanks are between 11 and 21 feet long and 3 feet wide, holding approximately 1700 gallons of sewage. "Caustic Soda Flakes" (sodium hydroxide), produced by Diamond Shamrock Co., were used in all cesspools up to 8 months previous to this study. The caustic soda was never used in the septic tanks.

Many of the tanks and cesspools are marked by a swelling of the ground above them. In some cases, the ground has swelled to such an extent that the concrete and asphalt around it is cracked and warped (See Photo 3).

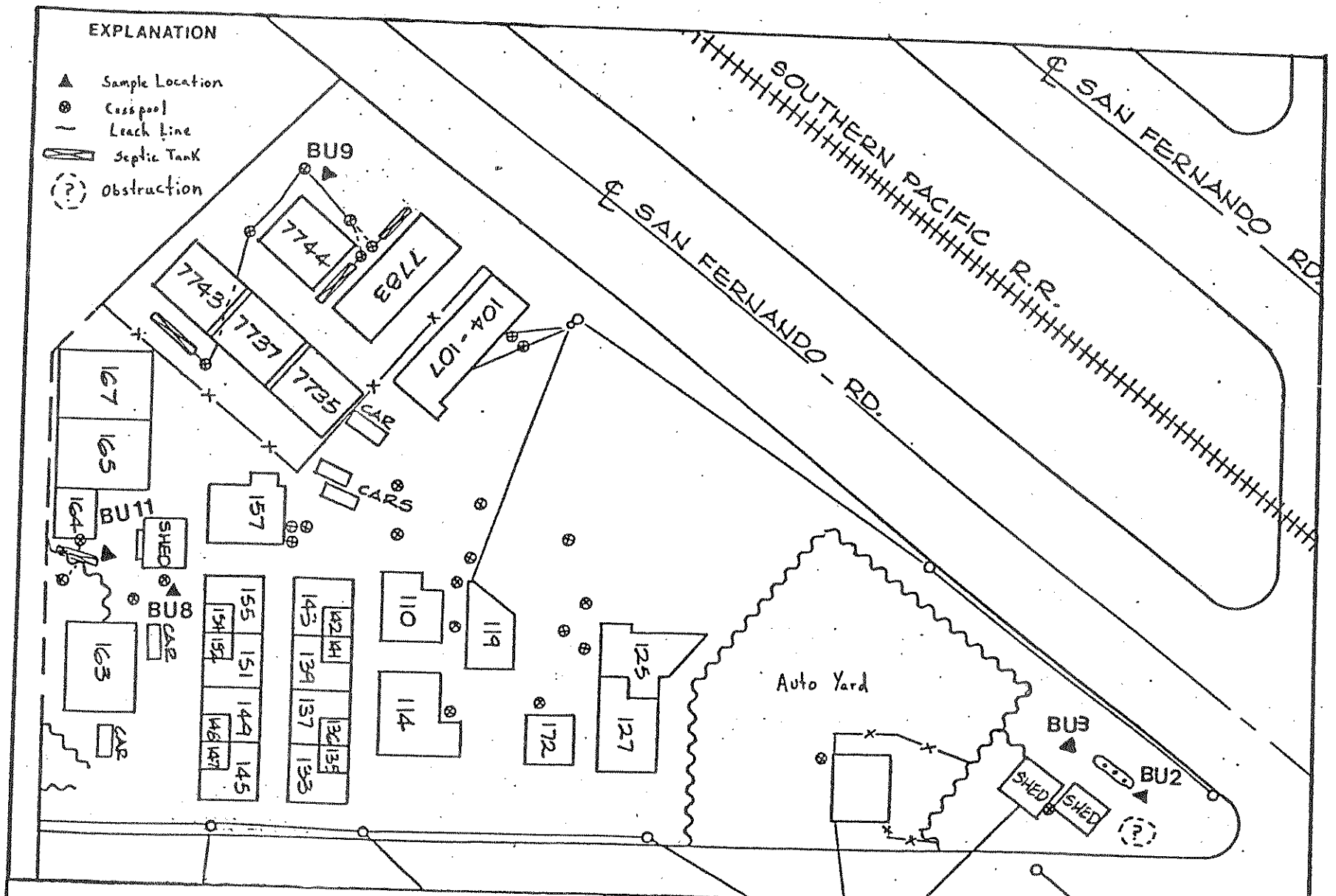
4.2 Field Investigation

A total of six (6) borings were drilled on the site. The location of the borings (and 5 gas samples) are presented in Figure 4A & 4B. All borings were pre-determined by A. L. Burke Engineers and presented in a sample plan submitted to the Airport Authority on December 10,1987.

The borings were drilled 15 to 45 feet, depending on the depth of the suspected contamination as determined in the initial investigation phase and sample plan. Most borings were sampled at the 5 and 10 foot lever, then every 5 feet thereafter. Two borings were sampled at the 2 foot level followed by a sample at 5 feet, then at 5 feet afterwards (see Table 1). The borings sampled at the 2 foot level were believed to be contaminated



SAMPLE PLAN	⊗ Cesspool Possible cesspool ▲ Sample Location	Possible Septic Tank Septic Tank — Leach Line	A.L. BURKE ENGINEERS, INC. CONSULTING ENGINEERS
DATE: 12/87	PROJ. NO.: 86-06[0003]	FIGURE: 4a	



SAMPLE LOCATIONS

DATE: 1/88	PROJ. NO.: 86-06	FIGURE: 4b

A.L. BURKE ENGINEERS, INC.
CONSULTING ENGINEERS

closer to the surface than those which were sampled at the 10 foot level and below.

4.3 Geophysical Results

As noted previously, the total area of the property was divided into 17 sections with 43 individual surveys conducted (Figure 5). The results from the surveys were used to construct 17 separate contour maps. Most of the magnetic anomalies on these maps are due to the presence of buildings, fences, power lines, trees, cars, grills, and other metallic obstructions present on the surface during the survey. Within the limits of the survey and with the information provided with personnel interviews two maps were constructed to show the presence of underground features (See Figures 4A and 4B).

4.4 Site Geology, Stratigraphy, and Hydrogeology

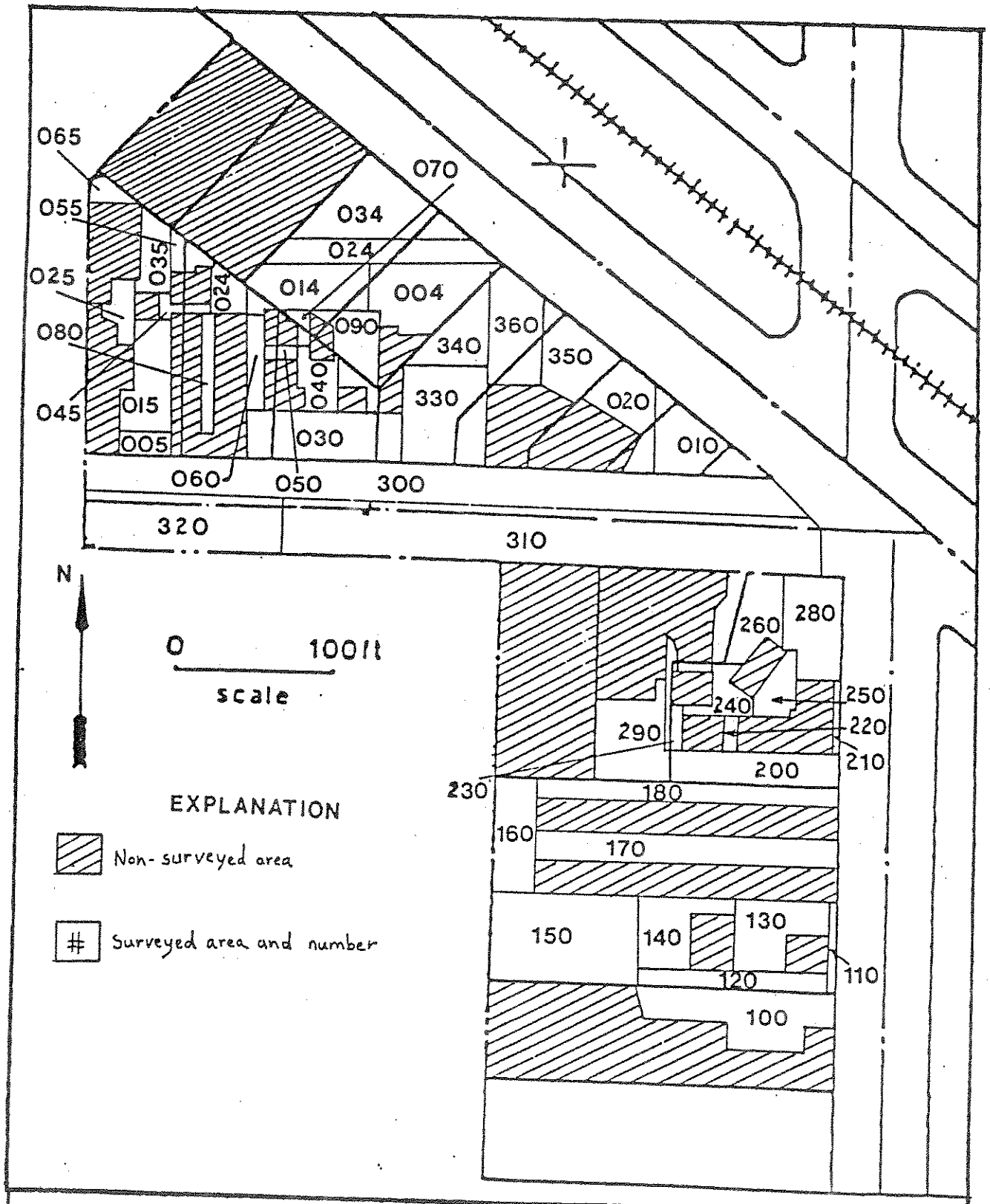
Surficial deposits around the Airport are alluvial (QAL) of recent Quaternary age. Soils are 60 percent Tujunga-Soboba and 10 percent sand and cobbly material. Soils of the Tujunga-Soboba association are over 60 inches deep and somewhat excessively drained, and have rapid to very rapid subsoil permeability. Beneath the Tujunga-Soboba alluvial deposits is a complex section of Cenozoic and Upper mesozoic sedimentary rocks.

All of the deposits encountered in drilling consisted of a tan, damp unconsolidated, coarse sand with varying amounts of gravel present. The sand grains consisted primarily of quartz, Alkali feldspar, plagioclase and biotite, while the pebbles were simply rounded clasts of a biotite-granite. These alluvial deposits were consistent over the entire area of the site.

No landslides are known to exist in this area. Likewise, no faults are known to exist on this site. The Verdugo Fault, however, is located approximately one mile to the southwest of the Airport. The fault is potentially active and has a Maximum Credible Earthquake rating of 6.8 on the Richter Scale. Other nearby areas include a small complex of minor faults located at the eastern terminus of the Santa Monica Mountains, approximately five miles distant, and a series of minor faults are located in the San Rafael hills, approximately eight miles away. Another major fault includes the San Gabriel Fault zone (nine miles away). It is potentially active and has a Maximum Credible Earthquake rating of 7.5 on the Richter Scale. The Inglewood Fault zone (nine miles away) is active and has a Maximum Credible Earthquake rating of 7.0 on the Richter Scale. The San Andreas Fault zone (28 miles away) is active with a Maximum Credible Earthquake rating of 8.25 on the Richter Scale. Please refer to Figure 6 for the location of the major faults.

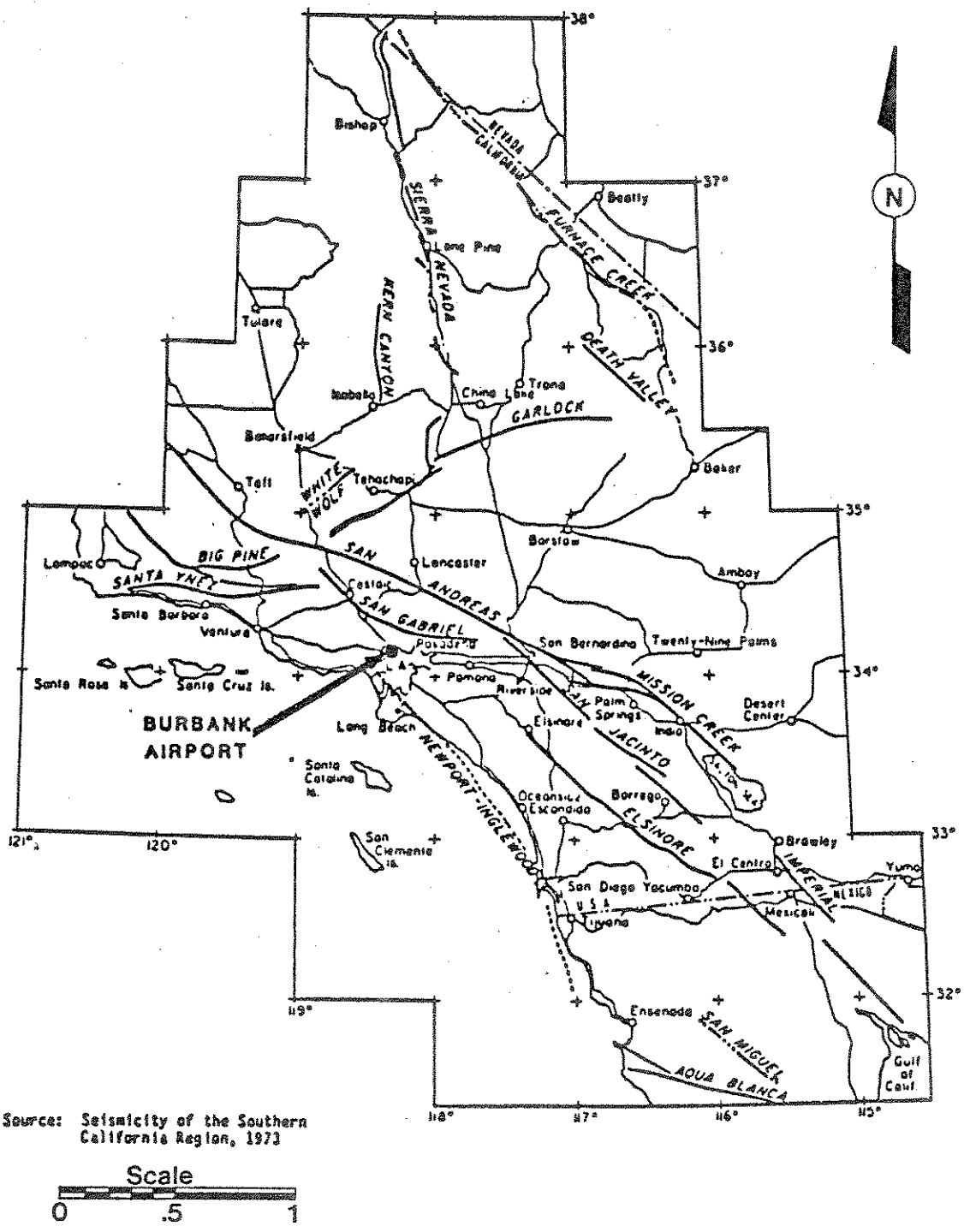
The site is located in the San Fernando Hydrologic subarea of the Los Angeles River Basin. The subarea encompasses the San Fernando Valley ground water basins which is about 110,000 acres in area. Replenishment of the basin's ground water body is by deep percolation of rainfall with artificial recharge through spreading basins and subsurface inflow.

Surface waters percolating in this area infiltrate directly into the



GEOPHYSICAL SURVEY NUMBERS

DATE: 1/88	PROJ. NO.: 86-06	FIGURE: 5	A.L. BURKE ENGINEERS, INC. CONSULTING ENGINEERS



Source: Seismicity of the Southern California Region, 1973

The fault locations in Southern California

DATE: 1/88	PROJ. NO.: 86-06 0003	FIGURE: 6

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underlying ground water. As a result, there is some potential for ground water pollution from surface spills of fuel or other hazardous liquids. In addition, public water supply wells for the Cities of Burbank and Los Angeles are located less than two miles from the Airport area.

4.5 Laboratory Analysis

Table 2 includes the results from the borings near the abandoned gasoline station. EPA test method 8015 (modified for hydrocarbons) was the only test ran on these samples. As shown in the following table, none on the samples showed any signs of contamination from petroleum hydrocarbons.

Table 3 shows the results of the borings occurring near swollen ground over cesspools and septic tanks. EPA test method 9040 was the only test run on these samples. The pH values for these samples range from 5.12 to 7.93.

Table 4 includes the results from the 5 gas (air) samples. Both EPA test method 9030 and Methane gas analysis were run on all samples. As shown, no H_2S was detected in any samples and methane gas values ranged from 2.2 to 6.2 ppm.

TABLE 1 SUMMARY OF BORINGS

Boring #	Total Depth	Initial Sample Depth	Sample Interval	Test Parameter
BU3	40 ft	10 ft	5 ft	8015
BU2	45 ft	10 ft	5 ft	8015
BU5	15 ft	2 ft	*5 ft	9040
BU4	15 ft	2 ft	*5 ft	9040
BU8	30 ft	10 ft	5 ft	9040
BU9	40 ft	5 ft	5 ft	9040

*Boring was sampled at 2ft, 5ft, and then at 5ft intervals to the desired depth.

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TABLE 2

RESULTS FROM EPA TEST METHOD 8015 (MODIFIED)

Sample #	Detection Limit, ppm	Total Petroleum Hydrocarbons
BU2-10	1.0	ND
BU2-15	1.0	ND
BU2-20	1.0	ND
BU2-20	1.0	ND
BU2-25	1.0	ND
BU2-30	1.0	ND
BU2-35	1.0	ND
BU2-40	1.0	ND
BU3-10	1.0	ND
BU3-15	1.0	ND
BU3-20	1.0	ND
BU3-25	1.0	ND
BU3-30	1.0	ND
BU3-35	1.0	ND
BU3-40	1.0	ND

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TABLE 3

RESULTS FROM EPA TEST METHOD 9040

Sample #	pH
BU4-2	6.21
BU4-5	6.12
BU4-10	6.77
BU4-15	6.10
BU4-20	6.22
BU5-2	6.05
BU5-5	6.03
BU5-10	6.92
BU5-15	6.63
BU8-10	5.5
BU8-15	6.02
BU8-20	6.24
BU8-25	5.12
BU8-30	7.55
BU9-5	7.16
BU9-10	7.81
BU9-15	7.93
BU9-20	7.03
BU9-25	6.47
BU9-30	6.44
BU9-35	6.46
BU9-40	6.50

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TABLE 4

RESULTS FROM EPA TEST METHOD 9030 AND METHANE GAS ANALYSIS

Sample #	Methane ppm	Hydrogen Sulfide ppm
BU6	5.7	ND
BU7	4.7	ND
BU9-G	6.2	ND
BU10	2.2	ND
BU11	2.2	ND

5.0 SITE ASSESSMENT

5.1 Preliminary Investigation

The preliminary investigations indicated that the area of main concern was the presence of numerous underground cesspools and septic tanks. The use of caustic soda (Sodium Hydroxide, NaOH) in the cesspools was particularly disturbing since it is extremely alkaline and poses a threat to both the surrounding soil and the water table below. The use of caustic soda can also cause the evolution of gas (personnel adding the compound indicated they had to breathe through wet handkerchiefs while performing the operation), and these gases may have contributed to the ground swelling, along with other gases evolved during anaerobic digestion.

Information from past records supported the concern that a reaction was taking place between the sewage and the caustic soda that was dumped in to result in off-gassing. This indicated that the sewage was acidic; perhaps sulfurous acid that was produced from H2S (Hydrogen Sulfide). Hydrogen Sulfide and methane (CH4) are common constituents in the gases produced by anaerobic digestion such as in the cesspools and septic tanks. Other evidence of methane and/or hydrogen sulfide was seen in the swelling of the ground over these underground sewers.

5.2 Evaluation of Laboratory Results

The results of the laboratory analysis indicate that none of the soils present on the site constitute a hazardous waste. The two borings around the abandoned gas station showed no signs of petroleum hydrocarbons to a depth of 45 ft below the surface. The pH values range between 5.12 and 7.93 and are within acceptable limits. Most samples show a slightly acidic pH (less than 7.0) indicating there may by minor leakage.

In addition the air samples obtained over swollen ground showed no sign of H2S gas. The samples tested for methane gas had values ranging from 2.2 ppm to 6.2 ppm and are also within acceptable limits.

In addition, the air samples obtained over swollen ground showed no signs of H2S gas. The samples tested for methane gas had values ranging from 2.2 ppm to 6.2 ppm and are also within the acceptable limits.

It should also be noted that a large obstruction was encountered while drilling at the old abandoned gas station. The underground feature was located about 6 to 7 feet below the surface and appeared to be made of concrete. It is unknown as to what the object was although it is believed to be related to the underground tanks that were present 25-30 years ago. Its location is shown on Figure 4B. The anomalies created in the magnetometer data by the metal objects and power line in the area do not confirm the presence of tanks. It cannot be determined if they were previously removed. If they are still in place, it is almost certain they are filled with grout or sand and would be a potential obstruction to future construction in the area.

5.3 Health and Environmental Impacts

Based on the analytical results, and assuming that the borings gave a representative group of samples, this site does not present any health of environmental hazard to the residents of the surrounding area, nor to personnel that may be working there in the future.

It was originally believed that swollen ground occurring over some sewage areas was due to the presence of H_2S gas or methane that was produced directly from the cesspools/septic tanks. The analytical results show, if this occurred, the gas has dissipated to insignificant levels. The swollen ground may also be a product of the cesspool/septic tank construction.

Another major concern was the use of caustic soda that could have severely altered the pH of the area. The laboratory results indicate that no extremes of pH exist. The slight acidity in most samples may be due to the neutralizing effect of the caustic soda or may indicate only minimal leakage has occurred in the past. Finally, the samples taken from the area of the old abandoned gas station showed no signs of hydrocarbon contamination. The only foreseeable problem in the area is the presence of the underground concrete structure occurring below 7 feet, or the possibility that the tanks have been abandoned in place, as noted previously.

5.4 Regulatory Considerations

There are currently no regulations in final form that define the requirements for investigation or the removal of cesspools and septic tanks. Since no contamination exists, it is the recommendations of A. L. Burke Engineers, Inc., that the structures be demolished during site preparation activities.

6.0 Recommendations

The results of the investigation have been evaluated and the findings are that there exists no potential environmental impact from the current or previous operations on the site. There is therefore no need for remedial action at this site. It is recommended, however, that if any excavation is done at the site for future facilities, the septic tanks, cesspools and associated lines be removed. In addition, if any excavation is to be done in the area of the old filling station, any tanks that may be located there will have to be removed, and the obstruction encountered may also require removal, if excavation goes below six feet.

It is further recommenced that the contractor doing the demolition and excavation have experience in, or retain the services of a contractor with experience in, the cleaning and removal of septic systems. Personnel may need to wear respiratory protective equipment for certain phases of the work and the contractor should be made responsible for ensuring personnel safety, and for compliance with all applicable regulations.

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APPENDIX A

SAMPLE PLAN

7.0 SAMPLE PLAN

For soils near abandoned gasoline station;

1) Drill four boreholes around approximate location of gasoline tanks.

2) Sample all four boreholes at 10, 15, 20, 30, and 40 feet.

3) Analyze all samples for total petroleum hydrocarbons EPA method 418.1 or modified EPA 8015.

For soils near extremely swollen ground over sewer locations:

1) Drill 1-2 boreholes near or around septic tank/cesspool locations.

2) Monitor for the presence of H_2S and methane.

3) Sample all boreholes at the 10, 20, and 30 ft. levels.

4) Measure the pH (EPA Method 9040) of each sample.

In addition, samples may be taken for tanks and cesspools at varied localities as indicated on the sample location plan (Figure 5) as possible sample sites. This would consist of the following:

1) Obtain (1) liquid sample with bailer

2) Transfer sample to glass container w/PVC twist cap

7.1 Job Description

The areas of swollen surface are indicated on Figures 4a and 4b and are recommended to be tested. A hollow-stem auger drilling rig will be required for all boreholes. The operation will utilize a four man crew consisting of a driller, drillers helper, a field technician, and a geologist/site safety officer.

7.2 Health and Safety

The same health and safety plan used for the underground tank investigation by A. L. Burke Engineers in December 1986 will be used for this work. The plan will be modified to reflect the concern with gaseous emissions of H_2S and methane.

7.3 Schedule

Dec. 8 through 11 - Submit sample plan to Airport Authority for approval.

Dec. 16 through 18 - Drilling and sampling operation underway.

Dec. 16 through 30 - Analysis of samples.

Jan. 4 through 18 - Evaluation of analytical data.

Jan. 18 - Feb. 1 - Prepare final report.

APPENDIX B

SITE SURVEY INFORMATION FORM

SPCC AND CONTINGENCY PLAN FIELD SURVEY

Field Engineer/Technician_____ Date_____
Project Number_____ Project Description_____
Facility_____ Site_____

1.0 SITE DESCRIPTION

1.1 Location_____

1.2 Shop_____ 1.3 Bldg. No._____ 1.4 Code_____

1.5 Supervisor's Name/Title/Phone No._____

1.6 Describe appearance of site: (paving, structures, condition of surface, building construction, etc.)

1.7 Site Operations/Processes:
(include number of people working at this site)

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1.8 Type of Facility:

Storage: Material (What?, Form - liquid, solid, gas)

Wastes (What? Form - liquid, solid, gas)

Runoff Area

Loading/Unloading

1.9 Quantity of Hazardous Materials/Waste Handled (Note frequency: daily, weekly, etc.; location; type, size, numbers of containers)

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1.10 Site Layout Sketch (Note structures -- buildings, fences, gates, fire extinguisher, parking lots, roadways, storm drains, eyewash, showers, utilities, fie hydrant, underground tanks -- and location; type of drains; slope of site; weather conditions (and prevailing wind direction) at time of survey and potential problems they could cause) Put a North arrow on the sketch.

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1.11 Condition of Storage Area Foundation:

1.12 Condition of Retaining Walls, Material, Construction, Supports:

Additional Notes:

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2.0 SPILL POTENTIAL

SPCC Measures: (Note if these are present and their condition; note location on site sketch. If not present, should they be installed?)

2.1 Containment:

Dikes

Berms

Retaining Walls

Impounding Basins

Diversion Ponds

Retention Ponds

Treatment System

Other

2.2 Drainage:

Curbing

Culverting

Guttering

Sewers

Grading

Valves

Other

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2.3 Signs/Weather Protection:

Warning Signs

Locks/Fences/Gates

Alarms

Telephone Nearby

Crash Posts

Roofs

Other Weather Protection

Lighting

2.4 Emergency Equipment:

Absorbent

Splash Masks, Gloves

Fire Extinguishers (Type)

Vacuum Equipment

Portable Barriers

Pumps (With Spark Arresters)

Vehicle Response Kit

Eyewash/Safety Showers

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2.5 Other:

Type of Drainage Valves

Visual Indication for Open/Close Position

Ventilation of Area

Potential Safety/Health Problems

2.6 Description of Tanks and Containers: (Note corrosion; leaks; size and material; shape; condition of supports and piping.)

2.7 Placement of Containers/Tanks: Is aisle space sufficient for access? Are incompatible materials segregated? Are proper labels used? Height of stacking? Use of pallets?

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3.0 FIRST RESPONSE CONSIDERATIONS

3.1 Route and Destination of Spill:

3.2 Potential for Spread To/Impact On Adjacent Areas:

3.3 Immediate Actions Recommended:

3.4 Potential for Vapor cloud: Route?

3.5 Notification:

3.6 Containment/Cleanup Actions:

4.0 GENERAL SITE PROCEDURES

4.1 Tank overflow protection:

High liquid level alarms with and audible/visual signal

High liquid level pump cutoff

Direct communication beween the tank gauger and pumping station?

Liquid level indication on tank?

Are mobile storage tanks properly positioned to prevent spill reaching navigable water or improper drainage outlet?

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4.2 Raw Material Storage Area/Runoff Area:

Must have drainage control or other features to prevent escape of hazardous substances. Drainage shall divert runoff to treatment or disposal systems (describe).

4.3 Liquid Loading/Unloading Area:

Secondary containment or treatment capacity to contain largest vessel or compartment plus rainfall from 2 year storm. Note: quick drainage system or diversionary structures such as grading and curbs to sump, separator, dike, catchment basin, or containment area are satisfactory measures

5.0 PREVENTIVE MAINTENANCE AND GOOD HOUSEKEEPING (all operations):

5.1 All areas are inspected at specified intervals for leaks and other conditions that could lead to discharges.

If an incident occurs, a procedure exists for corrective action to be taken (process or facility shut down). Have they had any spills in the past and, if so, how were they handled?

Procedures for collection/storage/treatment/disposal of spills are in place.

Additional Notes:

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UNDERGROUND TANK FIELD SURVEY

Field Engineer/Technician
Project Number
Facility

Project Description
Site

Date

1.0 SITE DESCRIPTION

1.1 Location

1.2 Facility

1.3 Bldg. No.

1.4 Code or I. D.

1.5 Contact's Name/Title/Phone No.

1.6 Describe appearance of site: (paving, structures, condition of surface, building construction, etc.)

1.7 Site Operations/Processes:

1.8 Site Location (use site grid references)

1.9 What existing permits does facility have?

2.0 TANK DESCRIPTION

Description of Tanks: (Note corrosion; leaks; size and material; shape; condition of supports and piping.)

2.1 Do new underground tanks have double containment and is a proper monitoring system is in place (new and old)?

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2.2 Is cathodic protection provided for tanks?

2.3 Are tanks pressure-tested on a scheduled, periodic basis as required by State/County?

2.4 Are tanks tested by County-approved method? Specify.

2.5 Have all tanks been registered and are registration forms on file at facility?

2.6 Tank overfill protection:

High liquid level alarms with and audible/visual signal

High liquid level pump cutoff

Direct communication beween the tank gauger and pumping station?

Liquid level indication?

2.7 Are controls for pumps secured to prevent pumps from being operated by unauthorized personnel

2.8 Are buried pipelines wrapped and coated to reduce corrosion, and is cathodic protection provided for buried pipelines?

2.9 When a buried pipeline section is exposed, is it inspected and corrective action taken as needed?

2.10 Is cathodic protection provided for buried pipelines as needed.

3.0 PREPARATION OF OPERATORS

3.1 Have personnel attended any trainin sessions related to tank operations or to regulatory requirements?

3.2 Do required inspections follow written procedures?

3.3 Are personnel familiar with regulatory requirements (testing, registration, monitoring)?

4.0 BACKGROUND RECORDS

4.1 Are records available dating back to beginning of facility operations?

4.2 Evidence of abandoned tanks (visual evidence -- fill pipes, etc.; written evidence; information from operators; other)

5.0 RECOMMENDATIONS

APPENDIX C

GEOPHYSICAL DATA

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
101	100	10:28:45	0	58673.3
101	100	10:28:59	1	58626.3
101	100	10:29:11	2	58604.1
101	100	10:29:22	3	58519.3
101	100	10:29:33	4	58576.8
101	100	10:29:43	5	58548.6
101	100	10:29:52	6	58580.0
101	100	10:30:01	7	58577.1
101	100	10:30:09	8	51952.5
101	100	10:30:24	9	51523.0
102	100	10:31:10	10	51866.2
102	100	10:31:19	11	45240.7
102	100	10:31:29	12	45313.4
102	100	10:31:39	13	45531.3
102	100	10:31:48	14	48059.4
102	100	10:31:56	15	52069.1
102	100	10:32:06	16	52024.0
102	100	10:32:16	17	52009.9
102	100	10:32:27	18	51959.8
102	100	10:32:38	19	47130.1
103	100	10:33:00	20	44635.8
103	100	10:33:09	21	46386.0
103	100	10:33:17	22	46975.3
103	100	10:33:24	23	47042.2
103	100	10:33:32	24	47093.6
103	100	10:33:40	25	47396.0
103	100	10:33:48	26	47509.5
103	100	10:33:55	27	47467.4
103	100	10:34:03	28	46834.5
103	100	10:34:12	29	50258.4
104	100	10:34:54	30	42422.3
104	100	10:35:02	31	47160.8
104	100	10:35:10	32	48122.0
104	100	10:35:19	33	48288.1
104	100	10:35:27	34	48324.9
104	100	10:35:35	35	48205.5
104	100	10:35:44	36	48275.6
104	100	10:35:53	37	47859.4
104	100	10:36:01	38	47443.0
104	100	10:36:10	39	45565.3
105	100	10:36:36	40	46418.7
105	100	10:36:44	41	45512.4
105	100	10:36:52	42	52086.6
105	100	10:37:01	43	46566.4
105	100	10:37:09	44	47775.2
105	100	10:37:16	45	48274.2
105	100	10:37:24	46	48557.8
105	100	10:37:37	47	48593.1
105	100	10:38:11	48	48767.1
105	100	10:38:21	49	48810.5
105	100	10:38:29	50	48770.7

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity (gammas)
105	100	10:38:29	50	48779.7
105	100	10:38:38	51	48636.7
105	100	10:38:46	52	48176.9
105	100	10:38:54	53	47263.8
105	100	10:39:02	54	47188.9
105	100	10:39:10	55	47255.1
105	100	10:39:17	56	47152.2
105	100	10:39:26	57	47036.9
105	100	10:39:34	58	45832.9
105	100	10:39:42	59	52052.5
105	100	10:39:50	60	48099.9
105	100	10:39:58	61	52004.4
105	100	10:40:07	62	52149.0
105	100	10:40:15	63	45457.0
105	100	10:40:23	64	45603.3
106	100	10:40:42	65	47457.3
106	100	10:41:09	66	45784.6
106	100	10:41:20	67	46719.2
106	100	10:41:35	68	47197.0
106	100	10:41:43	69	47692.0
106	100	10:42:01	70	47977.9
106	100	10:42:09	71	48280.7
106	100	10:42:19	72	48453.4
106	100	10:42:27	73	48460.3
106	100	10:42:37	74	48405.9
106	100	10:42:45	75	48362.3
106	100	10:42:54	76	48438.0
106	100	10:43:03	77	48665.6
106	100	10:43:14	78	48907.8
106	100	10:43:22	79	49017.6
106	100	10:43:31	80	45301.9
106	100	10:43:38	81	48926.9
106	100	10:43:47	82	48851.1
106	100	10:43:54	83	48734.5
106	100	10:44:01	84	48585.4
106	100	10:44:09	85	48426.6
106	100	10:44:17	86	46330.4
106	100	10:44:26	87	48207.0
106	100	10:44:34	88	48092.1
106	100	10:44:42	89	48447.9
107	100	10:49:54	90	48350.0
107	100	10:50:02	91	48315.1
107	100	10:50:09	92	53993.2
107	100	10:50:17	93	48262.1
107	100	10:50:25	94	48644.0
107	100	10:50:32	95	48722.5
107	100	10:50:39	96	48963.8
107	100	10:50:45	97	49001.0
107	100	10:50:52	98	49179.7

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
107	100	10:50:59	99	49425.4
107	100	10:51:10	100	49600.3
107	100	10:51:17	101	49275.7
107	100	10:51:27	102	49312.1
107	100	10:51:34	103	49458.2
107	100	10:51:41	104	49269.7
107	100	10:51:49	105	49528.7
107	100	10:51:56	106	48723.2
107	100	10:52:04	107	48725.9
107	100	10:52:11	108	48773.4
107	100	10:52:18	109	48753.3
107	100	10:52:29	110	48579.9
107	100	10:52:37	111	49243.4
107	100	10:52:45	112	47851.8
107	100	10:52:52	113	47161.2
107	100	10:52:59	114	43124.9
99	100	10:53:45	115	52177.3
111	110	11:10:32	116	49297.2
111	110	11:10:40	117	46824.9
111	110	11:10:48	118	47716.3
111	110	11:10:55	119	47877.4
111	110	11:11:03	120	48321.9
111	110	11:11:11	121	48421.5
111	110	11:11:18	122	48379.1
111	110	11:11:25	123	48721.8
111	110	11:11:32	124	45054.8
111	110	11:11:59	125	48428.7
111	110	11:12:10	126	41970.8
111	110	11:12:19	127	46325.7
111	110	11:12:26	128	48244.6
121	120	11:31:53	129	46454.2
121	120	11:32:01	130	47987.7
121	120	11:32:09	131	52054.5
121	120	11:32:17	132	48233.4
121	120	11:32:23	133	48259.6
121	120	11:32:31	134	48686.6
121	120	11:32:39	135	48993.8
121	120	11:32:47	136	49052.9
121	120	11:32:54	137	49563.1
121	120	11:33:01	138	50947.9
121	120	11:33:09	139	52106.0
121	120	11:33:15	140	49979.0
121	120	11:33:21	141	49100.4
121	120	11:33:29	142	48473.2
121	120	11:33:36	143	48148.6
121	120	11:33:43	144	48914.2
121	120	11:33:50	145	49812.9
121	120	11:33:58	146	49793.1
121	120	11:34:07	147	48960.8
121	120	11:34:15	148	49855.5
121	120	11:34:24	149	49679.1

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
121	120	11:34:31	150	49403.8
121	120	11:34:39	151	49099.8
121	120	11:34:47	152	47467.3
121	120	11:34:55	153	45208.7
122	120	11:35:18	154	45127.5
122	120	11:35:26	155	47678.5
122	120	11:35:34	156	48141.3
122	120	11:35:42	157	49435.7
122	120	11:35:51	158	48755.1
122	120	11:35:58	159	48997.1
122	120	11:36:24	160	48982.0
122	120	11:36:36	161	49455.2
122	120	11:36:48	162	48955.6
122	120	11:36:55	163	52160.4
122	120	11:37:03	164	48847.8
122	120	11:37:10	165	48546.0
122	120	11:37:19	166	49167.1
122	120	11:37:27	167	50554.8
122	120	11:37:34	168	51872.6
122	120	11:37:41	169	52181.8
122	120	11:37:50	170	51904.5
122	120	11:37:58	171	49353.3
122	120	11:38:06	172	48993.7
122	120	11:38:14	173	48557.8
122	120	11:38:22	174	48555.1
122	120	11:38:32	175	49258.1
122	120	11:38:44	176	47212.5
122	120	11:38:52	177	47843.8
122	120	11:39:00	178	47112.7
123	120	11:39:22	179	47687.8
123	120	11:39:32	180	47824.1
123	120	11:39:47	181	47766.6
123	120	11:39:54	182	46713.5
123	120	11:40:01	183	43641.3
123	120	11:40:08	184	46468.1
123	120	11:40:21	185	48711.2
123	120	11:40:32	186	49260.6
123	120	11:40:40	187	49523.1
123	120	11:40:47	188	49289.7
123	120	11:40:54	189	52009.6
123	120	11:41:02	190	49992.3
123	120	11:43:51	191	49365.6
123	120	11:43:58	192	48196.8
123	120	11:44:05	193	47809.3
123	120	11:44:13	194	47643.8
123	120	11:44:20	195	52033.9
123	120	11:44:30	196	51887.3
123	120	11:44:37	197	46036.9
123	120	11:44:44	198	51953.9
123	120	11:44:51	199	48434.4

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
123	120	11:44:59	200	48275.6
123	120	11:45:09	201	48076.0
123	120	11:45:27	202	47523.0
123	120	11:45:34	203	44866.6
131	130	11:54:16	204	49611.0
131	130	11:54:26	205	52092.8
131	130	11:54:39	206	51082.7
131	130	11:54:47	207	48019.8
131	130	11:54:55	208	49833.6
131	130	11:55:03	209	49309.2
132	130	11:55:32	210	47382.2
132	130	11:55:41	211	49163.5
132	130	11:55:49	212	52003.4
132	130	11:56:03	213	49345.9
132	130	11:56:12	214	49289.0
132	130	11:56:21	215	46460.5
133	130	11:56:40	216	43630.5
133	130	11:56:48	217	49313.4
133	130	11:56:57	218	45533.1
133	130	11:57:09	219	49265.9
133	130	11:57:18	220	48365.4
133	130	11:57:27	221	47404.1
134	130	11:57:57	222	46944.8
134	130	11:58:05	223	47282.7
134	130	11:58:12	224	49280.6
134	130	11:58:20	225	41763.9
134	130	11:58:28	226	29515.8
134	130	11:58:35	227	45471.9
135	130	11:59:56	228	46285.5
135	130	11:59:03	229	45069.4
135	130	11:59:11	230	39463.5
135	130	11:59:22	231	44709.7
135	130	11:59:30	232	45713.0
135	130	11:59:37	233	46727.0
136	130	11:59:51	234	52131.7
136	130	12:00:00	235	47226.9
136	130	12:00:08	236	47117.0
136	130	12:00:15	237	47494.3
136	130	12:00:23	238	48352.4
136	130	12:00:32	239	49023.7
137	130	12:01:08	240	48283.0
137	130	12:01:15	241	46884.4
137	130	12:01:23	242	47328.0
137	130	12:01:30	243	48293.4
137	130	12:01:38	244	47596.4
137	130	12:01:46	245	47655.1
137	130	12:01:54	246	45770.9
137	130	12:02:01	247	47166.1

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
137	130	12:02:08	248	47672.7
137	130	12:02:15	249	47652.6
137	130	12:02:23	250	47050.9
137	130	12:02:30	251	46779.4
138	130	12:02:48	252	37581.4
138	130	12:02:56	253	46833.6
138	130	12:03:04	254	48184.1
138	130	12:03:11	255	48301.6
138	130	12:03:20	256	46948.8
138	130	12:03:28	257	46539.4
138	130	12:03:36	258	47788.4
138	130	12:03:44	259	48168.0
138	130	12:03:53	260	48255.0
138	130	12:04:01	261	47924.9
138	130	12:04:08	262	47886.2
138	130	12:04:16	263	48542.4
138	130	12:05:12	264	48427.9
139	130	12:05:20	265	48320.2
139	130	12:05:27	266	48235.1
139	130	12:05:38	267	48249.7
139	130	12:06:41	268	48291.4
139	130	12:06:50	269	48059.2
139	130	12:07:00	270	47726.1
139	130	12:07:09	271	47716.9
139	130	12:08:05	272	48856.1
139	130	12:08:13	273	49102.9
139	130	12:08:21	274	51734.4
139	130	12:08:28	275	45932.6
139	130	12:08:36	276	45749.0
130	130	12:08:58	277	45232.8
130	130	12:09:06	278	41572.8
130	130	12:09:15	279	47858.4
130	130	12:09:23	280	48046.1
130	130	12:09:30	281	49753.2
130	130	12:09:38	282	46147.5
130	130	12:09:45	283	46625.3
130	130	12:09:53	284	47131.9
130	130	12:10:00	285	47629.8
130	130	12:10:08	286	48182.3
130	130	12:10:16	287	47886.8
130	130	12:10:24	288	47757.8
130	130	12:10:32	289	47860.9
141	140	12:25:44	290	48624.0
141	140	12:25:50	291	48311.9
141	140	12:25:57	292	48099.7
141	140	12:26:09	293	47543.9
141	140	12:26:17	294	45434.1
141	140	12:26:29	295	51944.7
142	140	12:26:54	296	48588.3

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
142	140	12:27:02	297	46229.2
142	140	12:27:09	298	47152.0
142	140	12:27:20	299	48149.7
142	140	12:27:27	300	48192.7
142	140	12:27:34	301	47179.8
143	140	12:27:49	302	46543.4
143	140	12:27:56	303	48313.5
143	140	12:28:05	304	48445.7
143	140	12:28:13	305	49009.9
143	140	12:28:20	306	47724.5
143	140	12:28:27	307	47491.1
144	140	12:28:40	308	48115.0
144	140	12:28:49	309	48370.5
144	140	12:28:59	310	48495.3
144	140	12:29:07	311	48542.5
144	140	12:29:14	312	48550.3
144	140	12:29:21	313	47527.6
145	140	12:29:45	314	47589.4
145	140	12:29:53	315	48495.0
145	140	12:30:00	316	48527.1
145	140	12:30:12	317	48581.4
145	140	12:30:22	318	48510.5
145	140	12:30:29	319	48391.5
146	140	12:32:23	320	49834.8
146	140	12:32:31	321	48550.4
146	140	12:32:39	322	48589.5
146	140	12:32:47	323	49490.9
146	140	12:32:55	324	48144.8
146	140	12:33:05	325	46957.2
147	140	12:33:21	326	51325.6
147	140	12:33:30	327	47799.4
147	140	12:33:38	328	48308.0
147	140	12:33:45	329	48648.1
147	140	12:33:53	330	48867.7
147	140	12:34:00	331	48604.2
148	140	12:34:19	332	46477.4
148	140	12:34:26	333	51995.4
148	140	12:34:39	334	52125.2
148	140	12:34:47	335	48194.0
148	140	12:34:56	336	47465.5
148	140	12:35:07	337	52186.1
149	140	12:35:43	338	38932.5
149	140	12:35:50	339	43953.3
149	140	12:35:57	340	46533.2
149	140	12:36:03	341	52156.4
149	140	12:36:10	342	47843.2
149	140	12:36:17	343	46734.9
149	140	12:36:25	344	47891.3
149	140	12:36:33	345	48202.3
149	140	12:36:41	346	47981.4

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
149	140	12:36:54	347	48563.5
149	140	12:37:03	348	48326.8
140	140	12:37:37	349	47315.2
140	140	12:37:50	350	47132.6
140	140	12:37:59	351	47384.9
140	140	12:38:08	352	47512.5
140	140	12:38:17	353	47905.0
140	140	12:38:29	354	46547.3
140	140	12:38:36	355	52080.2
140	140	12:38:44	356	46365.6
140	140	12:38:53	357	36596.1
140	140	12:39:00	358	37970.0
140	140	12:39:08	359	45076.4
151	150	15:18:26	360	52070.5
151	150	15:18:34	361	40490.4
151	150	15:18:42	362	38638.7
151	150	15:19:01	363	43440.4
151	150	15:19:11	364	42047.4
151	150	15:19:18	365	43011.9
151	150	15:19:25	366	45523.9
151	150	15:19:32	367	49376.2
151	150	15:19:40	368	36886.6
151	150	15:19:47	369	45704.6
151	150	15:19:54	370	45539.3
151	150	15:20:01	371	45628.6
151	150	15:20:09	372	38963.7
151	150	15:20:24	373	42733.9
152	150	15:20:47	374	45318.7
152	150	15:20:56	375	46119.0
152	150	15:21:03	376	46759.2
152	150	15:21:10	377	47393.3
152	150	15:21:17	378	47521.1
152	150	15:21:24	379	47580.7
152	150	15:21:31	380	47389.0
152	150	15:21:37	381	47365.4
152	150	15:21:44	382	47413.1
152	150	15:21:51	383	47068.9
152	150	15:21:59	384	45500.3
152	150	15:22:05	385	41721.5
152	150	15:22:12	386	38190.7
152	150	15:22:19	387	46653.6
152	150	15:22:26	388	47623.5
152	150	15:22:33	389	47530.8
153	150	15:22:52	390	49243.3
153	150	15:23:01	391	48700.5
153	150	15:23:08	392	49266.3
153	150	15:23:15	393	47976.0
153	150	15:23:22	394	47919.4
153	150	15:23:29	395	49068.7
153	150	15:23:36	396	49283.0
153	150	15:23:43	397	46354.4

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
153	150	15:23:50	398	48364.9
153	150	15:23:56	399	48371.1
153	150	15:24:03	400	48476.7
153	150	15:24:10	401	48435.8
153	150	15:24:16	402	48397.7
153	150	15:24:23	403	48231.5
153	150	15:24:33	404	47865.0
153	150	15:24:52	405	38230.8
154	150	15:25:10	406	46273.4
154	150	15:25:19	407	48393.8
154	150	15:25:26	408	48542.4
154	150	15:25:33	409	49021.9
154	150	15:25:40	410	49362.1
154	150	15:25:46	411	48787.6
154	150	15:25:54	412	48701.5
154	150	15:26:02	413	48698.9
154	150	15:26:10	414	48703.9
154	150	15:26:19	415	48742.8
154	150	15:26:26	416	48804.0
154	150	15:26:34	417	48722.3
154	150	15:26:41	418	48532.3
154	150	15:26:49	419	48409.5
154	150	15:26:57	420	48159.2
154	150	15:27:07	421	48199.1
155	150	15:33:07	422	48883.0
155	150	15:33:19	423	48584.3
155	150	15:33:32	424	48545.1
155	150	15:33:42	425	48921.7
155	150	15:33:54	426	49364.0
155	150	15:34:02	427	49061.3
155	150	15:34:11	428	48758.2
155	150	15:34:29	429	48763.9
155	150	15:34:38	430	48780.8
155	150	15:34:47	431	48784.9
155	150	15:34:55	432	48801.3
155	150	15:35:03	433	49052.7
155	150	15:35:13	434	48446.5
155	150	15:35:21	435	48329.1
155	150	15:35:32	436	48652.4
155	150	15:35:41	437	47147.6
156	150	15:36:50	438	47458.0
156	150	15:37:00	439	48757.0
156	150	15:37:22	440	48427.7
156	150	15:37:31	441	48228.4
156	150	15:37:39	442	48860.3
156	150	15:37:49	443	48781.5
156	150	15:37:57	444	48831.6
156	150	15:38:04	445	48832.8
156	150	15:38:11	446	48731.8
156	150	15:38:18	447	48828.3
156	150	15:38:26	448	49145.6

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
156	150	15:38:35	449	35076.4
156	150	15:38:42	450	49867.4
156	150	15:38:49	451	48606.4
156	150	15:38:59	452	48644.9
156	150	15:39:10	453	48730.5
157	150	15:39:28	454	48508.6
157	150	15:39:36	455	48469.4
157	150	15:39:43	456	48250.6
157	150	15:39:50	457	47980.0
157	150	15:39:58	458	48255.0
157	150	15:40:06	459	48913.3
157	150	15:40:13	460	48763.0
157	150	15:40:21	461	48727.1
157	150	15:40:28	462	48754.0
157	150	15:40:35	463	48759.2
157	150	15:40:43	464	48733.0
157	150	15:40:50	465	48513.3
157	150	15:40:58	466	47769.7
157	150	15:41:12	467	48289.5
157	150	15:41:20	468	48557.7
157	150	15:41:40	469	47379.1
158	150	15:42:01	470	46639.8
158	150	15:42:11	471	48330.5
158	150	15:42:19	472	48498.4
158	150	15:42:26	473	48471.6
158	150	15:42:34	474	48530.6
158	150	15:42:44	475	48584.2
158	150	15:42:51	476	48513.2
158	150	15:42:58	477	48423.8
158	150	15:43:07	478	48381.0
158	150	15:43:16	479	48332.4
158	150	15:43:23	480	48520.7
158	150	15:43:30	481	47554.0
158	150	15:43:37	482	45430.6
158	150	15:43:44	483	47901.6
158	150	15:43:51	484	48280.9
158	150	15:43:58	485	48253.0
159	150	15:47:23	486	47566.7
159	150	15:47:37	487	47685.4
159	150	15:47:48	488	47168.4
159	150	15:47:56	489	48343.9
159	150	15:48:10	490	32467.0
159	150	15:48:23	491	46824.3
159	150	15:48:30	492	47147.9
159	150	15:48:38	493	47383.7
159	150	15:48:45	494	47597.0
159	150	15:48:52	495	47963.9
159	150	15:49:00	496	48097.4
159	150	15:49:07	497	47950.1
159	150	15:49:14	498	48084.0
159	150	15:49:21	499	48437.8

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
159	150	15:49:29	500	46783.2
161	160	16:06:26	501	48621.3
161	160	16:06:38	502	46496.1
161	160	16:06:45	503	46768.0
161	160	16:06:52	504	46807.5
161	160	16:06:59	505	46576.0
161	160	16:07:06	506	45962.5
161	160	16:07:13	507	47047.9
161	160	16:07:20	508	46970.9
161	160	16:07:28	509	47516.0
161	160	16:07:35	510	47030.3
161	160	16:07:42	511	46538.5
161	160	16:07:49	512	46331.0
161	160	16:07:56	513	52048.1
161	160	16:08:04	514	48652.7
162	160	16:09:47	515	45556.5
162	160	16:09:55	516	45626.0
162	160	16:10:02	517	52014.1
162	160	16:10:09	518	47181.2
162	160	16:10:15	519	47776.5
162	160	16:10:22	520	48002.7
162	160	16:10:29	521	48246.4
162	160	16:10:39	522	48213.9
162	160	16:10:47	523	48076.6
162	160	16:10:54	524	47852.7
162	160	16:11:01	525	47672.9
162	160	16:11:08	526	47618.2
162	160	16:11:16	527	47435.3
162	160	16:11:23	528	52002.1
171	170	16:14:30	529	48323.2
171	170	16:14:37	530	48121.5
171	170	16:14:43	531	47793.5
171	170	16:14:49	532	47435.5
171	170	16:14:56	533	46766.9
171	170	16:15:03	534	48177.9
171	170	16:15:11	535	47025.7
171	170	16:15:18	536	47182.3
171	170	16:15:25	537	46960.5
171	170	16:15:32	538	45532.7
171	170	16:15:39	539	52542.4
171	170	16:15:46	540	46198.0
171	170	16:15:53	541	47106.9
171	170	16:16:00	542	47450.6
171	170	16:16:07	543	47269.5
171	170	16:16:14	544	47319.7
171	170	16:16:22	545	47484.9
171	170	16:16:29	546	47400.6
171	170	16:16:36	547	47476.2
171	170	16:16:43	548	48025.3
171	170	16:16:50	549	48322.2

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
171	170	16:16:59	550	49225.1
171	170	16:17:11	551	48077.0
171	170	16:17:19	552	47676.3
171	170	16:17:26	553	47504.3
171	170	16:17:33	554	47073.7
171	170	16:17:45	555	46776.8
171	170	16:17:53	556	46829.2
171	170	16:18:00	557	47017.0
171	170	16:18:08	558	46874.9
171	170	16:18:15	559	46950.2
171	170	16:18:25	560	47316.3
171	170	16:18:32	561	47533.4
171	170	16:18:40	562	47006.2
171	170	16:18:47	563	47684.1
171	170	16:18:55	564	46865.4
171	170	16:19:03	565	47210.8
171	170	16:19:10	566	47527.8
171	170	16:19:18	567	47550.8
171	170	16:19:43	568	47739.6
172	170	16:20:10	569	49310.6
172	170	16:20:17	570	47819.8
172	170	16:20:24	571	47797.3
172	170	16:20:32	572	47759.0
172	170	16:20:39	573	47664.6
172	170	16:20:45	574	47405.4
172	170	16:20:52	575	47307.1
172	170	16:20:59	576	47511.4
172	170	16:21:06	577	47749.9
172	170	16:21:12	578	47801.1
172	170	16:21:35	579	47759.8
172	170	16:21:43	580	47725.4
172	170	16:21:52	581	47551.5
172	170	16:21:58	582	47540.9
172	170	16:22:06	583	47719.0
172	170	16:22:12	584	47728.9
172	170	16:22:20	585	47537.4
172	170	16:22:27	586	47344.2
172	170	16:22:34	587	47654.4
172	170	16:22:40	588	49034.7
172	170	16:22:47	589	48204.6
172	170	16:22:55	590	48154.7
172	170	16:23:03	591	49076.7
172	170	16:23:12	592	49052.2
172	170	16:23:21	593	47966.1
172	170	16:23:31	594	47812.6
172	170	16:23:38	595	47891.7
172	170	16:23:47	596	47819.1
172	170	16:23:54	597	47454.2
172	170	16:24:03	598	46853.6
172	170	16:24:10	599	47147.2
172	170	16:24:17	600	47626.9

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Line#	Surv.#	Time	Reading#	Intensity(Gammas)
172	170	16:24:24	601	47794.9
172	170	16:24:32	602	47788.4
172	170	16:24:39	603	47793.7
172	170	16:24:46	604	47946.9
172	170	16:24:53	605	48145.9
172	170	16:25:00	606	48347.6
172	170	16:25:07	607	48548.8
172	170	16:25:14	608	48634.5
173	170	16:26:28	609	48527.6
173	170	16:26:36	610	48598.3
173	170	16:26:44	611	48088.5
173	170	16:26:53	612	47811.4
173	170	16:27:00	613	47351.1
173	170	16:27:12	614	46873.2
173	170	16:27:19	615	46990.7
173	170	16:27:28	616	47418.4
173	170	16:27:36	617	47501.8
173	170	16:27:43	618	46942.8
173	170	16:27:51	619	47121.4
173	170	16:27:58	620	47581.2
173	170	16:28:04	621	47645.4
173	170	16:28:11	622	47588.6
173	170	16:28:19	623	47527.4
173	170	16:28:26	624	47702.4
173	170	16:28:34	625	47848.3
173	170	16:28:41	626	47583.6
173	170	16:28:48	627	48125.0
173	170	16:28:55	628	48015.1
173	170	16:29:03	629	47485.0
173	170	16:29:09	630	48265.1
173	170	16:29:16	631	45050.3
173	170	16:29:23	632	45016.9
173	170	16:29:30	633	46584.0
173	170	16:29:36	634	47588.6
173	170	16:29:43	635	47568.8
173	170	16:29:50	636	47460.5
173	170	16:29:57	637	47353.0
173	170	16:30:04	638	47288.9
173	170	16:30:12	639	47173.2
173	170	16:30:19	640	45393.2
173	170	16:30:26	641	45603.5
173	170	16:30:33	642	46421.9
173	170	16:30:40	643	46804.2
173	170	16:30:48	644	46961.0
173	170	16:30:55	645	47053.7
173	170	16:31:02	646	46887.6
173	170	16:31:09	647	48399.3
173	170	16:31:17	648	39131.7
181	180	16:35:09	649	31889.1
181	180	16:35:17	650	37601.4
181	180	16:35:23	651	38999.2

Appendix C Continued

Line#	Surv.#	Time	Reading#	Intensity(Gammas)
181	180	16:35:30	652	34679.3
181	180	16:36:07	653	45547.5
181	180	16:36:14	654	37957.4
181	180	16:36:20	655	45638.1
181	180	16:36:26	656	31748.1
181	180	16:36:33	657	38637.7
181	180	16:36:39	658	29001.9
181	180	16:36:47	659	39132.5
181	180	16:36:56	660	31078.7
181	180	16:37:03	661	39060.8
181	180	16:37:10	662	40137.5
181	180	16:37:17	663	47414.5
181	180	16:37:23	664	45534.2
181	180	16:37:30	665	39009.2
181	180	16:37:37	666	39035.4
181	180	16:37:44	667	41976.8
181	180	16:37:51	668	43587.7
181	180	16:39:42	669	47657.2
181	180	16:39:49	670	49253.7
181	180	16:39:56	671	46758.3
181	180	16:40:03	672	47055.5
181	180	16:40:10	673	47762.6
181	180	16:40:16	674	46561.7
181	180	16:40:25	675	38323.4
181	180	16:40:32	676	46277.0
181	180	16:40:45	677	46780.5
181	180	16:40:52	678	46838.7
181	180	16:40:59	679	46911.8
181	180	16:41:06	680	47902.6
181	180	16:41:12	681	47928.9
181	180	16:41:18	682	47940.4
181	180	16:41:23	683	48247.6
181	180	16:41:43	684	48273.7
181	180	16:41:51	685	44358.9
181	180	16:41:57	686	45573.1
181	180	16:42:04	687	30745.0
181	180	16:42:11	688	47516.0
181	180	16:42:18	689	48284.9
181	180	16:42:25	690	48750.4

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
201	200	10:02:03	0	0.0	0.0	49292.0
201	200	10:02:10	1	0.0	0.0	48843.2
201	200	10:02:21	2	0.0	0.0	48451.3
201	200	10:02:28	3	0.0	0.0	48061.5
201	200	10:02:35	4	0.0	0.0	47613.5
201	200	10:02:42	5	0.0	0.0	47222.2
201	200	10:02:48	6	0.0	0.0	47339.4
201	200	10:02:57	7	0.0	0.0	47687.5
201	200	10:03:04	8	0.0	0.0	47925.7
201	200	10:03:10	9	0.0	0.0	48126.1
201	200	10:03:19	10	0.0	0.0	48130.9
201	200	10:03:30	11	0.0	0.0	48149.7
201	200	10:03:39	12	0.0	0.0	47982.8
201	200	10:03:46	13	0.0	0.0	48258.8
201	200	10:03:54	14	0.0	0.0	48011.7
201	200	10:04:01	15	0.0	0.0	47677.5
201	200	10:04:08	16	0.0	0.0	47512.2
201	200	10:04:15	17	0.0	0.0	47879.8
201	200	10:04:22	18	0.0	0.0	48134.8
201	200	10:04:29	19	0.0	0.0	48112.0
201	200	10:04:36	20	0.0	0.0	48128.7
201	200	10:04:44	21	0.0	0.0	48155.9
201	200	10:04:56	22	0.0	0.0	47016.9
201	200	10:05:03	23	0.0	0.0	45633.1
202	200	10:05:19	24	0.0	0.0	41479.9
202	200	10:05:26	25	0.0	0.0	47825.0
202	200	10:05:34	26	0.0	0.0	48328.2
202	200	10:05:41	27	0.0	0.0	48313.9
202	200	10:05:48	28	0.0	0.0	48323.8
202	200	10:05:55	29	0.0	0.0	48332.9
202	200	10:06:01	30	0.0	0.0	48305.3
202	200	10:06:22	31	0.0	0.0	48328.1
202	200	10:06:30	32	0.0	0.0	48484.9
202	200	10:06:37	33	0.0	0.0	48812.6
202	200	10:06:44	34	0.0	0.0	48515.6
202	200	10:06:52	35	0.0	0.0	48439.8
202	200	10:07:00	36	0.0	0.0	48464.0
202	200	10:07:08	37	0.0	0.0	48479.4
202	200	10:07:15	38	0.0	0.0	48416.4
202	200	10:07:22	39	0.0	0.0	48352.7
202	200	10:07:29	40	0.0	0.0	48320.2
202	200	10:07:36	41	0.0	0.0	48328.3
202	200	10:07:43	42	0.0	0.0	48368.1
202	200	10:07:50	43	0.0	0.0	48463.6
202	200	10:07:57	44	0.0	0.0	48530.9
202	200	10:08:05	45	0.0	0.0	48499.4
202	200	10:08:13	46	0.0	0.0	48395.8
202	200	10:08:21	47	0.0	0.0	48594.2
203	200	10:08:35	48	0.0	0.0	45824.5

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
203	200	10:08:43	49	0.0	0.0	49213.9
203	200	10:08:53	50	0.0	0.0	47786.6
203	200	10:09:01	51	0.0	0.0	48979.3
203	200	10:09:10	52	0.0	0.0	49068.0
203	200	10:09:22	53	0.0	0.0	48556.7
203	200	10:09:31	54	0.0	0.0	48578.2
203	200	10:09:39	55	0.0	0.0	49215.4
203	200	10:09:46	56	0.0	0.0	47549.2
203	200	10:09:54	57	0.0	0.0	48289.4
203	200	10:10:02	58	0.0	0.0	48452.1
203	200	10:10:08	59	0.0	0.0	48262.1
203	200	10:10:16	60	0.0	0.0	48368.9
203	200	10:10:25	61	0.0	0.0	42475.5
203	200	10:10:35	62	0.0	0.0	36175.0
203	200	10:10:44	63	0.0	0.0	48384.5
203	200	10:10:54	64	0.0	0.0	49524.0
203	200	10:11:02	65	0.0	0.0	48385.3
203	200	10:11:10	66	0.0	0.0	48085.1
203	200	10:11:19	67	0.0	0.0	45025.0
203	200	10:11:28	68	0.0	0.0	48090.7
203	200	10:11:36	69	0.0	0.0	48115.5
203	200	10:11:44	70	0.0	0.0	50398.4
203	200	10:11:52	71	0.0	0.0	45725.5
211	210	10:13:37	72	0.0	0.0	47082.0
211	210	10:13:45	73	0.0	0.0	35045.3
211	210	10:13:53	74	0.0	0.0	38999.0
211	210	10:14:00	75	0.0	0.0	35180.3
211	210	10:14:08	76	0.0	0.0	33089.3
211	210	10:14:15	77	0.0	0.0	40251.3
211	210	10:14:23	78	0.0	0.0	46447.6
211	210	10:14:31	79	0.0	0.0	45558.0
211	210	10:14:38	80	0.0	0.0	49266.0
221	220	10:16:09	81	0.0	0.0	38364.1
221	220	10:16:21	82	0.0	0.0	45475.3
221	220	10:16:28	83	0.0	0.0	47659.0
221	220	10:16:35	84	0.0	0.0	46697.0
221	220	10:16:42	85	0.0	0.0	39009.2
221	220	10:16:50	86	0.0	0.0	50100.5
231	230	10:19:43	87	0.0	0.0	43130.4
231	230	10:19:55	88	0.0	0.0	47117.0
231	230	10:20:02	89	0.0	0.0	45789.1
231	230	10:20:09	90	0.0	0.0	46861.0
231	230	10:20:15	91	0.0	0.0	46155.0
231	230	10:20:23	92	0.0	0.0	31715.5
231	230	10:20:30	93	0.0	0.0	45509.8
232	230	10:20:48	94	0.0	0.0	45628.9
232	230	10:20:55	95	0.0	0.0	35240.7
232	230	10:21:01	96	0.0	0.0	37490.4
232	230	10:21:09	97	0.0	0.0	46587.7
232	230	10:21:16	98	0.0	0.0	28650.7
232	230	10:21:23	99	0.0	0.0	33411.2

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Cammas)
232	230	10:21:30	100	0.0	0.0	35035.8
232	230	10:21:37	101	0.0	0.0	37663.8
232	230	10:21:43	102	0.0	0.0	35066.7
232	230	10:21:51	103	0.0	0.0	45658.2
232	230	10:21:58	104	0.0	0.0	45096.7
232	230	10:22:05	105	0.0	0.0	46483.8
232	230	10:22:12	106	0.0	0.0	49839.4
232	230	10:22:19	107	0.0	0.0	45491.2
232	230	10:22:27	108	0.0	0.0	46456.9
232	230	10:22:35	109	0.0	0.0	47857.4
232	230	10:22:43	110	0.0	0.0	49308.3
241	240	10:31:20	111	0.0	0.0	49869.3
241	240	10:31:28	112	0.0	0.0	48166.7
241	240	10:31:35	113	0.0	0.0	48077.1
241	240	10:31:43	114	0.0	0.0	48642.4
241	240	10:31:50	115	0.0	0.0	48870.3
241	240	10:31:58	116	0.0	0.0	48599.7
241	240	10:32:10	117	0.0	0.0	48334.8
241	240	10:32:18	118	0.0	0.0	48250.8
242	240	10:32:40	119	0.0	0.0	48116.2
242	240	10:32:48	120	0.0	0.0	48033.5
242	240	10:32:55	121	0.0	0.0	45275.1
242	240	10:33:03	122	0.0	0.0	48358.1
242	240	10:33:10	123	0.0	0.0	46122.7
242	240	10:33:20	124	0.0	0.0	47552.1
242	240	10:33:26	125	0.0	0.0	47573.2
242	240	10:33:34	126	0.0	0.0	47566.7
243	240	10:34:10	127	0.0	0.0	47839.0
243	240	10:34:18	128	0.0	0.0	47125.4
244	240	10:35:22	129	0.0	0.0	46528.9
244	240	10:35:35	130	0.0	0.0	47296.1
244	240	10:35:43	131	0.0	0.0	33238.7
245	240	10:36:21	132	0.0	0.0	47419.9
245	240	10:36:30	133	0.0	0.0	47745.9
245	240	10:36:43	134	0.0	0.0	48237.1
245	240	10:36:50	135	0.0	0.0	49214.8
245	240	10:36:58	136	0.0	0.0	49312.5
246	240	10:39:25	137	0.0	0.0	49147.9
246	240	10:39:35	138	0.0	0.0	48593.0
246	240	10:39:44	139	0.0	0.0	48367.7
246	240	10:39:54	140	0.0	0.0	49081.5
246	240	10:40:02	141	0.0	0.0	47417.1
247	240	10:40:26	142	0.0	0.0	45683.3
247	240	10:40:33	143	0.0	0.0	48305.8
247	240	10:40:43	144	0.0	0.0	36582.0
247	240	10:40:52	145	0.0	0.0	46593.3
247	240	10:41:00	146	0.0	0.0	47442.6
247	240	10:41:08	147	0.0	0.0	48335.9
247	240	10:41:16	148	0.0	0.0	48131.0
247	240	10:41:24	149	0.0	0.0	47676.9
247	240	10:41:33	150	0.0	0.0	41790.1

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
251	250	10:50:44	151	0.0	0.0	42967.9
251	250	10:50:54	152	0.0	0.0	48834.9
251	250	10:51:04	153	0.0	0.0	49765.1
252	250	10:51:45	154	0.0	0.0	35132.9
252	250	10:51:56	155	0.0	0.0	48366.1
252	250	10:52:05	156	0.0	0.0	48681.8
252	250	10:52:14	157	0.0	0.0	47622.5
253	250	10:52:44	158	0.0	0.0	43433.4
253	250	10:52:55	159	0.0	0.0	47827.5
253	250	10:53:10	160	0.0	0.0	48104.5
253	250	10:53:33	161	0.0	0.0	48219.6
253	250	10:53:41	162	0.0	0.0	46905.2
254	250	10:56:58	163	0.0	0.0	28621.5
254	250	10:57:05	164	0.0	0.0	47501.3
254	250	10:57:19	165	0.0	0.0	48388.0
254	250	10:57:28	166	0.0	0.0	47599.8
254	250	10:57:35	167	0.0	0.0	47234.9
254	250	10:57:41	168	0.0	0.0	46982.9
254	250	10:57:49	169	0.0	0.0	47105.9
254	250	10:58:02	170	0.0	0.0	38921.8
255	250	10:58:24	171	0.0	0.0	45449.1
255	250	10:58:30	172	0.0	0.0	26124.7
255	250	10:58:38	173	0.0	0.0	35885.1
255	250	10:58:49	174	0.0	0.0	46949.5
255	250	10:58:56	175	0.0	0.0	47957.7
255	250	10:59:03	176	0.0	0.0	47384.1
255	250	10:59:09	177	0.0	0.0	47536.0
255	250	10:59:17	178	0.0	0.0	47311.4
256	250	11:01:15	179	0.0	0.0	48516.9
256	250	11:01:23	180	0.0	0.0	48289.9
256	250	11:01:30	181	0.0	0.0	49184.6
256	250	11:01:37	182	0.0	0.0	48195.4
256	250	11:01:44	183	0.0	0.0	31643.7
256	250	11:01:55	184	0.0	0.0	33668.5
256	250	11:02:03	185	0.0	0.0	35083.0
261	260	11:14:04	186	0.0	0.0	37625.9
261	260	11:14:14	187	0.0	0.0	46254.8
261	260	11:14:20	188	0.0	0.0	42180.0
261	260	11:14:27	189	0.0	0.0	39053.8
262	260	11:14:47	190	0.0	0.0	26575.7
262	260	11:14:56	191	0.0	0.0	36309.7
262	260	11:15:04	192	0.0	0.0	48515.4
262	260	11:15:11	193	0.0	0.0	48159.9
262	260	11:15:19	194	0.0	0.0	47984.8
262	260	11:15:27	195	0.0	0.0	48184.1
263	260	11:15:41	196	0.0	0.0	47937.0
263	260	11:15:49	197	0.0	0.0	48052.6
263	260	11:15:56	198	0.0	0.0	48384.4
263	260	11:16:03	199	0.0	0.0	48447.0
263	260	11:16:09	200	0.0	0.0	47664.1
263	260	11:16:17	201	0.0	0.0	46509.6

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
263	260	11:16:25	202	0.0	0.0	31017.2
263	260	11:16:32	203	0.0	0.0	46271.7
263	260	11:16:40	204	0.0	0.0	45874.8
263	260	11:16:47	205	0.0	0.0	46568.2
263	260	11:16:55	206	0.0	0.0	47271.8
264	260	11:23:00	207	0.0	0.0	30846.8
264	260	11:23:12	208	0.0	0.0	47189.5
264	260	11:23:19	209	0.0	0.0	47346.1
264	260	11:23:29	210	0.0	0.0	47596.5
264	260	11:23:35	211	0.0	0.0	47853.7
264	260	11:23:42	212	0.0	0.0	48143.5
264	260	11:23:50	213	0.0	0.0	48420.5
264	260	11:23:57	214	0.0	0.0	48357.8
264	260	11:24:04	215	0.0	0.0	48191.4
264	260	11:24:12	216	0.0	0.0	47759.9
265	260	11:26:14	217	0.0	0.0	48069.7
265	260	11:26:23	218	0.0	0.0	48450.3
265	260	11:26:33	219	0.0	0.0	48202.5
265	260	11:26:41	220	0.0	0.0	48262.4
265	260	11:26:50	221	0.0	0.0	48385.5
265	260	11:26:58	222	0.0	0.0	48181.7
265	260	11:27:06	223	0.0	0.0	47715.6
265	260	11:27:16	224	0.0	0.0	47760.4
265	260	11:27:26	225	0.0	0.0	30351.0
266	260	11:28:42	226	0.0	0.0	35316.0
266	260	11:28:50	227	0.0	0.0	33904.9
266	260	11:28:59	228	0.0	0.0	48623.2
266	260	11:29:19	229	0.0	0.0	48517.5
266	260	11:29:26	230	0.0	0.0	48521.9
266	260	11:29:34	231	0.0	0.0	48401.6
266	260	11:29:41	232	0.0	0.0	47237.5
267	260	11:30:02	233	0.0	0.0	49049.3
267	260	11:30:10	234	0.0	0.0	46815.0
267	260	11:30:25	235	0.0	0.0	48926.0
267	260	11:30:34	236	0.0	0.0	49020.6
267	260	11:30:44	237	0.0	0.0	49012.7
267	260	11:30:53	238	0.0	0.0	25671.9
268	260	11:31:18	239	0.0	0.0	19522.9
268	260	11:31:26	240	0.0	0.0	49541.5
268	260	11:31:34	241	0.0	0.0	46732.1
268	260	11:31:41	242	0.0	0.0	48235.6
268	260	11:31:47	243	0.0	0.0	48938.3
268	260	11:31:55	244	0.0	0.0	49520.8
268	260	11:32:19	245	0.0	0.0	25417.6
269	260	11:32:38	246	0.0	0.0	48795.8
269	260	11:32:45	247	0.0	0.0	49064.9
269	260	11:32:51	248	0.0	0.0	49068.7
269	260	11:32:59	249	0.0	0.0	48877.6
269	260	11:33:08	250	0.0	0.0	49054.4
269	260	11:33:15	251	0.0	0.0	49374.6
269	260	11:34:48	252	0.0	0.0	52475.4

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
271	270	11:37:45	253	0.0	0.0	15452.4
271	270	11:37:53	254	0.0	0.0	25775.0
272	270	11:38:14	255	0.0	0.0	45561.0
272	270	11:38:20	256	0.0	0.0	52133.5
272	270	11:38:27	257	0.0	0.0	39050.2
272	270	11:38:34	258	0.0	0.0	39086.6
281	280	11:43:39	259	0.0	0.0	48891.1
281	280	11:43:47	260	0.0	0.0	48774.6
281	280	11:43:54	261	0.0	0.0	49068.9
281	280	11:44:08	262	0.0	0.0	49817.4
281	280	11:44:16	263	0.0	0.0	49334.3
281	280	11:44:22	264	0.0	0.0	49579.7
281	280	11:44:29	265	0.0	0.0	45324.7
281	280	11:45:10	266	0.0	0.0	45634.1
281	280	11:45:19	267	0.0	0.0	45530.5
283	280	11:49:02	268	0.0	0.0	39058.6
283	280	11:49:10	269	0.0	0.0	49844.8
283	280	11:49:45	270	0.0	0.0	49803.4
283	280	11:49:54	271	0.0	0.0	49393.8
283	280	11:50:06	272	0.0	0.0	49333.5
283	280	11:50:16	273	0.0	0.0	49151.5
283	280	11:50:22	274	0.0	0.0	48586.6
283	280	11:50:30	275	0.0	0.0	48542.8
283	280	11:50:37	276	0.0	0.0	48728.9
284	280	11:51:36	277	0.0	0.0	48153.4
284	280	11:51:43	278	0.0	0.0	48322.2
284	280	11:51:49	279	0.0	0.0	48471.0
284	280	11:51:56	280	0.0	0.0	48559.7
284	280	11:52:02	281	0.0	0.0	48659.0
284	280	11:52:08	282	0.0	0.0	48670.7
284	280	11:52:14	283	0.0	0.0	48559.2
284	280	11:52:20	284	0.0	0.0	48562.8
284	280	11:52:27	285	0.0	0.0	49093.0
284	280	11:52:32	286	0.0	0.0	49313.0
284	280	11:52:39	287	0.0	0.0	49365.7
284	280	11:52:45	288	0.0	0.0	49356.4
284	280	11:52:52	289	0.0	0.0	50264.4
284	280	11:53:07	290	0.0	0.0	48372.5
285	280	11:53:32	291	0.0	0.0	45430.0
285	280	11:53:48	292	0.0	0.0	48670.8
285	280	11:53:56	293	0.0	0.0	49014.9
285	280	11:54:03	294	0.0	0.0	49077.7
285	280	11:54:10	295	0.0	0.0	49123.4
285	280	11:54:17	296	0.0	0.0	49070.6
285	280	11:54:24	297	0.0	0.0	48753.1
285	280	11:54:34	298	0.0	0.0	48545.6
285	280	11:54:40	299	0.0	0.0	48737.8
285	280	11:54:49	300	0.0	0.0	48795.9
285	280	11:55:04	301	0.0	0.0	48762.9
285	280	11:55:11	302	0.0	0.0	48665.9
285	280	11:55:18	303	0.0	0.0	48581.7

Appendix C Continued

Line#	Surv.#	Time	Reading#		Intensity(Gammas)
285	280	11:55:25	304	0.0	0.0 47546.0
286	280	11:55:46	305	0.0	0.0 46377.1
286	280	11:55:54	306	0.0	0.0 49440.9
286	280	11:56:00	307	0.0	0.0 48668.6
286	280	11:56:05	308	0.0	0.0 48724.3
286	280	11:56:13	309	0.0	0.0 48688.7
286	280	11:56:19	310	0.0	0.0 48677.5
286	280	11:56:26	311	0.0	0.0 48639.9
286	280	11:56:36	312	0.0	0.0 49604.8
286	280	11:56:44	313	0.0	0.0 48911.9
286	280	11:56:52	314	0.0	0.0 48912.9
286	280	11:56:58	315	0.0	0.0 48809.2
286	280	11:57:05	316	0.0	0.0 48763.3
286	280	11:57:12	317	0.0	0.0 48667.7
286	280	11:57:25	318	0.0	0.0 46459.0
287	280	11:57:56	319	0.0	0.0 47443.8
287	280	11:58:08	320	0.0	0.0 48145.2
287	280	11:58:16	321	0.0	0.0 48501.7
287	280	11:58:25	322	0.0	0.0 48725.8
287	280	11:58:35	323	0.0	0.0 48693.3
287	280	11:58:42	324	0.0	0.0 48833.6
287	280	11:58:48	325	0.0	0.0 48762.9
287	280	11:58:56	326	0.0	0.0 48618.1
287	280	11:59:05	327	0.0	0.0 48728.0
287	280	11:59:14	328	0.0	0.0 48793.1
287	280	11:59:21	329	0.0	0.0 48691.3
287	280	11:59:29	330	0.0	0.0 48642.5
287	280	11:59:36	331	0.0	0.0 48447.1
287	280	11:59:43	332	0.0	0.0 47423.9
288	280	12:00:00	333	0.0	0.0 47971.6
288	280	12:00:07	334	0.0	0.0 48449.9
288	280	12:00:16	335	0.0	0.0 48319.1
288	280	12:00:22	336	0.0	0.0 48461.6
288	280	12:00:28	337	0.0	0.0 48857.8
288	280	12:00:35	338	0.0	0.0 48618.8
288	280	12:00:42	339	0.0	0.0 48412.4
288	280	12:00:56	340	0.0	0.0 49161.3
288	280	12:01:06	341	0.0	0.0 45581.0
288	280	12:01:17	342	0.0	0.0 38979.4
288	280	12:01:26	343	0.0	0.0 32924.4
288	280	12:01:34	344	0.0	0.0 42543.4
288	280	12:01:43	345	0.0	0.0 45483.0
288	280	12:01:52	346	0.0	0.0 34952.3
291	280	13:37:20	347	0.0	0.0 26437.3
291	280	13:37:27	348	0.0	0.0 33356.8
291	280	13:37:34	349	0.0	0.0 32635.3
291	280	13:37:41	350	0.0	0.0 28615.2
291	280	13:37:48	351	0.0	0.0 29651.6
291	280	13:37:55	352	0.0	0.0 32532.6
291	280	13:38:02	353	0.0	0.0 22759.6
291	280	13:38:09	354	0.0	0.0 25891.7

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
291	290	13:35:16	355	0.0	0.0	32542.3
292	290	13:36:34	356	0.0	0.0	32414.5
292	290	13:38:41	357	0.0	0.0	35112.5
292	290	13:39:00	358	0.0	0.0	45033.4
292	290	13:39:07	359	0.0	0.0	45372.6
292	290	13:39:14	360	0.0	0.0	45986.7
292	290	13:39:20	361	0.0	0.0	46476.6
292	290	13:39:27	362	0.0	0.0	46716.5
292	290	13:39:33	363	0.0	0.0	46539.5
292	290	13:39:40	364	0.0	0.0	46651.4
293	290	13:40:06	365	0.0	0.0	47275.2
293	290	13:40:13	366	0.0	0.0	47111.3
293	290	13:40:21	367	0.0	0.0	47654.9
293	290	13:40:28	368	0.0	0.0	47553.7
293	290	13:40:34	369	0.0	0.0	46772.5
293	290	13:40:51	370	0.0	0.0	45842.7
293	290	13:41:04	371	0.0	0.0	45282.7
293	290	13:41:10	372	0.0	0.0	44512.3
293	290	13:41:18	373	0.0	0.0	38891.3
294	290	13:43:07	374	0.0	0.0	35753.7
294	290	13:43:18	375	0.0	0.0	44425.5
294	290	13:43:26	376	0.0	0.0	45721.0
294	290	13:43:40	377	0.0	0.0	46113.8
294	290	13:43:48	378	0.0	0.0	29535.2
294	290	13:44:16	379	0.0	0.0	47602.5
294	290	13:44:33	380	0.0	0.0	47893.9
294	290	13:44:41	381	0.0	0.0	47875.7
294	290	13:44:49	382	0.0	0.0	32533.2
295	290	13:46:04	383	0.0	0.0	45597.1
295	290	13:46:10	384	0.0	0.0	47753.5
295	290	13:46:17	385	0.0	0.0	47738.1
295	290	13:46:23	386	0.0	0.0	47431.9
295	290	13:46:30	387	0.0	0.0	46422.7
295	290	13:46:37	388	0.0	0.0	28866.7
295	290	13:46:44	389	0.0	0.0	45765.5
295	290	13:46:51	390	0.0	0.0	45658.4
295	290	13:46:58	391	0.0	0.0	38834.8
296	290	13:47:15	392	0.0	0.0	33432.2
296	290	13:47:23	393	0.0	0.0	45738.4
296	290	13:47:32	394	0.0	0.0	46887.4
296	290	13:47:38	395	0.0	0.0	45313.0
296	290	13:47:45	396	0.0	0.0	46942.8
296	290	13:47:51	397	0.0	0.0	47032.8
296	290	13:47:58	398	0.0	0.0	47918.7
296	290	13:48:05	399	0.0	0.0	48164.6
296	290	13:48:11	400	0.0	0.0	35301.2
297	290	13:48:25	401	0.0	0.0	44164.3
297	290	13:48:32	402	0.0	0.0	48632.2
297	290	13:48:40	403	0.0	0.0	48440.4
297	290	13:48:49	404	0.0	0.0	45292.6
297	290	13:48:56	405	0.0	0.0	47845.5

Line#	Surv.#	Time	Reading#			Intensity(Cammas)
297	290	13:49:02	406	0.0	0.0	47555.3
297	290	13:49:08	407	0.0	0.0	46849.5
297	290	13:49:15	408	0.0	0.0	45721.5
297	290	13:49:22	409	0.0	0.0	52633.1
298	290	13:49:35	410	0.0	0.0	34604.3
298	290	13:49:42	411	0.0	0.0	45632.1
298	290	13:49:49	412	0.0	0.0	46864.2
298	290	13:49:56	413	0.0	0.0	47743.6
298	290	13:50:03	414	0.0	0.0	48121.2
298	290	13:50:09	415	0.0	0.0	48179.5
298	290	13:50:17	416	0.0	0.0	48422.4
298	290	13:50:24	417	0.0	0.0	48717.4
298	290	13:50:33	418	0.0	0.0	[illegible]
299	290	13:50:40	419	0.0	0.0	32355.6
299	290	13:50:54	420	0.0	0.0	48182.6
299	290	13:51:01	421	0.0	0.0	47316.2
299	290	13:51:08	422	0.0	0.0	47947.5
299	290	13:51:15	423	0.0	0.0	48104.3
299	290	13:51:21	424	0.0	0.0	47617.5
299	290	13:51:28	425	0.0	0.0	47126.5
299	290	13:51:42	426	0.0	0.0	[illegible]
299	290	13:51:53	427	0.0	0.0	[illegible]
301	300	14:11:59	428	0.0	0.0	49979.[illegible]
301	300	14:12:05	429	0.0	0.0	46634.6
301	300	14:12:12	430	0.0	0.0	47582.7
301	300	14:12:19	431	0.0	0.0	47552.5
301	300	14:12:26	432	0.0	0.0	48323.2
301	300	14:12:33	433	0.0	0.0	46626.4
301	300	14:12:40	434	0.0	0.0	45574.2
301	300	14:12:47	435	0.0	0.0	47542.8
301	300	14:13:02	436	0.0	0.0	48215.1
301	300	14:13:11	437	0.0	0.0	48125.4
301	300	14:13:17	438	0.0	0.0	47515.6
301	300	14:13:24	439	0.0	0.0	47584.3
301	300	14:13:31	440	0.0	0.0	48342.0
301	300	14:13:37	441	0.0	0.0	49554.6
301	300	14:13:44	442	0.0	0.0	49256.3
301	300	14:13:50	443	0.0	0.0	49523.1
301	300	14:13:57	444	0.0	0.0	48505.7
301	300	14:14:03	445	0.0	0.0	49633.6
301	300	14:14:10	446	0.0	0.0	48481.6
301	300	14:14:16	447	0.0	0.0	48532.1
301	300	14:14:23	448	0.0	0.0	38641.8
301	300	14:14:29	449	0.0	0.0	48771.5
301	300	14:14:36	450	0.0	0.0	48905.0
301	300	14:14:43	451	0.0	0.0	48934.0
301	300	14:14:49	452	0.0	0.0	49687.7
301	300	14:14:56	453	0.0	0.0	45826.4
301	300	14:15:03	454	0.0	0.0	45820.2
301	300	14:15:10	455	0.0	0.0	48:52.5
301	300	14:15:17	456	0.0	0.0	48121.4

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
301	300	14:15:24	457	0.0	0.0	49087.5
301	300	14:15:31	458	0.0	0.0	49061.9
301	300	14:15:39	459	0.0	0.0	49117.2
301	300	14:15:46	460	0.0	0.0	49109.3
301	300	14:15:54	461	0.0	0.0	49045.5
301	300	14:16:00	462	0.0	0.0	48913.6
301	300	14:16:07	463	0.0	0.0	48975.2
301	300	14:16:15	464	0.0	0.0	48556.3
301	300	14:16:22	465	0.0	0.0	48021.2
301	300	14:16:31	466	0.0	0.0	49589.6
301	300	14:16:38	467	0.0	0.0	50113.3
301	300	14:16:46	468	0.0	0.0	50043.3
301	300	14:16:53	469	0.0	0.0	49671.1
301	300	14:16:59	470	0.0	0.0	49490.3
301	300	14:17:05	471	0.0	0.0	49419.7
301	300	14:17:13	472	0.0	0.0	49479.2
301	300	14:17:20	473	0.0	0.0	49472.1
301	300	14:17:26	474	0.0	0.0	49425.5
301	300	14:17:35	475	0.0	0.0	49470.7
301	300	14:17:41	476	0.0	0.0	49859.0
301	300	14:17:48	477	0.0	0.0	50120.3
301	300	14:17:55	478	0.0	0.0	48819.7
301	300	14:18:02	479	0.0	0.0	47589.0
301	300	14:18:09	480	0.0	0.0	47797.6
301	300	14:18:16	481	0.0	0.0	47908.4
301	300	14:18:23	482	0.0	0.0	48584.3
301	300	14:18:31	483	0.0	0.0	48423.4
301	300	14:18:38	484	0.0	0.0	21274.4
301	300	14:18:45	485	0.0	0.0	23552.5
301	300	14:18:52	486	0.0	0.0	48110.6
301	300	14:19:00	487	0.0	0.0	49387.8
301	300	14:19:06	488	0.0	0.0	49481.8
301	300	14:19:13	489	0.0	0.0	49424.6
301	300	14:19:20	490	0.0	0.0	49329.5
301	300	14:19:26	491	0.0	0.0	49129.6
301	300	14:19:33	492	0.0	0.0	49265.7
301	300	14:19:40	493	0.0	0.0	48783.3
301	300	14:19:46	494	0.0	0.0	48913.6
301	300	14:19:54	495	0.0	0.0	48645.2
301	300	14:20:01	496	0.0	0.0	49124.6
301	300	14:20:09	497	0.0	0.0	49176.3
301	300	14:20:16	498	0.0	0.0	49227.0
301	300	14:20:51	499	0.0	0.0	49352.2
301	300	14:20:59	500	0.0	0.0	49357.6
301	300	14:21:07	501	0.0	0.0	49278.3
301	300	14:21:14	502	0.0	0.0	49356.6
301	300	14:21:21	503	0.0	0.0	48552.7
301	300	14:21:28	504	0.0	0.0	38981.4
301	300	14:21:35	505	0.0	0.0	19523.2
301	300	14:21:42	506	0.0	0.0	46524.8

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
301	300	14:21:48	507	0.0	0.0	49071.6
301	300	14:21:55	508	0.0	0.0	32428.4
301	300	14:22:02	509	0.0	0.0	29885.0
302	300	14:22:19	510	0.0	0.0	38586.9
302	300	14:22:26	511	0.0	0.0	47353.4
302	300	14:22:34	512	0.0	0.0	48459.9
302	300	14:22:40	513	0.0	0.0	48415.5
302	300	14:22:47	514	0.0	0.0	48400.6
302	300	14:22:54	515	0.0	0.0	48725.5
302	300	14:23:01	516	0.0	0.0	49073.4
302	300	14:23:08	517	0.0	0.0	49269.4
302	300	14:23:16	518	0.0	0.0	49228.8
302	300	14:23:24	519	0.0	0.0	49232.9
302	300	14:23:32	520	0.0	0.0	49328.4
302	300	14:23:39	521	0.0	0.0	49283.4
302	300	14:23:47	522	0.0	0.0	49256.2
302	300	14:23:54	523	0.0	0.0	49226.3
302	300	14:24:00	524	0.0	0.0	49224.8
302	300	14:24:06	525	0.0	0.0	49228.5
302	300	14:24:13	526	0.0	0.0	49204.6
302	300	14:24:21	527	0.0	0.0	49074.5
302	300	14:24:28	528	0.0	0.0	48968.7
302	300	14:24:36	529	0.0	0.0	48916.4
302	300	14:24:44	530	0.0	0.0	48949.3
302	300	14:24:51	531	0.0	0.0	49051.5
302	300	14:24:59	532	0.0	0.0	49146.3
302	300	14:25:05	533	0.0	0.0	49065.2
302	300	14:25:13	534	0.0	0.0	48862.3
302	300	14:25:19	535	0.0	0.0	49099.7
302	300	14:25:27	536	0.0	0.0	49022.1
302	300	14:25:35	537	0.0	0.0	48915.6
302	300	14:25:41	538	0.0	0.0	48732.6
302	300	14:25:48	539	0.0	0.0	48591.3
302	300	14:25:56	540	0.0	0.0	48312.1
302	300	14:26:02	541	0.0	0.0	48351.2
302	300	14:26:09	542	0.0	0.0	48669.4
302	300	14:26:15	543	0.0	0.0	48686.5
302	300	14:26:22	544	0.0	0.0	49321.4
302	300	14:26:29	545	0.0	0.0	49348.2
302	300	14:26:36	546	0.0	0.0	49338.6
302	300	14:26:43	547	0.0	0.0	49323.7
302	300	14:26:54	548	0.0	0.0	49156.8
302	300	14:27:00	549	0.0	0.0	49284.4
302	300	14:27:11	550	0.0	0.0	49382.8
302	300	14:27:18	551	0.0	0.0	49304.7
302	300	14:27:25	552	0.0	0.0	49604.4
302	300	14:27:31	553	0.0	0.0	49312.2
302	300	14:27:38	554	0.0	0.0	49049.0
302	300	14:27:44	555	0.0	0.0	48941.3
302	300	14:27:50	556	0.0	0.0	48844.3
302	300	14:27:57	557	0.0	0.0	48855.6

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
302	300	14:28:04	558	0.0	0.0	49360.3
302	300	14:28:11	559	0.0	0.0	49869.7
302	300	14:28:18	560	0.0	0.0	49825.5
302	300	14:28:24	561	0.0	0.0	49318.1
302	300	14:28:30	562	0.0	0.0	49048.6
302	300	14:28:37	563	0.0	0.0	49027.3
302	300	14:28:43	564	0.0	0.0	49026.7
302	300	14:28:50	565	0.0	0.0	49011.8
302	300	14:29:13	566	0.0	0.0	49021.1
302	300	14:29:20	567	0.0	0.0	49013.5
302	300	14:29:30	568	0.0	0.0	48999.1
302	300	14:29:37	569	0.0	0.0	48955.7
302	300	14:29:43	570	0.0	0.0	48956.5
302	300	14:29:50	571	0.0	0.0	48959.2
302	300	14:29:57	572	0.0	0.0	48932.3
302	300	14:30:04	573	0.0	0.0	48953.6
302	300	14:30:11	574	0.0	0.0	49031.5
302	300	14:30:20	575	0.0	0.0	49106.3
302	300	14:30:27	576	0.0	0.0	49425.5
302	300	14:30:33	577	0.0	0.0	49706.1
302	300	14:30:40	578	0.0	0.0	49535.4
302	300	14:30:46	579	0.0	0.0	49257.7
302	300	14:30:53	580	0.0	0.0	48928.4
302	300	14:31:00	581	0.0	0.0	48856.7
302	300	14:31:06	582	0.0	0.0	48855.2
302	300	14:31:12	583	0.0	0.0	48788.1
302	300	14:31:18	584	0.0	0.0	48679.4
302	300	14:31:24	585	0.0	0.0	48620.6
302	300	14:31:31	586	0.0	0.0	48652.9
302	300	14:31:38	587	0.0	0.0	48651.7
302	300	14:31:44	588	0.0	0.0	48638.7
302	300	14:31:51	589	0.0	0.0	48670.2
302	300	14:31:58	590	0.0	0.0	48787.3
302	300	14:32:05	591	0.0	0.0	48875.9
303	300	14:32:24	592	0.0	0.0	48937.7
303	300	14:32:31	593	0.0	0.0	48856.6
303	300	14:32:38	594	0.0	0.0	48931.2
303	300	14:32:49	595	0.0	0.0	48962.7
303	300	14:33:27	596	0.0	0.0	49021.5
303	300	14:33:36	597	0.0	0.0	49034.0
303	300	14:33:44	598	0.0	0.0	49051.4
303	300	14:34:47	599	0.0	0.0	49023.3
303	300	14:34:54	600	0.0	0.0	49001.4
303	300	14:35:01	601	0.0	0.0	48954.9
303	300	14:35:07	602	0.0	0.0	48872.0
303	300	14:35:14	603	0.0	0.0	48762.0
303	300	14:35:20	604	0.0	0.0	48729.0
303	300	14:35:27	605	0.0	0.0	48897.4
303	300	14:35:37	606	0.0	0.0	48988.2
303	300	14:35:44	607	0.0	0.0	48909.3
303	300	14:35:50	608	0.0	0.0	48537.6

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
303	300	14:35:57	609	0.0	0.0	45219.6
303	300	14:36:03	610	0.0	0.0	49049.6
303	300	14:36:10	611	0.0	0.0	45072.5
303	300	14:36:16	612	0.0	0.0	49082.5
303	300	14:36:23	613	0.0	0.0	49086.3
303	300	14:36:31	614	0.0	0.0	43067.0
303	300	14:36:40	615	0.0	0.0	49082.7
303	300	14:36:51	616	0.0	0.0	48930.5
303	300	14:36:58	617	0.0	0.0	45201.9
303	300	14:37:04	618	0.0	0.0	49066.6
303	300	14:37:10	619	0.0	0.0	49075.0
303	300	14:37:16	620	0.0	0.0	43056.5
303	300	14:37:23	621	0.0	0.0	49053.0
303	300	14:37:29	622	0.0	0.0	49054.9
303	300	14:37:37	623	0.0	0.0	49013.3
303	300	14:37:45	624	0.0	0.0	48967.0
303	300	14:37:55	625	0.0	0.0	48933.6
303	300	14:38:03	626	0.0	0.0	48924.2
303	300	14:38:10	627	0.0	0.0	48932.3
303	300	14:38:17	628	0.0	0.0	48584.3
303	300	14:38:24	629	0.0	0.0	49134.6
303	300	14:38:32	630	0.0	0.0	49425.5
303	300	14:38:39	631	0.0	0.0	45348.5
303	300	14:38:46	632	0.0	0.0	49217.1
303	300	14:38:55	633	0.0	0.0	49193.6
303	300	14:39:01	634	0.0	0.0	49193.2
303	300	14:39:09	635	0.0	0.0	49194.2
303	300	14:39:15	636	0.0	0.0	49224.6
303	300	14:39:24	637	0.0	0.0	49222.3
303	300	14:39:53	638	0.0	0.0	49249.6
303	300	14:40:00	639	0.0	0.0	49207.0
303	300	14:40:09	640	0.0	0.0	49375.6
303	300	14:40:18	641	0.0	0.0	49320.4
303	300	14:40:26	642	0.0	0.0	49186.3
303	300	14:40:35	643	0.0	0.0	49091.0
303	300	14:40:42	644	0.0	0.0	45078.5
303	300	14:40:49	645	0.0	0.0	49136.6
303	300	14:40:57	646	0.0	0.0	49224.5
303	300	14:41:04	647	0.0	0.0	49250.4
303	300	14:41:12	648	0.0	0.0	49224.8
303	300	14:41:19	649	0.0	0.0	49195.5
303	300	14:41:26	650	0.0	0.0	49366.3
303	300	14:41:35	651	0.0	0.0	48759.1
303	300	14:41:45	652	0.0	0.0	48488.0
303	300	14:41:52	653	0.0	0.0	48372.5
303	300	14:41:55	654	0.0	0.0	48343.6
303	300	14:42:07	655	0.0	0.0	48782.5
303	300	14:42:19	656	0.0	0.0	45220.4
303	300	14:42:27	657	0.0	0.0	45245.3
303	300	14:42:34	658	0.0	0.0	48199.3
303	300	14:42:42	659	0.0	0.0	49211.0

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
303	300	14:42:50	650	0.0	0.0	49254.5
303	300	14:42:57	651	0.0	0.0	49319.8
303	300	14:43:06	652	0.0	0.0	49356.9
303	300	14:43:14	653	0.0	0.0	49231.7
303	300	14:43:21	654	0.0	0.0	49202.0
303	300	14:43:30	655	0.0	0.0	48793.2
303	300	14:43:38	656	0.0	0.0	48755.7
303	300	14:43:45	657	0.0	0.0	48876.2
303	300	14:43:52	658	0.0	0.0	49576.9
303	300	14:43:58	659	0.0	0.0	48619.4
303	300	14:44:05	670	0.0	0.0	48785.0
303	300	14:44:11	671	0.0	0.0	48210.7
303	300	14:44:18	672	0.0	0.0	45638.8
304	300	14:44:32	673	0.0	0.0	46180.1
304	300	14:44:40	674	0.0	0.0	48293.6
304	300	14:44:47	675	0.0	0.0	48711.5
304	300	14:45:17	676	0.0	0.0	48683.7
304	300	14:45:23	677	0.0	0.0	48862.8
304	300	14:45:29	678	0.0	0.0	48940.5
304	300	14:46:17	679	0.0	0.0	48851.4
304	300	14:46:24	680	0.0	0.0	48677.1
304	300	14:46:31	681	0.0	0.0	48616.6
304	300	14:46:38	682	0.0	0.0	49250.3
304	300	14:46:59	683	0.0	0.0	49304.5
304	300	14:47:06	684	0.0	0.0	49475.7
304	300	14:47:13	685	0.0	0.0	49414.2
304	300	14:47:20	686	0.0	0.0	49244.9
304	300	14:48:28	687	0.0	0.0	49102.2
304	300	14:48:34	688	0.0	0.0	48919.1
304	300	14:48:44	689	0.0	0.0	48926.3
304	300	14:48:51	690	0.0	0.0	15481.2
304	300	14:50:42	691	0.0	0.0	26171.7
304	300	14:50:49	692	0.0	0.0	19492.1
304	300	14:50:57	693	0.0	0.0	27676.6
304	300	14:51:04	694	0.0	0.0	45553.5
304	300	14:51:12	695	0.0	0.0	48304.5
304	300	14:51:19	696	0.0	0.0	48775.9
304	300	14:51:26	697	0.0	0.0	48955.6
304	300	14:51:33	698	0.0	0.0	49050.1
304	300	14:51:50	699	0.0	0.0	49123.5
304	300	14:51:57	700	0.0	0.0	49205.0
304	300	14:52:04	701	0.0	0.0	49165.6
304	300	14:52:10	702	0.0	0.0	49188.5
304	300	14:52:17	703	0.0	0.0	49195.9
304	300	14:52:24	704	0.0	0.0	49273.4
304	300	14:52:31	705	0.0	0.0	49229.3
304	300	14:52:38	706	0.0	0.0	49219.4
304	300	14:52:44	707	0.0	0.0	49188.6
304	300	14:52:51	708	0.0	0.0	49168.6
304	300	14:52:58	709	0.0	0.0	49186.6
304	300	14:53:04	710	0.0	0.0	49150.9
304	300	14:53:10	711	0.0	0.0	49136.7

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
304	300	14:53:17	712	0.0	0.0	49122.5
304	300	14:53:26	713	0.0	0.0	49078.5
304	300	14:53:34	714	0.0	0.0	49063.4
304	300	14:53:41	715	0.0	0.0	48994.7
304	300	14:53:48	716	0.0	0.0	48853.1
304	300	14:53:55	717	0.0	0.0	48756.8
304	300	14:54:02	718	0.0	0.0	48661.5
304	300	14:54:10	719	0.0	0.0	48629.4
304	300	14:54:17	720	0.0	0.0	48627.8
304	300	14:54:22	721	0.0	0.0	48682.0
304	300	14:54:32	722	0.0	0.0	48737.7
304	300	14:54:37	723	0.0	0.0	48841.2
304	300	14:54:45	724	0.0	0.0	48931.8
304	300	14:54:53	725	0.0	0.0	49002.9
304	300	14:55:02	726	0.0	0.0	49035.4
304	300	14:55:07	727	0.0	0.0	49011.8
304	300	14:55:15	728	0.0	0.0	48972.0
304	300	14:55:23	729	0.0	0.0	48957.3
304	300	14:55:32	730	0.0	0.0	48937.7
304	300	14:55:37	731	0.0	0.0	48885.1
304	300	14:55:44	732	0.0	0.0	48865.1
304	300	14:55:51	733	0.0	0.0	48893.2
304	300	14:55:58	734	0.0	0.0	48978.8
304	300	14:56:05	735	0.0	0.0	48970.3
304	300	14:56:12	736	0.0	0.0	48856.7
304	300	14:56:19	737	0.0	0.0	48780.6
304	300	14:56:27	738	0.0	0.0	48674.5
304	300	14:56:33	739	0.0	0.0	48536.1
304	300	14:56:41	740	0.0	0.0	48366.9
304	300	14:56:49	741	0.0	0.0	48044.3
304	300	14:56:55	742	0.0	0.0	48055.0
304	300	14:57:03	743	0.0	0.0	48438.0
304	300	14:57:11	744	0.0	0.0	48652.7
304	300	14:57:18	745	0.0	0.0	48810.8
304	300	14:57:25	746	0.0	0.0	48966.3
304	300	14:57:33	747	0.0	0.0	49050.5
304	300	14:57:40	748	0.0	0.0	49152.5
304	300	14:57:49	749	0.0	0.0	49168.0
304	300	14:57:57	750	0.0	0.0	49144.5
304	300	14:58:09	751	0.0	0.0	49094.4
304	300	14:58:17	752	0.0	0.0	49062.7
304	300	14:58:24	753	0.0	0.0	49024.4
304	300	14:58:31	754	0.0	0.0	49027.2
304	300	14:58:39	755	0.0	0.0	49028.7
305	300	14:59:27	756	0.0	0.0	49083.5
305	300	14:59:35	757	0.0	0.0	49256.5
305	300	14:59:41	758	0.0	0.0	49083.1
305	300	14:59:49	759	0.0	0.0	49289.7
305	300	14:59:56	760	0.0	0.0	49236.1
305	300	15:00:26	761	0.0	0.0	49373.4
305	300	15:00:28	762	0.0	0.0	49374.1

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
305	300	15:00:37	763	0.0	0.0	49372.5
305	300	15:00:46	764	0.0	0.0	49124.0
305	300	15:01:03	765	0.0	0.0	48843.5
305	300	15:01:11	766	0.0	0.0	48564.0
305	300	15:01:20	767	0.0	0.0	48325.0
305	300	15:01:26	768	0.0	0.0	48128.3
305	300	15:01:34	769	0.0	0.0	47715.1
305	300	15:01:41	770	0.0	0.0	47512.9
305	300	15:01:49	771	0.0	0.0	47587.4
305	300	15:01:56	772	0.0	0.0	47848.0
305	300	15:02:03	773	0.0	0.0	48132.5
305	300	15:02:10	774	0.0	0.0	48358.4
305	300	15:02:18	775	0.0	0.0	48527.4
305	300	15:02:32	776	0.0	0.0	48784.2
305	300	15:02:37	777	0.0	0.0	48857.6
305	300	15:02:48	778	0.0	0.0	48886.1
305	300	15:02:56	779	0.0	0.0	48877.1
305	300	15:03:05	780	0.0	0.0	48908.9
305	300	15:03:12	781	0.0	0.0	48998.4
305	300	15:03:19	782	0.0	0.0	48934.3
305	300	15:03:27	783	0.0	0.0	48841.2
305	300	15:03:33	784	0.0	0.0	48957.0
305	300	15:03:47	785	0.0	0.0	49228.3
305	300	15:03:55	786	0.0	0.0	48385.5
305	300	15:04:05	787	0.0	0.0	48871.0
305	300	15:04:13	788	0.0	0.0	48655.2
305	300	15:04:23	789	0.0	0.0	45455.2
305	300	15:04:31	790	0.0	0.0	48320.1
305	300	15:04:40	791	0.0	0.0	48199.5
305	300	15:04:48	792	0.0	0.0	48204.7
305	300	15:04:56	793	0.0	0.0	48270.2
305	300	15:05:04	794	0.0	0.0	48495.0
305	300	15:05:11	795	0.0	0.0	46597.4
305	300	15:05:18	796	0.0	0.0	46856.5
305	300	15:05:26	797	0.0	0.0	45935.7
305	300	15:05:33	798	0.0	0.0	48956.9
305	300	15:05:42	799	0.0	0.0	49058.7
305	300	15:05:49	800	0.0	0.0	49112.9
305	300	15:05:56	801	0.0	0.0	49153.0
305	300	15:06:03	802	0.0	0.0	49192.5
305	300	15:06:16	803	0.0	0.0	49200.2
305	300	15:06:23	804	0.0	0.0	45336.3
305	300	15:06:30	805	0.0	0.0	49212.6
305	300	15:06:37	806	0.0	0.0	49276.4
305	300	15:06:45	807	0.0	0.0	49220.3
305	300	15:06:52	808	0.0	0.0	49221.9
305	300	15:06:59	809	0.0	0.0	49227.0
305	300	15:07:06	810	0.0	0.0	49220.1
305	300	15:07:13	811	0.0	0.0	49221.5
305	300	15:07:20	812	0.0	0.0	49188.9
305	300	15:07:29	813	0.0	0.0	49125.0
305	300	15:07:35	814	0.0	0.0	49509.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
305	300	15:07:42	815	0.0	0.0	48726.7
305	300	15:07:49	816	0.0	0.0	48232.3
305	300	15:07:56	817	0.0	0.0	45609.7
305	300	15:08:12	818	0.0	0.0	30716.6
305	300	15:08:19	819	0.0	0.0	21124.4
305	300	15:08:35	820	0.0	0.0	46568.2
305	300	15:08:42	821	0.0	0.0	48939.6
305	300	15:08:50	822	0.0	0.0	49103.0
305	300	15:08:57	823	0.0	0.0	48276.8
305	300	15:09:04	824	0.0	0.0	49430.1
305	300	15:09:11	825	0.0	0.0	49261.7
305	300	15:09:17	826	0.0	0.0	49112.9
305	300	15:09:27	827	0.0	0.0	46874.1
305	300	15:09:34	828	0.0	0.0	48772.6
305	300	15:09:41	829	0.0	0.0	46889.0
305	300	15:09:48	830	0.0	0.0	48844.1
305	300	15:09:55	831	0.0	0.0	48865.0
305	300	15:10:02	832	0.0	0.0	48470.7
305	300	15:10:10	833	0.0	0.0	48232.5
305	300	15:10:25	834	0.0	0.0	40268.0
311	310	15:29:31	835	0.0	0.0	32538.8
311	310	15:29:38	836	0.0	0.0	46511.2
311	310	15:29:46	837	0.0	0.0	46828.1
311	310	15:29:52	838	0.0	0.0	45536.4
311	310	15:29:59	839	0.0	0.0	30893.9
311	310	15:30:05	840	0.0	0.0	43272.4
311	310	15:30:11	841	0.0	0.0	43547.4
311	310	15:30:19	842	0.0	0.0	45953.5
311	310	15:30:30	843	0.0	0.0	47242.3
311	310	15:30:38	844	0.0	0.0	47112.2
311	310	15:30:44	845	0.0	0.0	45553.8
311	310	15:30:51	846	0.0	0.0	47053.3
311	310	15:30:58	847	0.0	0.0	46726.6
311	310	15:31:06	848	0.0	0.0	47548.5
311	310	15:31:12	849	0.0	0.0	47654.1
311	310	15:31:19	850	0.0	0.0	47596.4
311	310	15:31:26	851	0.0	0.0	46673.4
311	310	15:31:33	852	0.0	0.0	47794.6
311	310	15:31:39	853	0.0	0.0	45453.5
311	310	15:31:46	854	0.0	0.0	46474.6
311	310	15:31:53	855	0.0	0.0	35525.5
311	310	15:32:00	856	0.0	0.0	35323.8
311	310	15:32:06	857	0.0	0.0	47537.8
311	310	15:32:12	858	0.0	0.0	47754.0
311	310	15:32:19	859	0.0	0.0	44902.0
311	310	15:32:26	860	0.0	0.0	46869.6
311	310	15:32:33	861	0.0	0.0	47477.9
311	310	15:32:39	862	0.0	0.0	47445.9
311	310	15:32:45	863	0.0	0.0	47192.6
311	310	15:32:51	864	0.0	0.0	47140.1
311	310	15:32:58	865	0.0	0.0	46776.5

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
311	310	15:33:04	866	0.0	0.0	47025.6
311	310	15:33:11	867	0.0	0.0	47214.6
311	310	15:33:17	868	0.0	0.0	47775.3
311	310	15:33:24	869	0.0	0.0	47720.3
311	310	15:33:31	870	0.0	0.0	47622.6
311	310	15:33:38	871	0.0	0.0	47326.6
311	310	15:33:45	872	0.0	0.0	47026.2
311	310	15:33:53	873	0.0	0.0	46457.4
311	310	15:34:02	874	0.0	0.0	46145.0
311	310	15:34:09	875	0.0	0.0	46494.0
311	310	15:34:15	876	0.0	0.0	46533.0
311	310	15:34:23	877	0.0	0.0	46426.6
311	310	15:34:29	878	0.0	0.0	46414.5
311	310	15:34:36	879	0.0	0.0	46435.6
311	310	15:34:43	880	0.0	0.0	46832.4
311	310	15:34:49	881	0.0	0.0	47096.0
311	310	15:34:57	882	0.0	0.0	46685.2
311	310	15:35:03	883	0.0	0.0	45619.9
311	310	15:35:17	884	0.0	0.0	18705.0
312	310	15:35:46	885	0.0	0.0	34455.9
312	310	15:35:57	886	0.0	0.0	46554.6
312	310	15:36:04	887	0.0	0.0	48332.2
312	310	15:36:12	888	0.0	0.0	49645.1
312	310	15:36:19	889	0.0	0.0	49255.3
312	310	15:36:25	890	0.0	0.0	47792.6
312	310	15:36:32	891	0.0	0.0	47688.3
312	310	15:36:40	892	0.0	0.0	48110.4
312	310	15:36:48	893	0.0	0.0	48105.7
312	310	15:36:56	894	0.0	0.0	48538.8
312	310	15:37:02	895	0.0	0.0	48985.5
312	310	15:37:08	896	0.0	0.0	49146.2
312	310	15:37:16	897	0.0	0.0	49201.6
312	310	15:37:23	898	0.0	0.0	49194.7
312	310	15:37:30	899	0.0	0.0	49399.3
312	310	15:37:36	900	0.0	0.0	49084.8
312	310	15:37:44	901	0.0	0.0	49349.2
312	310	15:37:51	902	0.0	0.0	48945.5
312	310	15:37:57	903	0.0	0.0	48722.7
312	310	15:38:04	904	0.0	0.0	48385.5
312	310	15:38:11	905	0.0	0.0	48249.5
312	310	15:38:18	906	0.0	0.0	48373.1
312	310	15:38:25	907	0.0	0.0	48487.5
312	310	15:38:32	908	0.0	0.0	48536.6
312	310	15:38:39	909	0.0	0.0	48393.6
312	310	15:38:46	910	0.0	0.0	48788.9
312	310	15:38:53	911	0.0	0.0	48806.1
312	310	15:39:00	912	0.0	0.0	48771.9
312	310	15:39:14	913	0.0	0.0	48433.1
312	310	15:39:21	914	0.0	0.0	48213.0
312	310	15:39:27	915	0.0	0.0	48281.4
312	310	15:39:35	916	0.0	0.0	48276.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
312	310	15:39:41	917	0.0	0.0	47872.5
312	310	15:39:48	918	0.0	0.0	48296.6
312	310	15:39:57	919	0.0	0.0	48029.4
312	310	15:40:05	920	0.0	0.0	47975.2
312	310	15:40:12	921	0.0	0.0	47758.5
312	310	15:40:23	922	0.0	0.0	47962.0
312	310	15:40:32	923	0.0	0.0	48081.0
312	310	15:40:39	924	0.0	0.0	48814.7
312	310	15:40:46	925	0.0	0.0	49281.0
312	310	15:40:53	926	0.0	0.0	49322.9
312	310	15:40:59	927	0.0	0.0	49318.7
312	310	15:41:06	928	0.0	0.0	46466.5
312	310	15:41:13	929	0.0	0.0	47941.5
312	310	15:41:20	930	0.0	0.0	47135.7
312	310	15:41:26	931	0.0	0.0	47676.9
312	310	15:41:33	932	0.0	0.0	47818.5
312	310	15:41:39	933	0.0	0.0	47606.8
312	310	15:41:47	934	0.0	0.0	37548.1
313	310	15:42:07	935	0.0	0.0	45522.4
313	310	15:42:14	936	0.0	0.0	47802.9
313	310	15:42:20	937	0.0	0.0	48388.3
313	310	15:42:27	938	0.0	0.0	48551.9
313	310	15:42:34	939	0.0	0.0	48709.5
313	310	15:42:41	940	0.0	0.0	48965.2
313	310	15:42:48	941	0.0	0.0	47690.3
313	310	15:42:56	942	0.0	0.0	47875.1
313	310	15:43:03	943	0.0	0.0	47997.1
313	310	15:43:10	944	0.0	0.0	49700.9
313	310	15:43:17	945	0.0	0.0	49007.4
313	310	15:43:24	946	0.0	0.0	48258.1
313	310	15:43:31	947	0.0	0.0	49013.3
313	310	15:43:38	948	0.0	0.0	48321.3
313	310	15:43:44	949	0.0	0.0	48547.9
313	310	15:43:52	950	0.0	0.0	48621.6
313	310	15:43:59	951	0.0	0.0	48828.7
313	310	15:44:06	952	0.0	0.0	48930.0
313	310	15:44:13	953	0.0	0.0	48583.1
313	310	15:44:20	954	0.0	0.0	48814.6
313	310	15:44:27	955	0.0	0.0	49222.0
313	310	15:44:34	956	0.0	0.0	49185.2
313	310	15:44:41	957	0.0	0.0	49093.1
313	310	15:44:48	958	0.0	0.0	49074.6
313	310	15:44:57	959	0.0	0.0	49143.5
313	310	15:45:04	960	0.0	0.0	49249.1
313	310	15:45:12	961	0.0	0.0	49299.0
313	310	15:45:19	962	0.0	0.0	49076.3
313	310	15:45:26	963	0.0	0.0	48859.1
313	310	15:45:33	964	0.0	0.0	48782.7
313	310	15:45:42	965	0.0	0.0	48768.6
313	310	15:45:49	966	0.0	0.0	49323.2
313	310	15:45:56	967	0.0	0.0	50184.4

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
313	310	15:46:03	968	0.0	0.0	50216.9
313	310	15:46:10	969	0.0	0.0	49824.1
313	310	15:46:17	970	0.0	0.0	49699.5
313	310	15:46:23	971	0.0	0.0	49796.0
313	310	15:46:30	972	0.0	0.0	49735.4
313	310	15:46:37	973	0.0	0.0	49795.6
313	310	15:46:44	974	0.0	0.0	49665.1
313	310	15:46:51	975	0.0	0.0	49531.5
313	310	15:46:58	976	0.0	0.0	49418.9
313	310	15:47:06	977	0.0	0.0	49341.5
313	310	15:47:13	978	0.0	0.0	49029.8
313	310	15:47:20	979	0.0	0.0	47485.1
313	310	15:47:27	980	0.0	0.0	49288.5
313	310	15:47:36	981	0.0	0.0	26968.8
313	310	15:47:43	982	0.0	0.0	49622.3
313	310	15:47:51	983	0.0	0.0	47299.2
313	310	15:47:58	984	0.0	0.0	29195.4

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
331	330	10:45:45	0	0.0	0.0	48857.6
331	330	10:45:52	1	0.0	0.0	48133.0
331	330	10:46:06	2	0.0	0.0	26148.3
331	330	10:46:14	3	0.0	0.0	23868.0
331	330	10:46:23	4	0.0	0.0	22145.1
331	330	10:46:31	5	0.0	0.0	26596.1
331	330	10:46:44	6	0.0	0.0	25438.3
331	330	10:46:56	7	0.0	0.0	19286.3
331	330	10:47:02	8	0.0	0.0	21651.3
331	330	10:47:13	9	0.0	0.0	35130.8
331	330	10:47:20	10	0.0	0.0	46559.5
331	330	10:47:28	11	0.0	0.0	48142.1
332	330	10:47:47	12	0.0	0.0	48562.3
332	330	10:47:54	13	0.0	0.0	48065.4
332	330	10:48:00	14	0.0	0.0	47137.5
332	330	10:48:06	15	0.0	0.0	46113.4
332	330	10:48:13	16	0.0	0.0	48324.3
332	330	10:48:19	17	0.0	0.0	48611.0
332	330	10:48:26	18	0.0	0.0	47237.9
332	330	10:48:33	19	0.0	0.0	47155.5
332	330	10:48:40	20	0.0	0.0	45625.0
332	330	10:48:46	21	0.0	0.0	45368.0
332	330	10:48:53	22	0.0	0.0	45583.9
332	330	10:48:59	23	0.0	0.0	48731.9
333	330	10:49:14	24	0.0	0.0	48535.4
333	330	10:49:20	25	0.0	0.0	48150.5
333	330	10:49:26	26	0.0	0.0	47885.5
333	330	10:49:32	27	0.0	0.0	47910.3
333	330	10:49:35	28	0.0	0.0	48091.5
333	330	10:49:45	29	0.0	0.0	48197.6
333	330	10:49:52	30	0.0	0.0	48100.4
333	330	10:49:58	31	0.0	0.0	48057.8
333	330	10:50:04	32	0.0	0.0	48061.0
333	330	10:50:10	33	0.0	0.0	48240.1
333	330	10:50:17	34	0.0	0.0	48415.1
333	330	10:50:23	35	0.0	0.0	48632.7
334	330	10:50:42	36	0.0	0.0	48791.1
334	330	10:50:49	37	0.0	0.0	48468.9
334	330	10:50:56	38	0.0	0.0	48474.4
334	330	10:51:03	39	0.0	0.0	48618.5
334	330	10:51:10	40	0.0	0.0	48610.3
334	330	10:51:16	41	0.0	0.0	48454.6
334	330	10:51:23	42	0.0	0.0	48426.7
334	330	10:51:28	43	0.0	0.0	48261.0
334	330	10:51:35	44	0.0	0.0	47912.4
334	330	10:51:41	45	0.0	0.0	46839.9
334	330	10:51:47	46	0.0	0.0	46604.0
334	330	10:51:54	47	0.0	0.0	47763.7
335	330	10:52:08	48	0.0	0.0	47155.0
335	330	10:52:15	49	0.0	0.0	21875.1
335	330	10:52:22	50	0.0	0.0	21231.4
335	330	10:52:28	51	0.0	0.0	46576.6
335	330	10:52:34	52	0.0	0.0	48152.9
335	330	10:52:41	53	0.0	0.0	48490.3
335	330	10:52:48	54	0.0	0.0	48654.6
335	330	10:52:55	55	0.0	0.0	48813.7
335	330	10:53:02	56	0.0	0.0	49061.4
335	330	10:53:16	57	0.0	0.0	48795.0
335	330	10:53:23	58	0.0	0.0	48545.5
335	330	10:53:30	59	0.0	0.0	48560.3
336	330	10:53:49	60	0.0	0.0	48617.6
336	330	10:53:55				

336	330	10:54:16	63	0.0	0.0	48830.1
336	330	10:54:23	64	0.0	0.0	48667.3
336	330	10:54:29	65	0.0	0.0	48529.3
336	330	10:54:36	66	0.0	0.0	48352.5
336	330	10:54:43	67	0.0	0.0	47578.3
336	330	10:54:49	68	0.0	0.0	45734.4
336	330	10:55:05	69	0.0	0.0	26142.5
336	330	10:55:12	70	0.0	0.0	27883.7
337	330	10:55:31	71	0.0	0.0	46558.7
337	330	10:55:40	72	0.0	0.0	40038.8
337	330	10:55:55	73	0.0	0.0	50769.1
337	330	10:56:04	74	0.0	0.0	24341.8
337	330	10:56:11	75	0.0	0.0	45760.6
337	330	10:56:24	76	0.0	0.0	47206.8
337	330	10:56:33	77	0.0	0.0	48162.1
337	330	10:56:40	78	0.0	0.0	48371.3
337	330	10:56:47	79	0.0	0.0	48482.9
337	330	10:56:55	80	0.0	0.0	48562.9
337	330	10:57:07	81	0.0	0.0	48526.5
337	330	10:57:19	82	0.0	0.0	48452.6
338	330	10:57:36	83	0.0	0.0	48416.0
338	330	10:57:43	84	0.0	0.0	47767.8
338	330	10:57:49	85	0.0	0.0	47885.0
338	330	10:57:56	86	0.0	0.0	48022.9
338	330	10:58:02	87	0.0	0.0	48149.8
338	330	10:58:09	88	0.0	0.0	48020.4
338	330	10:58:16	89	0.0	0.0	47926.5
338	330	10:58:22	90	0.0	0.0	47637.9
338	330	10:58:29	91	0.0	0.0	47137.9
338	330	10:58:36	92	0.0	0.0	45502.1
338	330	10:58:59	93	0.0	0.0	29015.6
338	330	10:59:14	94	0.0	0.0	34160.5
339	330	10:59:32	95	0.0	0.0	24488.5
339	330	10:59:40	96	0.0	0.0	32564.8
339	330	11:00:01	97	0.0	0.0	19311.9
339	330	11:00:08	98	0.0	0.0	24930.9
339	330	11:00:14	99	0.0	0.0	22446.3
339	330	11:00:22	100	0.0	0.0	46623.3
339	330	11:00:29	101	0.0	0.0	46587.6
339	330	11:00:38	102	0.0	0.0	46877.9
339	330	11:00:45	103	0.0	0.0	47038.4
339	330	11:00:52	104	0.0	0.0	47327.6
339	330	11:01:00	105	0.0	0.0	47256.1
339	330	11:01:07	106	0.0	0.0	46247.6
330	330	11:01:29	107	0.0	0.0	46240.2
330	330	11:01:36	108	0.0	0.0	31488.5
330	330	11:01:43	109	0.0	0.0	26749.2
330	330	11:01:49	110	0.0	0.0	33213.1
330	330	11:01:56	111	0.0	0.0	45665.4
330	330	11:02:01	112	0.0	0.0	40571.8
330	330	11:02:09	113	0.0	0.0	40806.1
330	330	11:02:16	114	0.0	0.0	45288.8
330	330	11:02:23	115	0.0	0.0	39073.2
330	330	11:02:33	116	0.0	0.0	45824.5
330	330	11:02:55	117	0.0	0.0	30686.9
330	330	11:03:03	118	0.0	0.0	23703.5
341	340	11:13:05	119	0.0	0.0	46516.2
341	340	11:13:13	120	0.0	0.0	48808.4
341	340	11:13:20	121	0.0	0.0	48775.5
341	340	11:13:26	122	0.0	0.0	48768.8
341	340	11:13:33	123	0.0	0.0	48747.7
341	340	11:13:40	124	0.0	0.0	48575.1
341	340	11:13:46	125	0.0	0.0	48471.1
341	340	11:13:53	126	0.0	0.0	48328.2
			127	0.0		

341	340	11:14:12	129	0.0	0.0	46426.1
341	340	11:14:19	130	0.0	0.0	45155.0
341	340	11:14:26	131	0.0	0.0	43746.3
341	340	11:14:33	132	0.0	0.0	42352.4
341	340	11:14:40	133	0.0	0.0	40784.7
342	340	11:15:03	134	0.0	0.0	32853.7
342	340	11:15:10	135	0.0	0.0	29958.6
342	340	11:15:17	136	0.0	0.0	45519.6
342	340	11:15:24	137	0.0	0.0	44424.2
342	340	11:15:32	138	0.0	0.0	46407.8
342	340	11:15:40	139	0.0	0.0	47020.4
342	340	11:15:47	140	0.0	0.0	47572.5
342	340	11:15:54	141	0.0	0.0	48100.4
342	340	11:16:01	142	0.0	0.0	48479.2
342	340	11:16:09	143	0.0	0.0	48680.8
342	340	11:16:16	144	0.0	0.0	48772.2
342	340	11:16:23	145	0.0	0.0	48801.2
342	340	11:16:31	146	0.0	0.0	48699.5
343	340	11:16:43	147	0.0	0.0	48712.4
343	340	11:16:50	148	0.0	0.0	48761.8
343	340	11:16:57	149	0.0	0.0	48772.9
343	340	11:17:05	150	0.0	0.0	48641.1
343	340	11:17:18	151	0.0	0.0	48290.1
343	340	11:17:25	152	0.0	0.0	47894.1
343	340	11:17:31	153	0.0	0.0	47274.2
343	340	11:17:38	154	0.0	0.0	46370.6
343	340	11:17:46	155	0.0	0.0	45271.1
343	340	11:17:53	156	0.0	0.0	43335.8
343	340	11:18:02	157	0.0	0.0	19532.6
344	340	11:18:18	158	0.0	0.0	30357.9
344	340	11:18:29	159	0.0	0.0	30494.1
344	340	11:18:35	160	0.0	0.0	41164.7
344	340	11:18:43	161	0.0	0.0	45905.4
344	340	11:18:50	162	0.0	0.0	46920.4
344	340	11:18:57	163	0.0	0.0	47880.7
344	340	11:19:03	164	0.0	0.0	48411.3
344	340	11:19:09	165	0.0	0.0	48565.7
344	340	11:19:22	166	0.0	0.0	48761.3
344	340	11:19:30	167	0.0	0.0	48767.4
345	340	11:19:45	168	0.0	0.0	48675.1
345	340	11:19:55	169	0.0	0.0	48666.2
345	340	11:20:04	170	0.0	0.0	48489.8
345	340	11:20:10	171	0.0	0.0	48217.7
345	340	11:20:18	172	0.0	0.0	47541.8
345	340	11:20:25	173	0.0	0.0	46105.9
345	340	11:20:33	174	0.0	0.0	24227.7
345	340	11:20:42	175	0.0	0.0	25096.4
346	340	11:20:58	176	0.0	0.0	18892.3
346	340	11:21:12	177	0.0	0.0	23499.3
346	340	11:21:20	178	0.0	0.0	46495.1
346	340	11:21:28	179	0.0	0.0	47494.0
346	340	11:21:36	180	0.0	0.0	48098.5
346	340	11:21:42	181	0.0	0.0	48488.8
346	340	11:21:50	182	0.0	0.0	48522.6
347	340	11:22:04	183	0.0	0.0	48315.1
347	340	11:22:12	184	0.0	0.0	49022.9
347	340	11:22:21	185	0.0	0.0	47745.9
347	340	11:22:29	186	0.0	0.0	45672.0
348	340	11:22:58	187	0.0	0.0	48770.2
348	340	11:23:07	188	0.0	0.0	45597.2
348	340	11:23:15	189	0.0	0.0	47482.3
349	340	11:23:33	190	0.0	0.0	45677.5
351	350	11:38:13	191	0.0	0.0	28853.9
351	350	11:38:21	192	0.0	0.0	45608.9
351	350	11:38:26	193	0.0	0.0	[illegible]

351	350	11:38:54	185	0.0	0.0	48815.6
351	350	11:39:01	186	0.0	0.0	48873.7
351	350	11:39:07	187	0.0	0.0	48925.3
351	350	11:39:14	188	0.0	0.0	48941.4
351	350	11:39:20	189	0.0	0.0	48233.8
351	350	11:39:28	200	0.0	0.0	46964.9
352	350	11:39:45	201	0.0	0.0	30215.2
352	350	11:39:51	202	0.0	0.0	45871.2
352	350	11:39:58	203	0.0	0.0	48180.0
352	350	11:40:04	204	0.0	0.0	48669.6
352	350	11:40:11	205	0.0	0.0	48856.8
352	350	11:40:22	206	0.0	0.0	48941.6
352	350	11:40:31	207	0.0	0.0	48835.8
352	350	11:40:37	208	0.0	0.0	43807.6
352	350	11:40:43	209	0.0	0.0	48392.5
352	350	11:40:50	210	0.0	0.0	46870.4
353	350	11:41:04	211	0.0	0.0	26351.9
353	350	11:41:11	212	0.0	0.0	31274.8
353	350	11:41:15	213	0.0	0.0	47468.3
353	350	11:41:26	214	0.0	0.0	48368.9
353	350	11:41:34	215	0.0	0.0	48781.8
353	350	11:41:42	216	0.0	0.0	48899.3
353	350	11:41:49	217	0.0	0.0	48775.4
353	350	11:41:55	218	0.0	0.0	48619.4
353	350	11:42:01	219	0.0	0.0	48218.8
353	350	11:42:08	220	0.0	0.0	47751.5
354	350	11:42:21	221	0.0	0.0	45681.2
354	350	11:42:30	222	0.0	0.0	45501.8
354	350	11:42:35	223	0.0	0.0	46981.1
354	350	11:42:41	224	0.0	0.0	47935.0
354	350	11:42:48	225	0.0	0.0	48277.8
354	350	11:42:55	226	0.0	0.0	48798.8
354	350	11:43:02	227	0.0	0.0	48704.7
354	350	11:43:09	228	0.0	0.0	48407.6
354	350	11:43:15	229	0.0	0.0	48370.0
354	350	11:43:22	230	0.0	0.0	47689.1
354	350	11:43:29	231	0.0	0.0	46271.9
355	350	11:43:49	232	0.0	0.0	22085.0
355	350	11:43:59	233	0.0	0.0	27862.4
355	350	11:44:07	234	0.0	0.0	44505.0
355	350	11:44:15	235	0.0	0.0	46793.2
355	350	11:44:22	236	0.0	0.0	47577.2
355	350	11:44:32	237	0.0	0.0	47857.6
355	350	11:44:38	238	0.0	0.0	48419.2
355	350	11:44:45	239	0.0	0.0	48462.8
355	350	11:44:51	240	0.0	0.0	47532.2
355	350	11:44:57	241	0.0	0.0	46507.3
356	350	11:45:13	242	0.0	0.0	45652.3
356	350	11:45:24	243	0.0	0.0	45566.9
356	350	11:45:30	244	0.0	0.0	45371.0
356	350	11:45:38	245	0.0	0.0	47101.3
356	350	11:45:45	246	0.0	0.0	47851.9
356	350	11:45:52	247	0.0	0.0	47587.5
356	350	11:45:58	248	0.0	0.0	46846.6
356	350	11:46:04	249	0.0	0.0	46041.9
357	350	11:46:23	250	0.0	0.0	29938.8
357	350	11:46:30	251	0.0	0.0	43017.5
357	350	11:46:37	252	0.0	0.0	27208.9
357	350	11:46:43	253	0.0	0.0	45594.8
357	350	11:46:50	254	0.0	0.0	46891.5
357	350	11:46:59	255	0.0	0.0	46984.4
358	350	11:47:34	256	0.0	0.0	45204.5
358	350	11:47:41	257	0.0	0.0	45727.6
358	350	11:47:54	258	0.0	0.0	45162.5
			259	0.0	0.0	[illegible]

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361	360	11:52:18	262	0.0	0.0	28415.2
361	360	11:52:29	263	0.0	0.0	47820.5
361	360	11:52:35	264	0.0	0.0	48499.5
361	360	11:52:42	265	0.0	0.0	48779.3
361	360	11:52:51	266	0.0	0.0	48947.4
361	360	11:53:02	267	0.0	0.0	48851.1
361	360	11:53:08	268	0.0	0.0	48757.1
361	360	11:53:16	269	0.0	0.0	48611.2
361	360	11:53:22	270	0.0	0.0	48463.7
361	360	11:53:29	271	0.0	0.0	48182.3
361	360	11:53:35	272	0.0	0.0	47767.4
361	360	11:53:42	273	0.0	0.0	47115.0
361	360	11:53:49	274	0.0	0.0	45445.4
361	360	11:53:57	275	0.0	0.0	45425.5
361	360	11:54:04	276	0.0	0.0	43839.3
361	360	11:54:10	277	0.0	0.0	38828.4
362	360	11:54:29	278	0.0	0.0	45733.8
362	360	11:54:36	279	0.0	0.0	52041.5
362	360	11:54:43	280	0.0	0.0	46832.5
362	360	11:54:50	281	0.0	0.0	47242.7
362	360	11:55:41	282	0.0	0.0	47784.6
362	360	11:55:49	283	0.0	0.0	48373.7
362	360	11:55:56	284	0.0	0.0	48574.3
362	360	11:56:02	285	0.0	0.0	48678.2
362	360	11:56:09	286	0.0	0.0	48833.5
362	360	11:56:16	287	0.0	0.0	48887.1
362	360	11:56:24	288	0.0	0.0	49854.1
362	360	11:56:32	289	0.0	0.0	48797.7
362	360	11:56:40	290	0.0	0.0	48454.3
362	360	11:56:50	291	0.0	0.0	30432.0
363	360	11:57:03	292	0.0	0.0	29706.1
363	360	11:57:16	293	0.0	0.0	47371.7
363	360	11:57:41	294	0.0	0.0	48733.8
363	360	11:57:47	295	0.0	0.0	48856.1
363	360	11:57:54	296	0.0	0.0	48851.9
363	360	11:58:01	297	0.0	0.0	48840.3
363	360	11:58:11	298	0.0	0.0	48802.6
363	360	11:58:19	299	0.0	0.0	48828.8
363	360	11:58:27	300	0.0	0.0	43526.4
363	360	11:58:35	301	0.0	0.0	47964.0
363	360	11:58:42	302	0.0	0.0	47054.2
363	360	11:58:49	303	0.0	0.0	24138.6
363	360	11:58:56	304	0.0	0.0	44512.0
364	360	11:59:13	305	0.0	0.0	45475.8
364	360	11:59:19	306	0.0	0.0	45691.0
364	360	11:59:26	307	0.0	0.0	47813.3
364	360	11:59:35	308	0.0	0.0	47532.2
364	360	11:59:43	309	0.0	0.0	48478.0
364	360	11:59:50	310	0.0	0.0	48673.9
364	360	11:59:56	311	0.0	0.0	48840.5
364	360	12:00:03	312	0.0	0.0	48862.9
364	360	12:00:10	313	0.0	0.0	48854.9
364	360	12:00:16	314	0.0	0.0	48720.6
364	360	12:00:22	315	0.0	0.0	48238.6
364	360	12:00:29	316	0.0	0.0	41568.2
365	360	12:00:58	317	0.0	0.0	45423.0
365	360	12:03:19	318	0.0	0.0	48054.9
365	360	12:03:26	319	0.0	0.0	48646.5
365	360	12:03:33	320	0.0	0.0	48862.1
365	360	12:03:40	321	0.0	0.0	48880.6
365	360	12:03:47	322	0.0	0.0	49027.8
365	360	12:03:55	323	0.0	0.0	48715.5
365	360	12:04:01	324	0.0	0.0	48394.8
365	360	12:04:09	325	0.0	0.0	[illegible]

366	360	12:04:43	328	0.0	0.0	48872.1
366	360	12:04:56	329	0.0	0.0	48702.9
366	360	12:05:06	330	0.0	0.0	48491.5
366	360	12:05:12	331	0.0	0.0	47371.5
366	360	12:05:20	332	0.0	0.0	48153.0
366	360	12:05:27	333	0.0	0.0	49695.3
366	360	12:05:33	334	0.0	0.0	48857.7
366	360	12:05:40	335	0.0	0.0	48518.7
366	360	12:05:54	336	0.0	0.0	49812.4
366	360	12:06:02	337	0.0	0.0	49679.3
366	360	12:06:10	338	0.0	0.0	48235.8
11	10	16:08:54	339	0.0	0.0	45430.3
11	10	16:09:02	340	0.0	0.0	49667.0
11	10	16:09:09	341	0.0	0.0	50895.6
11	10	16:09:15	342	0.0	0.0	50208.4
11	10	16:09:22	343	0.0	0.0	50654.0
11	10	16:09:29	344	0.0	0.0	48224.7
11	10	16:09:35	345	0.0	0.0	46598.8
11	10	16:09:42	346	0.0	0.0	46576.4
11	10	16:09:50	347	0.0	0.0	47619.3
11	10	16:09:59	348	0.0	0.0	47731.4
11	10	16:10:08	349	0.0	0.0	48102.7
12	10	16:10:30	350	0.0	0.0	49091.4
12	10	16:10:39	351	0.0	0.0	49385.1
12	10	16:10:46	352	0.0	0.0	48674.7
12	10	16:10:52	353	0.0	0.0	48451.6
12	10	16:10:59	354	0.0	0.0	48036.1
12	10	16:11:05	355	0.0	0.0	47660.4
12	10	16:11:11	356	0.0	0.0	47324.7
12	10	16:11:17	357	0.0	0.0	47553.8
12	10	16:11:24	358	0.0	0.0	49367.9
12	10	16:11:30	359	0.0	0.0	51088.7
12	10	16:11:36	360	0.0	0.0	50231.9
13	10	16:11:57	361	0.0	0.0	49509.4
13	10	16:12:04	362	0.0	0.0	49223.8
13	10	16:12:10	363	0.0	0.0	49312.3
13	10	16:12:17	364	0.0	0.0	49388.3
13	10	16:12:23	365	0.0	0.0	48753.7
13	10	16:12:30	366	0.0	0.0	47978.3
13	10	16:12:36	367	0.0	0.0	47942.4
13	10	16:12:43	368	0.0	0.0	48098.7
13	10	16:12:50	369	0.0	0.0	48530.5
13	10	16:12:57	370	0.0	0.0	48897.6
13	10	16:13:06	371	0.0	0.0	49333.5
14	10	16:13:22	372	0.0	0.0	49744.0
14	10	16:13:29	373	0.0	0.0	49238.0
14	10	16:13:34	374	0.0	0.0	48913.9
14	10	16:13:40	375	0.0	0.0	48540.0
14	10	16:13:46	376	0.0	0.0	48257.5
14	10	16:13:53	377	0.0	0.0	49174.3
14	10	16:14:00	378	0.0	0.0	47931.0
14	10	16:14:06	379	0.0	0.0	47872.7
14	10	16:14:13	380	0.0	0.0	48455.4
14	10	16:14:19	381	0.0	0.0	48748.5
15	10	16:14:37	382	0.0	0.0	48884.2
15	10	16:14:44	383	0.0	0.0	48560.1
15	10	16:14:54	384	0.0	0.0	48569.6
15	10	16:15:01	385	0.0	0.0	48112.6
15	10	16:15:07	386	0.0	0.0	47431.1
15	10	16:15:14	387	0.0	0.0	47668.6
15	10	16:15:20	388	0.0	0.0	49087.8
15	10	16:15:27	389	0.0	0.0	48233.9
15	10	16:15:34	390	0.0	0.0	48129.1
16	10	16:15:50	391	0.0	0.0	49380.7

16	10	16:16:11	394	0.0	0.0	48616.7
16	10	16:16:18	395	0.0	0.0	45533.7
16	10	16:16:25	396	0.0	0.0	39017.3
16	10	16:16:31	397	0.0	0.0	47999.4
16	10	16:16:37	398	0.0	0.0	48464.6
16	10	16:16:44	399	0.0	0.0	48759.7
17	10	16:16:56	400	0.0	0.0	48832.7
17	10	16:17:05	401	0.0	0.0	48163.1
17	10	16:17:13	402	0.0	0.0	48032.0
17	10	16:17:20	403	0.0	0.0	37427.3
17	10	16:17:28	404	0.0	0.0	36855.9
17	10	16:17:35	405	0.0	0.0	50693.6
17	10	16:17:43	406	0.0	0.0	48340.4
17	10	16:17:51	407	0.0	0.0	45971.6
18	10	16:18:06	408	0.0	0.0	47372.8
18	10	16:18:13	409	0.0	0.0	47901.0
18	10	16:18:19	410	0.0	0.0	48164.1
18	10	16:18:26	411	0.0	0.0	45691.1
18	10	16:18:33	412	0.0	0.0	46547.1
18	10	16:18:39	413	0.0	0.0	48017.3
18	10	16:18:46	414	0.0	0.0	48616.4
19	10	16:19:03	415	0.0	0.0	46909.8
19	10	16:19:10	416	0.0	0.0	30511.4
19	10	16:19:16	417	0.0	0.0	46461.2
19	10	16:19:23	418	0.0	0.0	47677.1
21	20	16:22:22	419	0.0	0.0	49436.7
21	20	16:22:29	420	0.0	0.0	50342.2
21	20	16:22:35	421	0.0	0.0	46428.1
21	20	16:22:41	422	0.0	0.0	46169.5
21	20	16:22:47	423	0.0	0.0	46307.0
21	20	16:22:54	424	0.0	0.0	45433.5
21	20	16:23:00	425	0.0	0.0	45202.9
21	20	16:23:06	426	0.0	0.0	44455.6
21	20	16:23:14	427	0.0	0.0	46390.1
21	20	16:23:25	428	0.0	0.0	47855.9
21	20	16:23:32	429	0.0	0.0	48969.9
21	20	16:23:38	430	0.0	0.0	49198.8
21	20	16:23:45	431	0.0	0.0	49256.4
21	20	16:23:51	432	0.0	0.0	49248.4
22	20	16:24:09	433	0.0	0.0	48976.9
22	20	16:24:15	434	0.0	0.0	48352.4
22	20	16:24:22	435	0.0	0.0	48920.4
22	20	16:24:27	436	0.0	0.0	48819.2
22	20	16:24:34	437	0.0	0.0	48583.1
22	20	16:24:41	438	0.0	0.0	47571.0
22	20	16:24:47	439	0.0	0.0	35671.4
22	20	16:24:54	440	0.0	0.0	45440.0
22	20	16:25:28	441	0.0	0.0	45695.6
22	20	16:25:43	442	0.0	0.0	45642.7
22	20	16:25:52	443	0.0	0.0	45846.1
22	20	16:25:58	444	0.0	0.0	48269.0
23	20	16:29:10	445	0.0	0.0	47592.6
23	20	16:29:16	446	0.0	0.0	29829.1
23	20	16:29:50	447	0.0	0.0	45668.5
23	20	16:29:57	448	0.0	0.0	46893.8
23	20	16:30:04	449	0.0	0.0	48199.7
23	20	16:30:11	450	0.0	0.0	48597.1
23	20	16:30:18	451	0.0	0.0	48707.2
23	20	16:30:24	452	0.0	0.0	48856.5
23	20	16:30:31	453	0.0	0.0	48551.5
23	20	16:30:38	454	0.0	0.0	48338.8
23	20	16:30:44	455	0.0	0.0	48484.3
24	20	16:31:00	456	0.0	0.0	48132.2
24	20	16:31:09	457	0.0	0.0	[illegible]

24	20	16:31:20	459	0.0	0.0	48136.3
24	20	16:31:27	460	0.0	0.0	48557.4
24	20	16:31:34	461	0.0	0.0	48476.3
24	20	16:31:40	462	0.0	0.0	48404.6
24	20	16:31:48	463	0.0	0.0	48076.0
24	20	16:31:56	464	0.0	0.0	47572.1
24	20	16:32:05	465	0.0	0.0	47900.7
25	20	16:32:27	466	0.0	0.0	45642.5
25	20	16:32:35	467	0.0	0.0	46591.0
25	20	16:32:47	468	0.0	0.0	47958.3
25	20	16:32:53	469	0.0	0.0	48324.0
25	20	16:33:00	470	0.0	0.0	48281.3
25	20	16:33:05	471	0.0	0.0	48031.6
25	20	16:33:11	472	0.0	0.0	47007.9
25	20	16:33:18	473	0.0	0.0	36781.1
25	20	16:33:25	474	0.0	0.0	35232.4
25	20	16:33:31	475	0.0	0.0	46508.7
26	20	16:33:54	476	0.0	0.0	21486.5
26	20	16:34:01	477	0.0	0.0	46383.2
26	20	16:34:06	478	0.0	0.0	47313.1
26	20	16:34:13	479	0.0	0.0	47751.3
26	20	16:34:18	480	0.0	0.0	48075.7
26	20	16:34:25	481	0.0	0.0	32162.7
27	20	16:34:41	482	0.0	0.0	35086.8
27	20	16:34:49	483	0.0	0.0	47357.8
27	20	16:34:56	484	0.0	0.0	46394.5
27	20	16:35:03	485	0.0	0.0	44730.7
27	20	16:35:10	486	0.0	0.0	27771.7
28	20	16:35:24	487	0.0	0.0	33712.4
28	20	16:35:45	488	0.0	0.0	37146.2
2	20	16:36:01	489	0.0	0.0	30388.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
31	30	9:55:18	0	0.0	0.0	48503.8
31	30	9:55:25	1	0.0	0.0	46663.2
31	30	9:55:32	2	0.0	0.0	47537.5
31	30	9:55:38	3	0.0	0.0	47523.0
31	30	9:55:44	4	0.0	0.0	47053.5
31	30	9:55:50	5	0.0	0.0	48959.4
31	30	9:55:57	6	0.0	0.0	43877.7
31	30	9:59:03	7	0.0	0.0	48513.0
31	30	9:59:09	8	0.0	0.0	48741.8
31	30	9:59:16	9	0.0	0.0	48327.4
31	30	9:59:23	10	0.0	0.0	48455.1
31	30	9:59:30	11	0.0	0.0	43356.4
31	30	9:59:35	12	0.0	0.0	48812.5
31	30	9:59:50	13	0.0	0.0	46447.6
31	30	9:59:57	14	0.0	0.0	48730.2
31	30	10:00:05	15	0.0	0.0	45547.4
31	30	10:00:12	16	0.0	0.0	47539.5
31	30	10:00:19	17	0.0	0.0	45672.5
31	30	10:00:25	18	0.0	0.0	47545.4
31	30	10:00:32	19	0.0	0.0	47541.1
31	30	10:00:41	20	0.0	0.0	48462.4
32	30	10:00:56	21	0.0	0.0	44742.5
32	30	10:01:06	22	0.0	0.0	45353.2
32	30	10:01:13	23	0.0	0.0	47734.5
32	30	10:01:20	24	0.0	0.0	47526.0
32	30	10:01:26	25	0.0	0.0	47133.0
32	30	10:01:36	26	0.0	0.0	35183.5
32	30	10:01:46	27	0.0	0.0	47643.1
32	30	10:01:54	28	0.0	0.0	48492.3
32	30	10:02:01	29	0.0	0.0	46533.8
32	30	10:02:09	30	0.0	0.0	45752.5
32	30	10:02:17	31	0.0	0.0	48203.6
32	30	10:02:24	32	0.0	0.0	48439.4
32	30	10:02:31	33	0.0	0.0	49082.5
32	30	10:02:37	34	0.0	0.0	49994.8
32	30	10:02:44	35	0.0	0.0	49819.6
32	30	10:02:50	36	0.0	0.0	49472.0
32	30	10:02:59	37	0.0	0.0	49044.0
32	30	10:03:08	38	0.0	0.0	48215.6
32	30	10:03:15	39	0.0	0.0	49145.2
32	30	10:03:22	40	0.0	0.0	45295.7
32	30	10:03:29	41	0.0	0.0	47116.3
33	30	10:03:45	42	0.0	0.0	45657.2
33	30	10:03:53	43	0.0	0.0	47826.8
33	30	10:03:59	44	0.0	0.0	49566.2
33	30	10:04:05	45	0.0	0.0	49759.4
33	30	10:04:11	46	0.0	0.0	48515.6
33	30	10:04:18	47	0.0	0.0	49073.6
33	30	10:04:24	48	0.0	0.0	49207.7
33	30	10:04:30	49	0.0	0.0	49383.3
33	30	10:04:39	50	0.0	0.0	49145.5
33	30	10:04:46	51	0.0	0.0	48836.7
33	30	10:04:55	52	0.0	0.0	49863.2
33	30	10:05:15	53	0.0	0.0	49507.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
33	30	10:05:27	54	0.0	0.0	49452.0
33	30	10:05:35	55	0.0	0.0	48778.8
33	30	10:05:46	56	0.0	0.0	45600.7
33	30	10:05:53	57	0.0	0.0	32355.6
33	30	10:06:13	58	0.0	0.0	30488.1
33	30	10:06:23	59	0.0	0.0	36259.1
33	30	10:06:30	60	0.0	0.0	47379.9
33	30	10:06:39	61	0.0	0.0	48104.6
33	30	10:06:55	62	0.0	0.0	43632.4
34	30	10:07:10	63	0.0	0.0	47154.4
34	30	10:07:21	64	0.0	0.0	47535.1
34	30	10:07:30	65	0.0	0.0	47200.8
34	30	10:07:37	66	0.0	0.0	45749.5
34	30	10:07:48	67	0.0	0.0	36634.7
34	30	10:08:24	68	0.0	0.0	33047.1
34	30	10:08:36	69	0.0	0.0	48627.6
34	30	10:09:26	70	0.0	0.0	48849.0
34	30	10:09:32	71	0.0	0.0	48041.6
34	30	10:09:39	72	0.0	0.0	48362.6
34	30	10:09:51	73	0.0	0.0	48823.9
34	30	10:09:58	74	0.0	0.0	48458.6
34	30	10:10:05	75	0.0	0.0	48531.8
34	30	10:10:12	76	0.0	0.0	48782.9
34	30	10:10:18	77	0.0	0.0	48894.4
34	30	10:10:25	78	0.0	0.0	48872.1
34	30	10:10:31	79	0.0	0.0	48801.2
34	30	10:10:38	80	0.0	0.0	48703.7
34	30	10:10:44	81	0.0	0.0	48491.7
34	30	10:10:50	82	0.0	0.0	48137.1
34	30	10:10:57	83	0.0	0.0	45579.6
35	30	10:11:14	84	0.0	0.0	46414.4
35	30	10:11:21	85	0.0	0.0	47787.1
35	30	10:11:29	86	0.0	0.0	48194.1
35	30	10:11:36	87	0.0	0.0	48357.4
35	30	10:11:42	88	0.0	0.0	48269.4
35	30	10:11:49	89	0.0	0.0	48345.8
35	30	10:11:56	90	0.0	0.0	48659.3
35	30	10:12:03	91	0.0	0.0	48413.7
35	30	10:12:10	92	0.0	0.0	45040.1
35	30	10:12:17	93	0.0	0.0	47741.5
35	30	10:12:24	94	0.0	0.0	48302.4
35	30	10:12:31	95	0.0	0.0	48798.1
35	30	10:12:38	96	0.0	0.0	48887.9
35	30	10:12:44	97	0.0	0.0	48682.4
35	30	10:12:51	98	0.0	0.0	48894.5
35	30	10:13:04	99	0.0	0.0	28524.4
35	30	10:13:16	100	0.0	0.0	40828.2
35	30	10:13:29	101	0.0	0.0	46825.1
35	30	10:13:46	102	0.0	0.0	30612.3
35	30	10:13:54	103	0.0	0.0	46773.5
35	30	10:14:01	104	0.0	0.0	46754.7
35	30	10:14:09	105	0.0	0.0	28811.9
36	30	10:14:29	106	0.0	0.0	29054.8
36	30	10:14:35	107	0.0	0.0	41015.1

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
36	30	10:14:42	108	0.0	0.0	47157.9
36	30	10:14:49	109	0.0	0.0	47789.5
36	30	10:15:08	110	0.0	0.0	46415.3
36	30	10:15:14	111	0.0	0.0	52113.7
36	30	10:15:22	112	0.0	0.0	35200.9
36	30	10:15:29	113	0.0	0.0	48890.5
36	30	10:15:36	114	0.0	0.0	48887.5
36	30	10:15:42	115	0.0	0.0	48780.3
36	30	10:15:49	116	0.0	0.0	48726.0
36	30	10:15:56	117	0.0	0.0	45702.5
36	30	10:16:06	118	0.0	0.0	26053.5
36	30	10:16:14	119	0.0	0.0	28722.3
36	30	10:16:20	120	0.0	0.0	47953.6
36	30	10:16:27	121	0.0	0.0	48392.4
36	30	10:16:38	122	0.0	0.0	49097.4
36	30	10:16:44	123	0.0	0.0	31534.7
36	30	10:16:51	124	0.0	0.0	50116.7
36	30	10:16:58	125	0.0	0.0	48750.1
36	30	10:17:05	126	0.0	0.0	35440.7
36	30	10:17:12	127	0.0	0.0	32623.6
37	30	10:17:31	128	0.0	0.0	47998.6
37	30	10:17:37	129	0.0	0.0	48727.2
37	30	10:17:44	130	0.0	0.0	49133.8
37	30	10:17:52	131	0.0	0.0	49235.4
37	30	10:18:00	132	0.0	0.0	48622.9
37	30	10:18:08	133	0.0	0.0	49029.3
37	30	10:18:16	134	0.0	0.0	48345.6
37	30	10:18:23	135	0.0	0.0	47131.8
37	30	10:18:55	136	0.0	0.0	46412.3
37	30	10:19:02	137	0.0	0.0	48303.0
37	30	10:19:10	138	0.0	0.0	48706.5
37	30	10:19:18	139	0.0	0.0	48814.3
37	30	10:19:30	140	0.0	0.0	48953.7
37	30	10:19:37	141	0.0	0.0	49145.2
37	30	10:19:43	142	0.0	0.0	48786.1
37	30	10:19:55	143	0.0	0.0	48091.5
37	30	10:20:01	144	0.0	0.0	47923.2
37	30	10:20:07	145	0.0	0.0	46648.7
38	30	10:20:21	146	0.0	0.0	47290.6
38	30	10:20:28	147	0.0	0.0	47921.9
38	30	10:20:35	148	0.0	0.0	48386.3
38	30	10:20:42	149	0.0	0.0	48693.3
38	30	10:20:49	150	0.0	0.0	48875.4
38	30	10:20:56	151	0.0	0.0	48921.0
38	30	10:21:03	152	0.0	0.0	48955.5
38	30	10:21:10	153	0.0	0.0	48755.5
38	30	10:21:17	154	0.0	0.0	48207.2
38	30	10:21:24	155	0.0	0.0	36615.8
38	30	10:21:34	156	0.0	0.0	33929.8
38	30	10:21:40	157	0.0	0.0	48547.1
38	30	10:21:47	158	0.0	0.0	48671.5
38	30	10:21:54	159	0.0	0.0	48897.9
38	30	10:22:01	160	0.0	0.0	48525.7
38	30	10:22:07	161	0.0	0.0	48310.7
38	30	10:22:13	162	0.0	0.0	48742.6
38	30	10:22:21	163	0.0	0.0	48463.[illegible]
41	40	10:32:41	164	0.0	0.0	47[illegible]

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
36	30	10:14:42	108	0.0	0.0	47157.9
36	30	10:14:49	109	0.0	0.0	47789.5
36	30	10:15:08	110	0.0	0.0	46419.3
36	30	10:15:14	111	0.0	0.0	52113.7
36	30	10:15:22	112	0.0	0.0	35000.9
36	30	10:15:29	113	0.0	0.0	48890.5
36	30	10:15:36	114	0.0	0.0	48897.5
36	30	10:15:42	115	0.0	0.0	48780.3
36	30	10:15:49	116	0.0	0.0	48726.0
36	30	10:15:56	117	0.0	0.0	45702.5
36	30	10:16:06	118	0.0	0.0	26053.5
36	30	10:16:14	119	0.0	0.0	28722.3
36	30	10:16:20	120	0.0	0.0	47863.6
36	30	10:16:27	121	0.0	0.0	48352.4
36	30	10:16:38	122	0.0	0.0	49097.4
36	30	10:16:44	123	0.0	0.0	31534.7
36	30	10:16:51	124	0.0	0.0	50116.7
36	30	10:16:58	125	0.0	0.0	48750.1
36	30	10:17:05	126	0.0	0.0	35440.7
36	30	10:17:12	127	0.0	0.0	32623.6
37	30	10:17:31	128	0.0	0.0	47989.6
37	30	10:17:37	129	0.0	0.0	48727.2
37	30	10:17:44	130	0.0	0.0	49133.8
37	30	10:17:52	131	0.0	0.0	49235.4
37	30	10:18:00	132	0.0	0.0	49622.9
37	30	10:18:08	133	0.0	0.0	49029.3
37	30	10:18:16	134	0.0	0.0	48345.6
37	30	10:18:23	135	0.0	0.0	47131.8
37	30	10:18:55	136	0.0	0.0	46412.3
37	30	10:19:02	137	0.0	0.0	48303.0
37	30	10:19:10	138	0.0	0.0	48706.5
37	30	10:19:18	139	0.0	0.0	48814.3
37	30	10:19:30	140	0.0	0.0	48953.7
37	30	10:19:37	141	0.0	0.0	49145.2
37	30	10:19:43	142	0.0	0.0	48786.1
37	30	10:19:55	143	0.0	0.0	48091.5
37	30	10:20:01	144	0.0	0.0	47923.2
37	30	10:20:07	145	0.0	0.0	46643.7
38	30	10:20:21	146	0.0	0.0	47090.6
38	30	10:20:28	147	0.0	0.0	47921.9
38	30	10:20:35	148	0.0	0.0	48396.3
38	30	10:20:42	149	0.0	0.0	48693.3
38	30	10:20:49	150	0.0	0.0	48875.4
38	30	10:20:56	151	0.0	0.0	48921.0
38	30	10:21:03	152	0.0	0.0	48955.5
38	30	10:21:10	153	0.0	0.0	48755.5
38	30	10:21:17	154	0.0	0.0	49207.2
38	30	10:21:24	155	0.0	0.0	36615.8
38	30	10:21:34	156	0.0	0.0	33925.8
38	30	10:21:40	157	0.0	0.0	48547.1
38	30	10:21:47	158	0.0	0.0	46671.5
38	30	10:21:54	159	0.0	0.0	48897.9
38	30	10:22:01	160	0.0	0.0	49925.7
38	30	10:22:07	161	0.0	0.0	48910.7
38	30	10:22:13	162	0.0	0.0	49742.6
38	30	10:22:21	163	0.0	0.0	48467.5
41	40	10:32:41	164	0.0	0.0	47288.9
41	40	10:32:48	165	0.0	0.0	45771.9

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
41	40	10:33:15	168	0.0	0.0	15839.4
41	40	10:33:23	169	0.0	0.0	39079.1
42	40	10:33:38	170	0.0	0.0	13521.3
42	40	10:33:45	171	0.0	0.0	39088.5
42	40	10:33:52	172	0.0	0.0	25830.7
42	40	10:33:59	173	0.0	0.0	45028.0
42	40	10:34:07	174	0.0	0.0	47101.9
42	40	10:34:16	175	0.0	0.0	34560.2
43	40	10:34:45	176	0.0	0.0	47797.2
43	40	10:34:52	177	0.0	0.0	47477.4
43	40	10:34:59	178	0.0	0.0	47759.5
43	40	10:35:07	179	0.0	0.0	48771.3
43	40	10:35:14	180	0.0	0.0	47707.9
43	40	10:35:21	181	0.0	0.0	46435.1
44	40	10:35:52	182	0.0	0.0	46453.4
44	40	10:35:59	183	0.0	0.0	47451.1
44	40	10:36:05	184	0.0	0.0	47698.1
44	40	10:36:14	185	0.0	0.0	47480.1
44	40	10:36:20	186	0.0	0.0	47466.6
44	40	10:36:26	187	0.0	0.0	47720.0
45	40	10:36:38	188	0.0	0.0	47748.9
45	40	10:36:45	189	0.0	0.0	46501.4
45	40	10:36:52	190	0.0	0.0	46076.4
45	40	10:36:58	191	0.0	0.0	46198.4
45	40	10:37:05	192	0.0	0.0	46609.0
45	40	10:37:12	193	0.0	0.0	46409.5
46	40	10:37:25	194	0.0	0.0	46145.4
46	40	10:37:35	195	0.0	0.0	31027.5
46	40	10:37:42	196	0.0	0.0	25560.8
46	40	10:37:49	197	0.0	0.0	29218.1
46	40	10:37:57	198	0.0	0.0	29712.2
46	40	10:38:07	199	0.0	0.0	21149.3
51	50	10:40:02	200	0.0	0.0	24720.1
51	50	10:40:09	201	0.0	0.0	45783.7
51	50	10:40:18	202	0.0	0.0	30421.1
51	50	10:40:26	203	0.0	0.0	27032.0
52	50	10:40:41	204	0.0	0.0	45524.3
52	50	10:40:49	205	0.0	0.0	47094.3
52	50	10:40:56	206	0.0	0.0	47072.9
52	50	10:41:03	207	0.0	0.0	46389.5
52	50	10:41:10	208	0.0	0.0	45913.9
61	60	10:44:12	209	0.0	0.0	46460.0
61	60	10:44:20	210	0.0	0.0	47157.9
61	60	10:44:28	211	0.0	0.0	45716.6
61	60	10:44:36	212	0.0	0.0	45197.3
61	60	10:44:44	213	0.0	0.0	46089.8
61	60	10:44:51	214	0.0	0.0	45551.5
61	60	10:45:01	215	0.0	0.0	45857.2
61	60	10:45:11	216	0.0	0.0	46461.0
61	60	10:45:18	217	0.0	0.0	46487.1
61	60	10:45:26	218	0.0	0.0	41920.5
61	60	10:45:34	219	0.0	0.0	45680.7
61	60	10:45:41	220	0.0	0.0	46534.2
61	60	10:45:48	221	0.0	0.0	47646.3
61	60	10:45:55	222	0.0	0.0	48023.0
62	60	10:46:08	223	0.0	0.0	45649.2
62	60	10:46:16	224	0.0	0.0	43390.7

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
62	60	10:46:22	225	0.0	0.0	49164.7
62	60	10:46:29	226	0.0	0.0	46656.0
62	60	10:46:40	227	0.0	0.0	36056.2
62	60	10:46:46	228	0.0	0.0	46451.3
62	60	10:46:54	229	0.0	0.0	45574.3
62	60	10:47:00	230	0.0	0.0	45116.0
62	60	10:47:07	231	0.0	0.0	38054.2
62	60	10:47:13	232	0.0	0.0	46145.8
62	60	10:47:20	233	0.0	0.0	35148.7
62	60	10:47:28	234	0.0	0.0	38288.3
62	60	10:47:35	235	0.0	0.0	47425.3
62	60	10:47:42	236	0.0	0.0	46464.7
71	70	10:54:33	237	0.0	0.0	47917.4
71	70	10:54:44	238	0.0	0.0	45565.2
71	70	10:54:52	239	0.0	0.0	39920.4
71	70	10:54:58	240	0.0	0.0	26638.4
71	70	10:55:05	241	0.0	0.0	21281.2
72	70	10:55:18	242	0.0	0.0	45758.7
72	70	10:55:25	243	0.0	0.0	45095.3
72	70	10:55:31	244	0.0	0.0	46502.7
72	70	10:55:38	245	0.0	0.0	45384.6
72	70	10:55:44	246	0.0	0.0	35993.2
81	80	10:58:59	247	0.0	0.0	42068.3
81	80	10:59:06	248	0.0	0.0	46105.2
81	80	10:59:12	249	0.0	0.0	46085.6
81	80	10:59:18	250	0.0	0.0	46030.2
81	80	10:59:25	251	0.0	0.0	46135.8
81	80	10:59:31	252	0.0	0.0	45882.6
81	80	10:59:37	253	0.0	0.0	45725.5
81	80	10:59:44	254	0.0	0.0	45121.7
81	80	10:59:51	255	0.0	0.0	45171.5
81	80	10:59:58	256	0.0	0.0	45071.5
81	80	11:00:04	257	0.0	0.0	45583.9
81	80	11:00:12	258	0.0	0.0	46527.7
81	80	11:00:19	259	0.0	0.0	46055.4
81	80	11:00:27	260	0.0	0.0	46458.1
81	80	11:00:34	261	0.0	0.0	46326.4
81	80	11:00:41	262	0.0	0.0	46477.9
81	80	11:00:47	263	0.0	0.0	44716.3
81	80	11:00:54	264	0.0	0.0	45668.5
91	90	11:06:48	265	0.0	0.0	47146.9
91	90	11:06:54	266	0.0	0.0	46853.7
91	90	11:07:00	267	0.0	0.0	45856.0
91	90	11:07:07	268	0.0	0.0	46345.4
91	90	11:07:14	269	0.0	0.0	47622.1
91	90	11:07:20	270	0.0	0.0	35194.6
91	90	11:07:26	271	0.0	0.0	29872.3
91	90	11:07:33	272	0.0	0.0	19464.7
91	90	11:07:40	273	0.0	0.0	19579.0
91	90	11:07:46	274	0.0	0.0	46722.7
91	90	11:07:53	275	0.0	0.0	45431.7
91	90	11:07:59	276	0.0	0.0	42614.1
91	90	11:08:06	277	0.0	0.0	47678.7
91	90	11:08:12	278	0.0	0.0	48094.4
92	90	11:08:36	279	0.0	0.0	48123.0
92	90	11:08:43	280	0.0	0.0	45605.0
92	90	11:08:49	281	0.0	0.0	45627.0

	Line#	Surv.#	Time	Reading#			Intensity(Gammas)
92	90		11:08:56	282	0.0	0.0	47811.0
92	90		11:09:02	283	0.0	0.0	47574.0
92	90		11:09:08	284	0.0	0.0	48435.9
92	90		11:09:15	285	0.0	0.0	46291.3
92	90		11:09:21	286	0.0	0.0	46425.3
92	90		11:09:28	287	0.0	0.0	47668.8
92	90		11:09:35	288	0.0	0.0	47666.3
92	90		11:09:41	289	0.0	0.0	47253.2
93	90		11:09:56	290	0.0	0.0	38994.6
93	90		11:10:03	291	0.0	0.0	47818.5
93	90		11:10:10	292	0.0	0.0	48273.4
93	90		11:10:24	293	0.0	0.0	48514.3
93	90		11:10:30	294	0.0	0.0	48228.8
93	90		11:11:31	295	0.0	0.0	48394.2
93	90		11:11:38	296	0.0	0.0	48361.9
93	90		11:11:45	297	0.0	0.0	47602.9
93	90		11:11:53	298	0.0	0.0	47163.3
93	90		11:11:59	299	0.0	0.0	47000.7
93	90		11:12:05	300	0.0	0.0	48335.2
94	90		11:12:17	301	0.0	0.0	48572.3
94	90		11:12:27	302	0.0	0.0	40372.9
94	90		11:12:37	303	0.0	0.0	43601.6
94	90		11:12:47	304	0.0	0.0	48233.7
94	90		11:12:55	305	0.0	0.0	48294.8
94	90		11:13:04	306	0.0	0.0	47976.5
94	90		11:13:21	307	0.0	0.0	49390.9
94	90		11:13:29	308	0.0	0.0	49345.1
94	90		11:13:34	309	0.0	0.0	48621.7
94	90		11:13:45	310	0.0	0.0	47326.5
94	90		11:13:51	311	0.0	0.0	45796.3
95	90		11:14:06	312	0.0	0.0	38422.6
95	90		11:14:13	313	0.0	0.0	46803.6
95	90		11:14:21	314	0.0	0.0	47789.0
95	90		11:14:26	315	0.0	0.0	48879.6
95	90		11:14:33	316	0.0	0.0	33852.5
95	90		11:14:41	317	0.0	0.0	48000.4
95	90		11:14:51	318	0.0	0.0	49055.5
95	90		11:14:58	319	0.0	0.0	45574.0
95	90		11:15:04	320	0.0	0.0	48155.9
95	90		11:15:10	321	0.0	0.0	48262.7
95	90		11:15:16	322	0.0	0.0	48912.6
96	90		11:15:36	323	0.0	0.0	49165.2
96	90		11:15:44	324	0.0	0.0	48513.6
96	90		11:15:52	325	0.0	0.0	48103.6
96	90		11:16:00	326	0.0	0.0	48630.1
96	90		11:16:07	327	0.0	0.0	48392.1
96	90		11:16:15	328	0.0	0.0	48781.8
96	90		11:16:21	329	0.0	0.0	48439.5
96	90		11:16:28	330	0.0	0.0	48297.6
96	90		11:16:34	331	0.0	0.0	46713.8
97	90		11:18:19	332	0.0	0.0	48597.7
97	90		11:18:31	333	0.0	0.0	48557.3
98	90		11:18:48	334	0.0	0.0	47330.7
98	90		11:18:59	335	0.0	0.0	33592.9
401	4		12:47:26	336	0.0	0.0	48332.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
401	4	12:47:35	337	0.0	0.0	48229.9
401	4	12:47:46	338	0.0	0.0	48438.2
401	4	12:47:57	339	0.0	0.0	48601.7
401	4	12:48:05	340	0.0	0.0	48694.0
401	4	12:48:18	341	0.0	0.0	48681.1
401	4	12:48:25	342	0.0	0.0	48684.5
401	4	12:48:32	343	0.0	0.0	48730.4
401	4	12:48:39	344	0.0	0.0	48594.9
401	4	12:48:46	345	0.0	0.0	47931.5
401	4	12:48:55	346	0.0	0.0	47290.4
401	4	12:49:02	347	0.0	0.0	46250.6
401	4	12:49:09	348	0.0	0.0	38028.1
401	4	12:49:15	349	0.0	0.0	46447.3
402	4	12:49:51	350	0.0	0.0	35172.3
402	4	12:50:00	351	0.0	0.0	44785.0
402	4	12:50:06	352	0.0	0.0	46646.5
402	4	12:50:13	353	0.0	0.0	47245.0
402	4	12:50:20	354	0.0	0.0	48191.4
402	4	12:50:26	355	0.0	0.0	48693.3
402	4	12:50:32	356	0.0	0.0	48983.2
402	4	12:50:41	357	0.0	0.0	48749.7
402	4	12:50:48	358	0.0	0.0	48791.2
402	4	12:51:00	359	0.0	0.0	48719.4
402	4	12:51:07	360	0.0	0.0	48153.2
402	4	12:51:13	361	0.0	0.0	47757.0
402	4	12:51:20	362	0.0	0.0	47947.4
403	4	12:51:36	363	0.0	0.0	48306.9
403	4	12:51:51	364	0.0	0.0	48221.3
403	4	12:51:58	365	0.0	0.0	48265.2
403	4	12:52:05	366	0.0	0.0	48134.4
403	4	12:52:13	367	0.0	0.0	49079.5
403	4	12:52:21	368	0.0	0.0	48619.4
403	4	12:52:28	369	0.0	0.0	48686.2
403	4	12:52:35	370	0.0	0.0	48164.9
403	4	12:52:43	371	0.0	0.0	47596.7
403	4	12:52:51	372	0.0	0.0	47115.9
403	4	12:52:57	373	0.0	0.0	46519.7
403	4	12:53:05	374	0.0	0.0	45053.2
403	4	12:53:12	375	0.0	0.0	33696.0
404	4	12:53:38	376	0.0	0.0	22289.3
404	4	12:53:49	377	0.0	0.0	44590.3
404	4	12:53:58	378	0.0	0.0	46067.0
404	4	12:54:04	379	0.0	0.0	46249.0
404	4	12:54:10	380	0.0	0.0	45627.3
404	4	12:54:16	381	0.0	0.0	46721.9
404	4	12:54:22	382	0.0	0.0	47842.4
404	4	12:54:29	383	0.0	0.0	48205.9
404	4	12:54:35	384	0.0	0.0	48847.8
404	4	12:54:42	385	0.0	0.0	49538.6
404	4	12:54:49	386	0.0	0.0	48947.1
404	4	12:54:58	387	0.0	0.0	48584.8
404	4	12:55:06	388	0.0	0.0	48525.9
405	4	12:55:22	389	0.0	0.0	48363.8
405	4	12:55:33	390	0.0	0.0	48566.0
405	4	12:55:40	391	0.0	0.0	48677.1

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
405	4	12:55:46	392	0.0	0.0	48032.5
405	4	12:55:54	393	0.0	0.0	33008.1
405	4	12:56:01	394	0.0	0.0	31766.3
405	4	12:56:07	395	0.0	0.0	46895.7
405	4	12:56:13	396	0.0	0.0	46239.1
405	4	12:56:20	397	0.0	0.0	33382.7
405	4	12:56:27	398	0.0	0.0	45202.3
405	4	12:56:36	399	0.0	0.0	45541.1
405	4	12:56:42	400	0.0	0.0	34726.7
405	4	12:56:49	401	0.0	0.0	32476.2
406	4	12:57:02	402	0.0	0.0	19464.9
406	4	12:57:09	403	0.0	0.0	37991.6
406	4	12:57:16	404	0.0	0.0	45638.9
406	4	12:57:25	405	0.0	0.0	45680.6
406	4	12:57:33	406	0.0	0.0	46398.7
406	4	12:57:40	407	0.0	0.0	46047.5
406	4	12:57:46	408	0.0	0.0	45550.7
406	4	12:57:57	409	0.0	0.0	39136.9
406	4	12:58:03	410	0.0	0.0	47761.6
406	4	12:58:11	411	0.0	0.0	48272.8
407	4	12:58:28	412	0.0	0.0	47937.0
407	4	12:58:34	413	0.0	0.0	47319.7
407	4	12:58:41	414	0.0	0.0	28545.5
407	4	12:58:55	415	0.0	0.0	39021.3
407	4	12:59:06	416	0.0	0.0	27683.7
407	4	12:59:17	417	0.0	0.0	45853.0
407	4	12:59:23	418	0.0	0.0	29954.3
407	4	12:59:36	419	0.0	0.0	32482.1
407	4	12:59:44	420	0.0	0.0	19486.4
408	4	13:00:07	421	0.0	0.0	28554.0
408	4	13:00:39	422	0.0	0.0	30747.1
408	4	13:00:46	423	0.0	0.0	36690.2
408	4	13:01:00	424	0.0	0.0	32039.4
408	4	13:01:07	425	0.0	0.0	46520.2
408	4	13:01:14	426	0.0	0.0	46959.9
409	4	13:01:42	427	0.0	0.0	32206.9
409	4	13:01:51	428	0.0	0.0	35717.8
409	4	13:01:59	429	0.0	0.0	25887.8
409	4	13:02:07	430	0.0	0.0	41236.5
409	4	13:02:13	431	0.0	0.0	44132.6
409	4	13:02:25	432	0.0	0.0	19455.3
400	4	13:02:51	433	0.0	0.0	25835.2
400	4	13:02:59	434	0.0	0.0	35123.7
400	4	13:03:06	435	0.0	0.0	43707.6
400	4	13:03:15	436	0.0	0.0	37988.1
400	4	13:03:24	437	0.0	0.0	40298.3
400	4	13:03:39	438	0.0	0.0	34748.2
410	14	13:12:43	439	0.0	0.0	48646.1
410	14	13:12:51	440	0.0	0.0	45208.1
410	14	13:12:58	441	0.0	0.0	49287.2
410	14	13:13:05	442	0.0	0.0	49089.9
410	14	13:13:12	443	0.0	0.0	49002.9
410	14	13:13:19	444	0.0	0.0	49102.5
410	14	13:13:34	445	0.0	0.0	49667.0

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
410	14	13:13:42	446	0.0	0.0	49296.0
410	14	13:13:49	447	0.0	0.0	49689.1
410	14	13:13:56	448	0.0	0.0	49980.2
410	14	13:14:04	449	0.0	0.0	49762.8
410	14	13:14:11	450	0.0	0.0	49538.6
410	14	13:14:19	451	0.0	0.0	49715.6
410	14	13:14:26	452	0.0	0.0	48844.8
410	14	13:14:34	453	0.0	0.0	48068.4
410	14	13:14:43	454	0.0	0.0	46488.0
412	14	13:16:53	455	0.0	0.0	32516.1
412	14	13:16:59	456	0.0	0.0	48257.8
412	14	13:17:05	457	0.0	0.0	49767.9
412	14	13:17:12	458	0.0	0.0	49805.7
412	14	13:17:19	459	0.0	0.0	49474.1
412	14	13:17:26	460	0.0	0.0	49469.1
412	14	13:17:33	461	0.0	0.0	49606.8
412	14	13:17:40	462	0.0	0.0	49253.6
412	14	13:17:47	463	0.0	0.0	49346.4
412	14	13:17:54	464	0.0	0.0	49119.0
412	14	13:18:01	465	0.0	0.0	49066.3
412	14	13:18:08	466	0.0	0.0	48884.2
412	14	13:18:15	467	0.0	0.0	48951.9
412	14	13:18:22	468	0.0	0.0	49050.5
412	14	13:18:29	469	0.0	0.0	48992.9
412	14	13:18:36	470	0.0	0.0	48523.3
413	14	13:18:51	471	0.0	0.0	48655.3
413	14	13:18:58	472	0.0	0.0	48667.5
413	14	13:19:05	473	0.0	0.0	48754.3
413	14	13:19:12	474	0.0	0.0	48848.9
413	14	13:19:19	475	0.0	0.0	48995.6
413	14	13:19:25	476	0.0	0.0	49047.9
413	14	13:19:35	477	0.0	0.0	49122.0
413	14	13:19:42	478	0.0	0.0	49194.4
413	14	13:19:50	479	0.0	0.0	49235.3
413	14	13:19:57	480	0.0	0.0	49261.9
413	14	13:20:04	481	0.0	0.0	49217.8
413	14	13:20:10	482	0.0	0.0	49224.8
413	14	13:20:17	483	0.0	0.0	49274.8
413	14	13:20:24	484	0.0	0.0	49153.3
413	14	13:20:30	485	0.0	0.0	48723.7
413	14	13:20:37	486	0.0	0.0	48169.3
414	14	13:21:05	487	0.0	0.0	47976.8
414	14	13:21:12	488	0.0	0.0	48721.3
414	14	13:21:19	489	0.0	0.0	48711.0
414	14	13:21:26	490	0.0	0.0	48822.5
414	14	13:21:33	491	0.0	0.0	49024.0
414	14	13:21:41	492	0.0	0.0	49009.0
414	14	13:21:48	493	0.0	0.0	49003.0
414	14	13:21:55	494	0.0	0.0	47487.3
414	14	13:22:01	495	0.0	0.0	49021.6
414	14	13:22:09	496	0.0	0.0	48573.2
414	14	13:22:16	497	0.0	0.0	48319.3
414	14	13:22:23	498	0.0	0.0	48985.2
414	14	13:22:30	499	0.0	0.0	48753.4
414	14	13:22:37	500	0.0	0.0	48415.9
414	14	13:22:44	501	0.0	0.0	48486.0
414	14	13:22:50	502	0.0	0.0	[illegible]

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
415	14	13:23:06	503	0.0	0.0	48437.0
415	14	13:23:13	504	0.0	0.0	48459.5
415	14	13:23:20	505	0.0	0.0	48097.7
415	14	13:23:27	506	0.0	0.0	48486.1
415	14	13:23:34	507	0.0	0.0	48381.1
415	14	13:23:41	508	0.0	0.0	48549.7
415	14	13:23:49	509	0.0	0.0	48771.3
415	14	13:23:58	510	0.0	0.0	48648.3
415	14	13:24:05	511	0.0	0.0	48647.5
415	14	13:24:12	512	0.0	0.0	48718.5
415	14	13:24:18	513	0.0	0.0	48725.9
415	14	13:24:24	514	0.0	0.0	48750.1
415	14	13:24:31	515	0.0	0.0	48509.0
415	14	13:24:38	516	0.0	0.0	46460.2
415	14	13:24:45	517	0.0	0.0	47905.8
415	14	13:24:51	518	0.0	0.0	48046.5
416	14	13:25:12	519	0.0	0.0	46432.2
416	14	13:25:22	520	0.0	0.0	48885.1
416	14	13:25:31	521	0.0	0.0	29548.8
416	14	13:25:38	522	0.0	0.0	48338.7
416	14	13:25:44	523	0.0	0.0	48051.1
416	14	13:25:53	524	0.0	0.0	48075.9
416	14	13:26:01	525	0.0	0.0	48024.9
416	14	13:26:08	526	0.0	0.0	48273.7
416	14	13:26:19	527	0.0	0.0	48663.7
416	14	13:26:28	528	0.0	0.0	48063.5
416	14	13:26:36	529	0.0	0.0	43288.7
416	14	13:26:44	530	0.0	0.0	48778.2
416	14	13:26:51	531	0.0	0.0	48462.1
416	14	13:26:58	532	0.0	0.0	48498.8
416	14	13:27:07	533	0.0	0.0	48526.1
421	24	13:46:07	534	0.0	0.0	45448.7
421	24	13:46:14	535	0.0	0.0	46464.5
421	24	13:46:19	536	0.0	0.0	45157.7
421	24	13:46:26	537	0.0	0.0	46445.3
421	24	13:46:33	538	0.0	0.0	46464.9
421	24	13:46:39	539	0.0	0.0	46453.4
422	24	13:46:51	540	0.0	0.0	39516.9
422	24	13:46:58	541	0.0	0.0	32018.9
422	24	13:47:05	542	0.0	0.0	40256.4
422	24	13:47:12	543	0.0	0.0	48787.1
422	24	13:47:18	544	0.0	0.0	47884.6
422	24	13:47:26	545	0.0	0.0	48588.0
423	24	13:47:37	546	0.0	0.0	47231.3
423	24	13:47:44	547	0.0	0.0	47994.8
423	24	13:47:51	548	0.0	0.0	48031.8
423	24	13:47:58	549	0.0	0.0	47863.3
423	24	13:48:04	550	0.0	0.0	47927.4
424	24	13:48:16	551	0.0	0.0	45617.6
424	24	13:48:23	552	0.0	0.0	38501.2
424	24	13:48:29	553	0.0	0.0	48599.3
424	24	13:48:36	554	0.0	0.0	49343.6

Appendix C Continued

	Line#	Surv.#	Time	Reading#			Intensity(Gammas)
	424	24	13:48:44	555	0.0	0.0	47858.8
	425	24	13:49:00	556	0.0	0.0	47390.3
	425	24	13:49:12	557	0.0	0.0	47999.9
	425	24	13:49:19	558	0.0	0.0	30364.4
	425	24	13:49:26	559	0.0	0.0	34725.1
	426	24	13:49:49	560	0.0	0.0	45507.9
	426	24	13:50:11	561	0.0	0.0	44558.1
	426	24	13:50:21	562	0.0	0.0	44435.8
	427	24	13:50:36	563	0.0	0.0	37935.7
	427	24	13:50:43	564	0.0	0.0	19444.0
	427	24	13:50:51	565	0.0	0.0	19468.8
	427	24	13:51:01	566	0.0	0.0	45492.1
	427	24	13:51:08	567	0.0	0.0	47714.3
	427	24	13:51:14	568	0.0	0.0	49202.6
	427	24	13:51:20	569	0.0	0.0	48226.4
	427	24	13:51:27	570	0.0	0.0	48631.4
	427	24	13:51:33	571	0.0	0.0	48973.3
	427	24	13:51:40	572	0.0	0.0	49099.1
	427	24	13:51:48	573	0.0	0.0	49036.6
	427	24	13:51:55	574	0.0	0.0	49095.3
	427	24	13:52:02	575	0.0	0.0	48761.3
	427	24	13:52:09	576	0.0	0.0	49705.8
	427	24	13:52:16	577	0.0	0.0	48147.3
	427	24	13:52:23	578	0.0	0.0	48762.2
	427	24	13:52:30	579	0.0	0.0	48887.5
	427	24	13:52:37	580	0.0	0.0	49389.6
	427	24	13:52:43	581	0.0	0.0	49465.7
	427	24	13:52:50	582	0.0	0.0	48947.1
	427	24	13:52:57	583	0.0	0.0	48812.8
	427	24	13:53:04	584	0.0	0.0	48900.0
	427	24	13:53:11	585	0.0	0.0	48929.5
	427	24	13:53:18	586	0.0	0.0	48961.3
	427	24	13:53:25	587	0.0	0.0	48917.1
	427	24	13:53:32	588	0.0	0.0	48869.4
	427	24	13:53:38	589	0.0	0.0	48766.7
	427	24	13:53:45	590	0.0	0.0	49788.1
	427	24	13:53:52	591	0.0	0.0	46545.1
	427	24	13:54:00	592	0.0	0.0	48176.8
	427	24	13:54:08	593	0.0	0.0	47640.7
	427	24	13:54:15	594	0.0	0.0	47133.4
	427	24	13:54:22	595	0.0	0.0	52164.4
	427	24	13:54:29	596	0.0	0.0	45560.5
	427	24	13:54:36	597	0.0	0.0	45516.1
	428	24	13:54:57	598	0.0	0.0	32127.7
	428	24	13:55:04	599	0.0	0.0	47830.5
	428	24	13:55:11	600	0.0	0.0	47508.8
	428	24	13:55:18	601	0.0	0.0	47575.8
	428	24	13:55:26	602	0.0	0.0	47798.2
	428	24	13:55:33	603	0.0	0.0	48193.7
	428	24	13:55:41	604	0.0	0.0	48528.6
	428	24	13:55:48	605	0.0	0.0	48676.7
	428	24	13:55:54	606	0.0	0.0	48726.5
	428	24	13:56:01	607	0.0	0.0	48855.3
	428	24	13:56:08	608	0.0	0.0	49102.8
	428	24	13:56:15	609	0.0	0.0	49240.6
	428	24	13:56:22	610	0.0	0.0	49259.5

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
428	24	13:56:29	611	0.0	0.0	48822.8
428	24	13:56:36	612	0.0	0.0	48842.7
428	24	13:56:43	613	0.0	0.0	49119.5
428	24	13:56:50	614	0.0	0.0	49117.0
428	24	13:56:56	615	0.0	0.0	49006.1
428	24	13:57:03	616	0.0	0.0	49195.3
428	24	13:57:10	617	0.0	0.0	49041.3
428	24	13:57:17	618	0.0	0.0	48842.7
428	24	13:57:31	619	0.0	0.0	48615.9
428	24	13:57:40	620	0.0	0.0	48805.0
428	24	13:57:47	621	0.0	0.0	48561.0
428	24	13:57:54	622	0.0	0.0	48243.9
428	24	13:58:01	623	0.0	0.0	48537.3
428	24	13:58:07	624	0.0	0.0	48752.3
428	24	13:58:15	625	0.0	0.0	48731.3
428	24	13:58:21	626	0.0	0.0	48713.2
428	24	13:58:28	627	0.0	0.0	48329.0
428	24	13:58:34	628	0.0	0.0	47906.4
428	24	13:58:41	629	0.0	0.0	48055.4
428	24	13:58:48	630	0.0	0.0	47569.3
428	24	13:58:54	631	0.0	0.0	26639.5
428	24	13:59:04	632	0.0	0.0	32518.6
429	24	13:59:17	633	0.0	0.0	43655.8
429	24	13:59:24	634	0.0	0.0	46819.3
429	24	13:59:32	635	0.0	0.0	48505.9
429	24	13:59:38	636	0.0	0.0	45388.6
429	24	13:59:47	637	0.0	0.0	31122.2
429	24	13:59:55	638	0.0	0.0	48487.7
429	24	14:00:03	639	0.0	0.0	48629.1
429	24	14:00:10	640	0.0	0.0	48646.1
429	24	14:00:17	641	0.0	0.0	48737.3
429	24	14:00:24	642	0.0	0.0	48201.1
429	24	14:00:48	643	0.0	0.0	48830.1
429	24	14:00:58	644	0.0	0.0	48872.2
429	24	14:01:05	645	0.0	0.0	48735.6
429	24	14:01:12	646	0.0	0.0	48945.2
429	24	14:01:19	647	0.0	0.0	48746.4
429	24	14:01:25	648	0.0	0.0	48963.9
429	24	14:01:31	649	0.0	0.0	49084.5
429	24	14:01:42	650	0.0	0.0	49067.8
429	24	14:01:49	651	0.0	0.0	49026.9
429	24	14:01:58	652	0.0	0.0	49157.0
429	24	14:02:05	653	0.0	0.0	49142.5
429	24	14:02:12	654	0.0	0.0	49110.3
429	24	14:02:19	655	0.0	0.0	49073.7
429	24	14:02:26	656	0.0	0.0	49209.5
429	24	14:02:35	657	0.0	0.0	49031.4
429	24	14:02:41	658	0.0	0.0	49021.5
429	24	14:02:49	659	0.0	0.0	48909.8
429	24	14:02:56	660	0.0	0.0	48854.9
429	24	14:03:03	661	0.0	0.0	48794.6
429	24	14:03:09	662	0.0	0.0	49622.2
429	24	14:03:16	663	0.0	0.0	48385.3
429	24	14:03:24	664	0.0	0.0	48300.0
429	24	14:03:32	665	0.0	0.0	48537.0
429	24	14:03:40	666	0.0	0.0	48817.0
429	24	14:03:46	667	0.0	0.0	48931.5

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
429	24	14:03:58	668	0.0	0.0	49147.1
431	34	14:04:37	669	0.0	0.0	49387.3
431	34	14:04:44	670	0.0	0.0	48962.1
431	34	14:04:51	671	0.0	0.0	48766.0
431	34	14:04:58	672	0.0	0.0	48851.4
431	34	14:05:06	673	0.0	0.0	48935.0
431	34	14:05:12	674	0.0	0.0	48867.1
431	34	14:05:19	675	0.0	0.0	49093.8
431	34	14:05:26	676	0.0	0.0	49026.5
431	34	14:05:36	677	0.0	0.0	49158.1
431	34	14:05:43	678	0.0	0.0	49037.5
431	34	14:05:49	679	0.0	0.0	49240.8
431	34	14:05:56	680	0.0	0.0	49212.5
431	34	14:06:03	681	0.0	0.0	49288.0
431	34	14:06:10	682	0.0	0.0	49341.5
431	34	14:06:17	683	0.0	0.0	49022.9
431	34	14:06:24	684	0.0	0.0	49252.3
431	34	14:06:31	685	0.0	0.0	49214.6
431	34	14:06:45	686	0.0	0.0	49161.6
431	34	14:06:55	687	0.0	0.0	49152.1
431	34	14:07:02	688	0.0	0.0	49220.2
431	34	14:07:08	689	0.0	0.0	49125.6
431	34	14:07:15	690	0.0	0.0	49096.7
431	34	14:07:23	691	0.0	0.0	48978.0
431	34	14:07:30	692	0.0	0.0	48815.5
431	34	14:07:37	693	0.0	0.0	48874.0
431	34	14:07:44	694	0.0	0.0	49344.7
431	34	14:07:50	695	0.0	0.0	48685.8
431	34	14:07:57	696	0.0	0.0	48446.6
431	34	14:08:04	697	0.0	0.0	48501.9
431	34	14:08:11	698	0.0	0.0	37003.7
431	34	14:08:17	699	0.0	0.0	32546.1
431	34	14:08:27	700	0.0	0.0	45568.2
431	34	14:08:34	701	0.0	0.0	24718.9
431	34	14:08:44	702	0.0	0.0	47836.6
431	34	14:08:51	703	0.0	0.0	30190.9
432	34	14:23:17	704	0.0	0.0	47740.2
432	34	14:23:31	705	0.0	0.0	29430.1
432	34	14:23:37	706	0.0	0.0	47382.9
432	34	14:23:43	707	0.0	0.0	47650.7
432	34	14:23:50	708	0.0	0.0	47588.2
432	34	14:23:57	709	0.0	0.0	49284.0
432	34	14:24:04	710	0.0	0.0	48191.2
432	34	14:24:12	711	0.0	0.0	48596.1
432	34	14:24:19	712	0.0	0.0	48776.6
432	34	14:24:27	713	0.0	0.0	48945.5
432	34	14:24:34	714	0.0	0.0	48852.2
432	34	14:24:41	715	0.0	0.0	49039.1
432	34	14:24:49	716	0.0	0.0	49088.0
432	34	14:24:57	717	0.0	0.0	49146.8
432	34	14:25:04	718	0.0	0.0	49129.4
432	34	14:25:11	719	0.0	0.0	49073.8
432	34	14:25:18	720	0.0	0.0	49164.6
432	34	14:25:25	721	0.0	0.0	49247.4

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
432	34	14:25:32	722	0.0	0.0	49286.5
432	34	14:25:38	723	0.0	0.0	49293.4
432	34	14:25:46	724	0.0	0.0	49240.3
432	34	14:25:53	725	0.0	0.0	49147.2
432	34	14:26:00	726	0.0	0.0	49099.8
432	34	14:26:06	727	0.0	0.0	48968.8
432	34	14:26:12	728	0.0	0.0	49100.3
432	34	14:26:19	729	0.0	0.0	48942.5
432	34	14:26:26	730	0.0	0.0	49097.6
432	34	14:26:33	731	0.0	0.0	49039.7
432	34	14:26:41	732	0.0	0.0	49238.2
432	34	14:26:48	733	0.0	0.0	49261.6
432	34	14:26:56	734	0.0	0.0	49253.0
433	34	14:27:16	735	0.0	0.0	49304.9
433	34	14:27:23	736	0.0	0.0	49291.0
433	34	14:27:30	737	0.0	0.0	49252.1
433	34	14:27:36	738	0.0	0.0	49287.0
433	34	14:27:44	739	0.0	0.0	49322.7
433	34	14:27:50	740	0.0	0.0	49288.4
433	34	14:27:58	741	0.0	0.0	49167.0
433	34	14:28:05	742	0.0	0.0	49145.4
433	34	14:28:12	743	0.0	0.0	49266.4
433	34	14:28:20	744	0.0	0.0	49353.7
433	34	14:28:27	745	0.0	0.0	49324.0
433	34	14:28:35	746	0.0	0.0	49319.4
433	34	14:28:42	747	0.0	0.0	49319.4
433	34	14:28:49	748	0.0	0.0	49302.7
433	34	14:28:56	749	0.0	0.0	49308.1
433	34	14:29:03	750	0.0	0.0	49221.2
433	34	14:29:10	751	0.0	0.0	49416.1
433	34	14:29:17	752	0.0	0.0	49217.7
433	34	14:29:24	753	0.0	0.0	49204.6
433	34	14:29:30	754	0.0	0.0	49033.4
433	34	14:29:36	755	0.0	0.0	48935.7
433	34	14:29:43	756	0.0	0.0	48772.4
433	34	14:29:50	757	0.0	0.0	48391.0
433	34	14:29:58	758	0.0	0.0	47633.1
433	34	14:30:08	759	0.0	0.0	40457.8
433	34	14:30:15	760	0.0	0.0	47584.5
433	34	14:30:21	761	0.0	0.0	47102.9
433	34	14:30:28	762	0.0	0.0	46147.0
433	34	14:30:34	763	0.0	0.0	30698.4
434	34	14:30:51	764	0.0	0.0	19458.6
434	34	14:30:59	765	0.0	0.0	45576.6
434	34	14:31:07	766	0.0	0.0	46325.5
434	34	14:31:22	767	0.0	0.0	46143.9
434	34	14:31:30	768	0.0	0.0	48130.8
434	34	14:31:36	769	0.0	0.0	48556.3
434	34	14:31:44	770	0.0	0.0	48783.5
434	34	14:31:50	771	0.0	0.0	48906.1
434	34	14:31:56	772	0.0	0.0	48923.1
434	34	14:32:03	773	0.0	0.0	48931.5

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
434	34	14:32:10	774	0.0	0.0	49210.5
434	34	14:32:18	775	0.0	0.0	49212.4
434	34	14:32:26	776	0.0	0.0	49147.8
434	34	14:32:34	777	0.0	0.0	49169.7
434	34	14:32:41	778	0.0	0.0	49217.3
434	34	14:32:48	779	0.0	0.0	49196.9
434	34	14:32:56	780	0.0	0.0	49281.9
434	34	14:33:04	781	0.0	0.0	49604.7
434	34	14:33:19	782	0.0	0.0	49248.7
434	34	14:33:26	783	0.0	0.0	49161.7
434	34	14:33:40	784	0.0	0.0	49268.4
434	34	14:33:47	785	0.0	0.0	49319.5
434	34	14:33:54	786	0.0	0.0	49367.8
434	34	14:34:01	787	0.0	0.0	49153.3
434	34	14:34:07	788	0.0	0.0	49461.5
434	34	14:34:15	789	0.0	0.0	49406.8
435	34	14:34:35	790	0.0	0.0	49302.0
435	34	14:34:43	791	0.0	0.0	49252.5
435	34	14:34:50	792	0.0	0.0	49517.0
435	34	14:34:56	793	0.0	0.0	49244.8
435	34	14:35:03	794	0.0	0.0	49528.4
435	34	14:35:10	795	0.0	0.0	49250.4
435	34	14:35:17	796	0.0	0.0	48949.1
435	34	14:35:24	797	0.0	0.0	49623.7
435	34	14:35:32	798	0.0	0.0	49301.6
435	34	14:35:38	799	0.0	0.0	49055.8
435	34	14:35:45	800	0.0	0.0	49181.7
435	34	14:35:52	801	0.0	0.0	49178.8
435	34	14:35:59	802	0.0	0.0	49287.7
435	34	14:36:05	803	0.0	0.0	49224.8
435	34	14:36:13	804	0.0	0.0	49201.9
435	34	14:36:20	805	0.0	0.0	49026.4
435	34	14:36:26	806	0.0	0.0	48921.1
435	34	14:36:32	807	0.0	0.0	48982.8
435	34	14:36:38	808	0.0	0.0	48702.3
435	34	14:36:45	809	0.0	0.0	48396.9
435	34	14:36:52	810	0.0	0.0	47881.6
435	34	14:37:00	811	0.0	0.0	45532.1
435	34	14:37:18	812	0.0	0.0	38201.4
436	34	14:37:41	813	0.0	0.0	47739.6
436	34	14:37:48	814	0.0	0.0	48028.4
436	34	14:37:55	815	0.0	0.0	48316.0
436	34	14:38:01	816	0.0	0.0	48631.6
436	34	14:38:08	817	0.0	0.0	48714.1
436	34	14:38:15	818	0.0	0.0	48798.8
436	34	14:38:22	819	0.0	0.0	49020.2
436	34	14:38:32	820	0.0	0.0	49162.7
436	34	14:38:36	821	0.0	0.0	49112.5
436	34	14:38:44	822	0.0	0.0	49181.8
436	34	14:38:51	823	0.0	0.0	49179.0
436	34	14:38:59	824	0.0	0.0	49011.8
436	34	14:39:06	825	0.0	0.0	49035.8
436	34	14:39:14	826	0.0	0.0	48855.6
436	34	14:39:22	827	0.0	0.0	48772.1
436	34	14:39:29	828	0.0	0.0	48960.5
436	34	14:39:37	829	0.0	0.0	49401.[illegible]
436	34	14:39:44	830	0.0	0.0	49532.3

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
437	34	14:40:12	831	0.0	0.0	49660.7
437	34	14:40:19	832	0.0	0.0	49245.3
437	34	14:40:26	833	0.0	0.0	48867.2
437	34	14:40:33	834	0.0	0.0	48995.9
437	34	14:40:41	835	0.0	0.0	49295.6
437	34	14:40:48	836	0.0	0.0	49625.1
437	34	14:40:55	837	0.0	0.0	49300.6
437	34	14:41:03	838	0.0	0.0	49102.6
437	34	14:41:17	839	0.0	0.0	49158.4
437	34	14:41:23	840	0.0	0.0	49129.2
437	34	14:41:30	841	0.0	0.0	48919.5
437	34	14:41:37	842	0.0	0.0	48835.0
437	34	14:41:43	843	0.0	0.0	48784.2
437	34	14:41:49	844	0.0	0.0	48570.1
437	34	14:41:56	845	0.0	0.0	48577.7
437	34	14:42:03	846	0.0	0.0	47882.6
437	34	14:42:14	847	0.0	0.0	46613.9
438	34	14:42:24	848	0.0	0.0	47188.0
438	34	14:42:30	849	0.0	0.0	47903.9
438	34	14:42:35	850	0.0	0.0	48222.2
438	34	14:42:42	851	0.0	0.0	48352.7
438	34	14:42:48	852	0.0	0.0	48509.4
438	34	14:42:55	853	0.0	0.0	48594.9
438	34	14:43:02	854	0.0	0.0	48812.4
438	34	14:43:09	855	0.0	0.0	48899.1
438	34	14:43:15	856	0.0	0.0	48043.9
438	34	14:43:22	857	0.0	0.0	49301.5
438	34	14:43:29	858	0.0	0.0	50728.7
438	34	14:43:37	859	0.0	0.0	49400.0
438	34	14:43:45	860	0.0	0.0	49220.4
439	34	14:44:06	861	0.0	0.0	49293.8
439	34	14:44:13	862	0.0	0.0	49308.0
439	34	14:44:21	863	0.0	0.0	49316.9
439	34	14:44:28	864	0.0	0.0	48933.4
439	34	14:44:35	865	0.0	0.0	48898.2
439	34	14:44:42	866	0.0	0.0	48939.7
439	34	14:44:49	867	0.0	0.0	48872.3
439	34	14:44:56	868	0.0	0.0	48701.9
439	34	14:45:03	869	0.0	0.0	48540.6
439	34	14:45:12	870	0.0	0.0	48288.0
439	34	14:45:20	871	0.0	0.0	47857.6
439	34	14:45:27	872	0.0	0.0	47707.2
441	44	14:45:53	873	0.0	0.0	48542.4
441	44	14:46:00	874	0.0	0.0	47498.3
441	44	14:46:07	875	0.0	0.0	48163.7
441	44	14:46:14	876	0.0	0.0	48530.6
441	44	14:46:21	877	0.0	0.0	48747.7
441	44	14:46:27	878	0.0	0.0	48836.2
441	44	14:46:34	879	0.0	0.0	48681.1
441	44	14:46:40	880	0.0	0.0	52228.7
441	44	14:46:47	881	0.0	0.0	49135.3
441	44	14:46:54	882	0.0	0.0	49281.9
442	44	14:47:08	883	0.0	0.0	49613.0
442	44	14:47:17	884	0.0	0.0	49559.2
442	44	14:47:24	885	0.0	0.0	48749.4
442	44	14:47:29	886	0.0	0.0	48844.6

Appendix C Continued

Line#	Surv.#	Time	Reading#			Intensity(Gammas)
442	44	14:47:35	887	0.0	0.0	48738.6
442	44	14:47:42	888	0.0	0.0	48214.2
442	44	14:47:49	889	0.0	0.0	47882.4
442	44	14:47:56	890	0.0	0.0	45668.9
443	44	14:48:08	891	0.0	0.0	34276.2
443	44	14:48:16	892	0.0	0.0	47221.3
443	44	14:48:23	893	0.0	0.0	48305.3
443	44	14:48:30	894	0.0	0.0	48681.6
443	44	14:48:36	895	0.0	0.0	48509.3
443	44	14:48:42	896	0.0	0.0	48705.8
444	44	14:48:55	897	0.0	0.0	48921.5
444	44	14:49:02	898	0.0	0.0	49148.5
444	44	14:49:08	899	0.0	0.0	48882.7
444	44	14:49:15	900	0.0	0.0	48766.1
444	44	14:49:21	901	0.0	0.0	47098.5
445	44	14:49:36	902	0.0	0.0	49353.1
445	44	14:49:42	903	0.0	0.0	49091.8
446	44	14:50:08	904	0.0	0.0	49514.1

APPENDIX D

CHAIN OF CUSTODY FORMS

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CHAIN OF CUSTODY RECORD

Date [illegible] Page 1 of 1

BGPAA 0812

CLIENT: A. L. Burke Engineers

ADDRESS: [illegible] Place
[illegible] 12306

PROJECT MANAGER: A. L. Burke

PHONE NUMBER: 714) 666-[illegible]20

PROJECT NAME: Burbank (Trampers) 86-06 (1003)

SAMPLERS: (Signature) [illegible]

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE: WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BU3-10	Trampers	12/28/87	0:00				X	1	3015 [illegible]
BU3-15		↓					↓	1	"
BU3-20		↓	↓				↓	1	" "
BU3-25		↓	↓				↓	1	" "
BU3-30		↓	↓				↓	1	" "
BU3-35		↓	↓				↓	1	" "
BU3-40	↓	↓	11:15				↓	1	" "

Relinquished by: (Signature) [illegible]

Received by: (Signature)

Relinquished by: (Signature)

Received by: (Signature)

Relinquished by: (Signature)

Received by Mobile Laboratory for field analysis: (Signature)

Dispatched by: (Signature)

Date/Time

Received for Laboratory by: [illegible]

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time 12/28

Date/Time

Date/Time

Date/Time 12/28 4:10pm

Method of Shipment: Ice / Cooler

Special Instructions: Note the archive samples (see here)

I hereby authorize the performance of the above indicated work.

[illegible]

SOURCE: Adapted from U.S. EPA, 1985

DISTRIBUTION: White with report. Yellow to CRL. Pink to Courier. [illegible]

CCR-100

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CHAIN OF CUSTODY RECORD

Date 12/28/87 Page 1 of 2

BGPAA 0813

CLIENT: A. J. Burke Engineers
ADDRESS: 1162 N Kodiak Place
Anaheim Ca 92806

PROJECT MANAGER: A. J. Burke
PHONE NUMBER: (714) 666-1120

PROJECT NAME: Burbank (Trappers) 86-06 (0003)

SAMPLERS: (Signature)

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BU2-10		12/28/87	1130				X	1	8015 [illegible]
BU2-15								1	(gasoline)
BU2-20								1	
BU2-25								1	
BU2-30								1	
BU2-35								1	
BU2-40								1	

Relinquished by: (Signature) [signature]
Received by: (Signature)
Relinquished by: (Signature)
Received by: (Signature)
Relinquished by: (Signature)
Received by Mobile Laboratory for field analysis: (Signature)
Dispatched by: (Signature)
Date/Time
Received for Laboratory by: [signature]

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time 12/28
Date/Time
Date/Time
Date/Time 12/28 4:10pm

Method of Shipment: ice / cooler

Special Instructions:

I hereby authorize the performance of the above indicated work.

[signature]

SOURCE: Adapted from U.S. EPA, 1985

DISTRIBUTION: White with report. Yellow to Cl...

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CHAIN OF CUSTODY RECORD

Date 12/28/87 Page 2 of 2

BGPAA 0814

CLIENT: A. L. Burke Engineers

ADDRESS: 1162 N. Kimber Place, Anaheim, Ca 92806

PROJECT NAME: Burbank (Trappers)

PROJECT MANAGER: A. L. Burke

PHONE NUMBER: (714) 666-1120

SAMPLERS: (Signature) Robert J. [illegible]

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE: WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BV2-45		12/28/87	12:30				X	1	[illegible]

Relinquished by: (Signature) Robert J. [illegible]

Received by: (Signature)

Relinquished by: (Signature)

Received by: (Signature)

Relinquished by: (Signature)

Received by Mobile Laboratory for field analysis: (Signature)

Dispatched by: (Signature)

Date/Time

Received for Laboratory by: [illegible]

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time 12/28

Date/Time

Date/Time

Date/Time 12/28 4:10 pm

Method of Shipment: Ice / Cooler

Special Instructions:

I hereby authorize the performance of the above indicated work.

Robert J. [illegible]

SOURCE: Adapted from U.S. EPA, 1985

CCR-100

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CHAIN OF CUSTODY RECORD

Date 12/29/87 Page 1 of 1

BGPAA 0815

CLIENT: A.L. Burke Engineers, Inc
ADDRESS: 1162 N. Kraemer Place
Anaheim, Ca 92806

PROJECT MANAGER: A.L. Burke
PHONE NUMBER: (714) ~~[illegible]~~ 666-1120
SAMPLERS: (Signature) Robert J. [illegible]

PROJECT NAME: Burbank (Trappers Property)

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE: WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BU5-2		12/29/87					X	1	pH (9010)
BU5-5		↓					X	1	" "
BU5-10		↓					X	1	" "
BU5-15		↓					X	1	" "
BU6		↓				X		1	Sulfide Gas and Methane Analysis
BU7		↓				X		1	Sulfide Gas and Methane Analysis

Relinquished by: (Signature) Robert J. [illegible]
Received by: (Signature)
Relinquished by: (Signature)
Received by: (Signature)
Relinquished by: (Signature)
Received by Mobile Laboratory for field analysis: (Signature)
Dispatched by: (Signature)
Date/Time
Received for Laboratory by: Don Burley

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time
Date/Time
Date/Time
Date/Time 12/29/87 1:50

Method of Shipment: ice / cooler

Special Instructions: 4 soil Samples
2 gas samples

I hereby authorize the performance of the above indicated work.
Robert J. [illegible]

SOURCE: Adapted from U.S. EPA, 1985

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CHAIN OF CUSTODY RECORD

Date 12/29/87 Page 1 of 1

BGPAA 0816

CLIENT: A.L. Burke Engineers

ADDRESS: 1162 N. Kraemer Place, Anaheim, Ca 92806

PROJECT NAME:

PROJECT MANAGER: Anne Burke

PHONE NUMBER: (714) 666-1120

SAMPLERS: (Signature) Robert J. Burke

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BU4-2		12/29					X	1	pH
BU4-5							X	1	" "
BU4-10							X	1	" "
BU4-15							X	1	" "
BU4-20							X	1	" "

Relinquished by: (Signature) Robert J. Burke

Received by: (Signature)

Relinquished by: (Signature)

Received by: (Signature)

Relinquished by: (Signature)

Received by Mobile Laboratory for field analysis: (Signature)

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time

Date/Time

Date/Time

Dispatched by: (Signature)

Date/Time

Received for Laboratory by: Don Burley

Date/Time 12/29/87 1:50

Method of Shipment:

Special Instructions:

I hereby authorize the performance of the above indicated work.

Robert J. Burke

SOURCE: Adapted from U.S. EPA, 1985

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CHAIN OF CUSTODY RECORD

Date 12/30/87 Page 1 of 1

BGPAA 0817

CLIENT: A.L. Burke Engineers

ADDRESS: 462 N. Kinder Place, Anaheim, Ca 92801

PROJECT MANAGER: Anne Burke

PHONE NUMBER: (714) ~~[illegible]~~ 666-1120

PROJECT NAME: Burbank 86-06 (0003)

SAMPLERS: (Signature) Robert J. [illegible]

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BUB-10		12/30/87					X	1	pH
BUB-15							X	1	"
BUB-20							X	1	"
BUB-25							X	1	"
BUB-30							X	1	"

Relinquished by: (Signature) Robert J. [illegible]

Received by: (Signature)

Relinquished by: (Signature)

Received by: (Signature)

Relinquished by: (Signature)

Received by Mobile Laboratory for field analysis: (Signature)

Dispatched by: (Signature)

Date/Time

Received for Laboratory by: [illegible]

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Date/Time

Date/Time

Date/Time

Date/Time 12/31/87 3:[illegible]

Method of Shipment: ice/cooler

Special Instructions:

I hereby authorize the performance of the above indicated work.

Robert J. [illegible]

SOURCE: Adapted from U.S. EPA, 1985

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CHAIN OF CUSTODY RECORD

Date 12/30/97 Page 1 of 2

BGPAA 0818

CLIENT: A. L. Smith Engineers

ADDRESS: 1112 N. Kraemer Place, Anaheim, Ca 92806

PROJECT MANAGER: Alex Smith

PHONE NUMBER: 714) 666-1120

PROJECT NAME: Burlende

SAMPLERS: (Signature) [signature]

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
309-5		12/30/97					X	1	pH
309-10							X	1	"
309-15							X	1	"
309-20							X	1	"
309-25							X	1	"
309-30							X	1	"
309-35							X	1	"

Relinquished by: (Signature) [signature]

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by Mobile Laboratory for field analysis: (Signature)

Date/Time

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.

1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Dispatched by: (Signature)

Date/Time

Received for Laboratory by: [signature]

Date/Time 12/30/97 Time

Method of Shipment: ice / truck

Special Instructions: pH on soil samples only

I hereby authorize the performance of the above indicated work. [signature]

SOURCE: Adapted from U.S. EPA, 1985

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CHAIN OF CUSTODY RECORD

Date 12/30/87 Page 1 of 2

BGPAA 0819

CLIENT: A. L. Burke Engineers
ADDRESS: 1162 N. Kramer Place, Anaheim, Ca 92806
PROJECT NAME: Burbank
PROJECT MANAGER: Anne Burke (714) 666-1120
PHONE NUMBER: Robert J. [illegible]
SAMPLERS: (Signature)

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE: WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BU9-40		12/30					X	1	pH
BU9-G						X		1	Sulfide Gas + Methane Analyses
BU10						X		1	" " "
BU11						X		1	" " "

Relinquished by: (Signature) Robert J. [illegible]
Received by: (Signature)
Relinquished by: (Signature)
Received by: (Signature)
Relinquished by: (Signature)
Received by Mobile Laboratory for field analysis: (Signature)
Dispatched by: (Signature)
Date/Time
Received for Laboratory by: [illegible]
Date/Time 12/31/87 3:1[illegible]

CRL will store sample for 30 days at no charge. Storage after 30 days is charged at $10 per month per sample. Disposal of sample is charged at $10 per sample. Please indicate the disposition of your sample.
1. Client retrieved _____ by _____
2. Lab Disposal _____ by _____
3. Store for _____ days. by _____
4. Other _____ by _____

Method of Shipment: ice cooler
Special Instructions:

I hereby authorize the performance of the above indicated work.
Robert J. [illegible]

SOURCE: Adapted from U.S. EPA, 1985

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April 5, 2002
Project 01123-024
Work Order No. 37.1, Document No.2

Mr. Dan Feger
Burbank-Glendale-Pasadena Airport Authority
2627 North Hollywood Way
Burbank, California 91505

Re: Environmental Summary – Former Building 360 Complex

Dear Mr. Feger:

This report presents a history and summary of environmental information and data associated with the former Building 360 Complex of the Lockheed Plant B-6 site.

Background

The former Building 360 Complex is comprised of approximately 22 acres located at 7575 San Fernando Road in Los Angeles, California, see Figure 1 – Site Vicinity Map. The Building 360 Complex was part of a former 130-acre parcel known as the Lockheed Plant B-6 facility. The Building 360 Complex is located in the City of Los Angeles while the remainder of the former B-6 facility is located in the City of Burbank. Lockheed developed the B-6 facility in the early 1940s for aircraft research, manufacturing, and maintenance operations, primarily on behalf of the United States Department of Defense. Prior to 1941-1942 the majority of the B-6 facility site was undeveloped or used for dry land agriculture, such as grain crops, grazing and vineyards.

The B-6 site development included aircraft hangers, aircraft assembly and testing areas, maintenance areas, office space, and warehouses. The principal activity at the Building 360 Complex was engineering offices and some final aircraft assembly, however, other operations included research and development activities, minor subassembly work, aircraft testing, ground support, and flight operations. Some of these activities involved cleaning, painting, welding, and machining. Hazardous materials historically stored and used at the subject site included aircraft fuels, fuel oils, gasoline, solvents, metals, acids, caustics, adhesives, plastic resins, and hardeners.

The B-6 facility closed operations in 1993. In the summer of 2001, the buildings and foundations associated with the former Building 360 Complex were demolished and removed from the site. The Building 360 Complex property is currently a vacant lot comprised of soil, concrete paving, and asphalt paving.

Environmental Assessment

During the past decade, the former Lockheed Plant B-6 site has been the subject of several subsurface environmental assessments and remediation activities. In the early 1990's, Lockheed, in anticipation of vacating the property, conducted several environmental assessments. McLaren Hart conducted a comprehensive Phase I Environmental Site Assessment (ESA) on behalf of Lockheed in 1991 and 1992. Based on the results of the Phase I, Lockheed hired Tetra Tech Inc. to systematically conduct subsurface assessments in areas of concern. From approximately 1992 through 1996, Tetra Tech conducted several subsurface assessments and some soil remediation on the Plant B-6 facility site. The Los Angeles Regional Water Quality Control Board (RWQCB) was the regulatory agency responsible for oversight of environmental issues associated with the property and, as such, reviewed and approved all the Tetra Tech assessment and remediation work.

ENSR conducted an independent subsurface assessment of the Plant B-6 site on behalf of the Burbank-Glendale-Pasadena Airport Authority from 1996 through 1998. In addition, during demolition of the Building 360 Complex ENSR observed and sampled the subsurface soils immediately beneath the building slabs and foundations for any evidence of discoloration, staining, odor, and/or contamination. Shallow soil samples were collected beneath the slabs and foundations and screened for contamination with a photoionization detector (PID).

For the purposes of this report, ENSR has summarized the subsurface soil vapor and soil boring data collected for the various investigations of the Building 360 Complex. The results of these various assessment efforts are summarized below.

Soil Vapor Results. Tetra Tech and ENSR collected a total of 258 soil vapor samples from 180 soil vapor survey probes illustrated on Figure 2 - Soil Vapor Survey Locations. Soil vapor probes were installed on an average 60-foot interval over the site. The soil vapor samples collected by Tetra Tech were collected at depths of 6 feet on 100-foot centers. Subsequently, ENSR collected soil vapor samples at depths of 10 and 20 on staggered 100-foot centers. As a result of the staggering, vapor probe locations were installed on an average 60-foot grid over the entire site. At the time of the surveys, the vapor samples were analyzed on site for volatile organic compounds (VOC) in a mobile laboratory using EPA Method 8260.

A summary of the analytical results is presented in Table 1 – Soil Vapor Analytical Results. Only a few samples recorded the presence of VOCs at very low concentrations. Based on the relative absence of VOCs in the area, Table1 presents the results as a summation of all VOC constituent concentrations for each sample, rather than as individual VOC concentrations. To further assist in a review of the data, Table 1 was sorted and truncated to develop a "hits only" listing of results; presented as Table 1A.

The data indicate that out of the 258 samples collected, 212 samples recorded an absence of all VOC's. Of the 46 samples with a detection of VOCs, only 10 samples recorded concentrations greater than 10 micrograms pre liter (ug/l); ranging from 11.5 ug/l to 52.3 ug/l.

Soil Boring Results. Tetra Tech and ENSR collected a total of 330 soil matrix samples from 37 soil boring explorations illustrated on Figure 3 – Soil Boring Locations. The soil borings were located randomly across the site and in areas where historic processes and/or operations may have resulted in an environmental impact to the subsurface. Soil samples were generally collected on 5-foot intervals by Tetra Tech and on 10-foot intervals by ENSR to depths ranging from 30 to 120 feet. The soil samples were analyzed for a combination of total petroleum hydrocarbons (TPH), volatile organic compounds (VOC), and in some cases, semi-volatile organic compounds (SVOC), polychlorinated biphenyl (PCB), and 17 CAM metals.

A summary of the analytical results is presented in Table 2 – Soil Boring Analytical Results. Again, based on the relative absence of VOCs in the area, and for simplicity, the results are not reported as individual VOC concentrations but as a summation of VOC concentrations for each sample. Similarly, the 17 CAM metals results were all consistent with background levels for the region and therefore, individual concentrations are not presented. To further assist in a review of the data, Table 2 was sorted and truncated to develop a "hits only" listing of results; presented as Table 2A.

The data indicate an absence of VOC and PCB in all samples collected. The 17 CAM metal results were all consistent with background levels for the region. One SVOC, bis (2-ethylhexyl) phthalate, was recorded at a concentration of 4,400 micrograms per kilogram (ug/kg) at a depth of 10 feet in Boring AFL-SB21. The presence of this single SVOC is inconsistent with any process or operation on the site and is likely a laboratory contaminant.

The data indicate that out of 330 soil matrix samples collected, 218 samples recorded an absence of TPH. Of the 112 samples with a detection of TPH, only 15 samples recorded concentrations greater than 100 milligrams per kilogram (mg/kg); ranging from 103 mg/kg to 345 mg/kg, with one sample recording a result at 1081 mg/kg at a depth of 2 feet in Boring AP33-SB05.

PID Results. ENSR collected a total of 35 shallow soil samples on 100-foot centers from an average depth of 12 inches beneath the former Building 360 Complex slabs and foundations. The location of these samples is illustrated on Figure 4 – PID Sample Locations. Headspace analysis of each sample was conducted for the presence of organic vapors using a MSA Passport PID equipped with a 10.2 eV lamp.

The results of organic vapor analysis (PID readings) of the 35 shallow soil samples are summarized on Table 3 – Photoionization Detector - Organic Vapor Results. Only two sample locations recorded concentrations greater than 1.0 part-per-million (ppm). Sample location No. 3

recorded a reading of 1.8 ppm and sample location No. 4 recorded a reading of 2.0 ppm. All other samples were less than 1.0 ppm, with most locations recording a non-detected (ND) condition.

During slab and foundation demolition, some soil coloration differences were observed. These color changes were generally associated with different backfill materials used at the time of construction. No unusual odor was indicated and PID readings of the ambient air immediately above these locations did not record a measurable presence of organic vapors.

Regulatory Oversight

The Los Angeles Regional Water Quality Control Board (LARWQCB) has been the regulatory agency responsible for oversight of environmental issues associated with the former Plant B-6 site. The LARWQCB systematically reviewed all the environmental data from the various assessments and remediation efforts, and issued "no further requirements" (NFR) letters for the site in 1996. These letters were issued per legal parcel. The former Building 360 Complex comprises parcels F and G. The letters are included as Attachment 1 - LARWQCB – NFA Letters.

Groundwater Condition

The Building 360 Complex overlies the San Fernando Valley Groundwater basin, an aquifer which, prior to the discovery of contamination in the early 1980's, had provided drinking water to over 800,000 residents of the Cities of Los Angeles, Burbank, and Glendale, and the La Crescenta Water District. Depth to groundwater in this area is approximately 240 feet.

In 1980, concentrations of chlorinated volatile organic compounds (VOC), including trichloroethylene (TCE) and perchloroethylene (PCE) were found to be above Federal Maximum Contaminant Levels (MCLs) and State Action Levels (SALs) in many city production wells. Those solvents were widely used in a number of industries including aerospace and defense manufacturing, machinery degreasing, dry-cleaning, and metal plating.

In June 1986, EPA placed four well field sites in the San Fernando Valley on the National Priorities (NPL) list: the North Hollywood Superfund site (Area 1); the Crystal Springs Superfund site (Area 2); the Pollack Superfund Site (Area 3); and the Verdugo Superfund Site (Area 4). The Building 360 Complex is within the North Hollywood Superfund site (Area 1) and has been identified with the Burbank Operable Unit (OU) of that site.

In 1989, EPA issued a Record of Decision (ROD) prescribing an interim remedy for the North Hollywood Superfund site (Area 1). The remedy described in the ROD was modified by an Explanation of Significant Differences (ESD) in 1990 and a second ESD in 1997. The remedy consists of a groundwater extraction and treatment system, a blending system and delivery of the

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treated water to the public water supply. The interim remedy is required to operate for twenty years.

In 1992, EPA entered into a Consent Decree with Lockheed Martin, Weber Aircraft and the City of Burbank, that provided for the construction of the treatment system and operation and maintenance of them for two years. In 1998, a Second Consent Decree was entered into pursuant to which Lockheed Martin is primarily responsible for funding the operation and maintenance of the treatment system for the remaining 18 years. Groundwater is currently being remediated from the treatment system located approximately ½ mile down-gradient from the Building 360 Complex.

The above report, with included Tables and Figures summarize the environmental data and information for the Building 360 Complex. If you have any questions or require clarification on the above, please contact Mr. L. David Parker in ENSR's Camarillo, California office at 805-388-3775.

Sincerely,

L. David Parker
Program Manager

Attachment 1 - LARWQCB – NFA Letters.

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
ASG-001	6.0	ND
ASG-002	6.0	ND
ASG-003	6.0	ND
ASG-004	6.0	ND
ASG-005	6.0	ND
ASG-006	6.0	ND
ASG-007	6.0	ND
ASG-008	6.0	ND
ASG-009	6.0	ND
ASG-010	6.0	ND
ASG-011	6.0	ND
ASG-012	6.0	ND
ASG-013	6.0	ND
ASG-014	6.0	ND
ASG-015	6.0	ND
ASG-016	6.0	ND
ASG-017	6.0	ND
ASG-018	6.0	ND
ASG-019	6.0	ND
ASG-020	6.0	ND
ASG-021	6.0	ND
ASG-022	6.0	ND
ASG-023	6.0	ND
ASG-024	6.0	ND
ASG-025	6.0	ND
ASG-026	6.0	ND
ASG-027	6.0	ND
ASG-028	6.0	ND
ASG-029	6.0	ND
ASG-031	6.0	ND
ASG-032	6.0	1.3
ASG-033	6.0	1.0
ASG-034	6.0	ND
ASG-035	6.0	ND
ASG-036	6.0	ND
ASG-037	6.0	ND
ASG-038	6.0	ND
ASG-039	6.0	ND
ASG-040	6.0	ND
ASG-041	6.0	ND
ASG-044	6.0	ND
ASG-045	6.0	ND

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
ASG-046	6.0	ND
ASG-047	6.0	ND
ASG-048	6.0	ND
ASG-049	6.0	ND
ASG-050	6.0	ND
ASG-051	6.0	ND
ASG-052	6.0	ND
ASG-053	6.0	ND
ASG-054	6.0	ND
ASG-055	6.0	2.0
ASG-056	6.0	ND
ASG-057	6.0	ND
ASG-058	6.0	ND
ASG-059	6.0	ND
ASG-060	6.0	ND
ASG-061	6.0	ND
ASG-062	6.0	ND
ASG-063	6.0	ND
ASG-064	6.0	ND
ASG-066	6.0	ND
ASG-067	6.0	ND
ASG-068	6.0	ND
ASG-069	6.0	ND
ASG-070	6.0	ND
ASG-071	6.0	ND
ASG-072	6.0	ND
ASG-073	6.0	ND
ASG-074	6.0	ND
ASG-075	6.0	ND
ASG-076	6.0	ND
ASG-077	6.0	1.1
ASG-078	6.0	2.7
ASG-079	6.0	ND
ASG-080	6.0	ND
ASG-081	6.0	ND
ASG-082	6.0	ND
ASG-083	6.0	ND
ASG-084	6.0	ND
ASG-085	6.0	ND
ASG-086	6.0	1.2
ASG-087	6.0	ND
ASG-088	6.0	4.4

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
ASG-089	6.0	2.2
ASG-090	6.0	ND
ASG-091	6.0	ND
ASG-092	6.0	ND
ASG-093	6.0	ND
ASG-094	6.0	ND
ASG-095	6.0	ND
ASG-096	6.0	ND
ASG-097	6.0	1.2
ASG-098	6.0	1.3
ASG-099	6.0	4.5
ASG-100	6.0	2.8
ASG-101	6.0	ND
A2SG-001	6.0	1.6
A2SG-002	6.0	ND
A2SG-003	6.0	ND
A2SG-004	6.0	4.8
A2SG-005	6.0	ND
A2SG-005	18.0	2.3
A2SG-006	6.0	ND
A2SG-006	14.0	3.7
FSV-001	10.0	ND
FSV-001	20.0	ND
FSV-002	10.0	ND
FSV-002	20.0	ND
FSV-003	10.0	ND
FSV-003	20.0	ND
FSV-004	10.0	ND
FSV-004	20.0	ND
FSV-005	10.0	ND
FSV-005	20.0	ND
FSV-006	10.0	ND
FSV-006	20.0	ND
FSV-007	10.0	ND
FSV-007	20.0	ND
FSV-008	10.0	ND
FSV-008	20.0	ND
FSV-009	10.0	ND
FSV-009	20.0	ND
FSV-010	10.0	ND
FSV-010	20.0	ND
FSV-011	10.0	ND

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
FSV-011	20.0	ND
FSV-012	10.0	ND
FSV-012	20.0	ND
FSV-013	10.0	ND
FSV-013	20.0	ND
FSV-014	10.0	5.6
FSV-014	20.0	5.9
GSV-001	10.0	ND
GSV-001	20.0	ND
GSV-002	10.0	ND
GSV-002	20.0	ND
GSV-003	10.0	ND
GSV-003	20.0	ND
GSV-004	10.0	ND
GSV-004	20.0	ND
GSV-005	10.0	ND
GSV-005	20.0	ND
GSV-007	10.0	1.1
GSV-007	20.0	2.9
GSV-008	10.0	ND
GSV-008	20.0	ND
GSV-009	10.0	ND
GSV-009	20.0	ND
GSV-010	10.0	ND
GSV-010	20.0	ND
GSV-011	10.0	ND
GSV-011	20.0	ND
GSV-012	10.0	ND
GSV-012	20.0	ND
GSV-013	10.0	ND
GSV-013	20.0	ND
GSV-016	10.0	ND
GSV-016	20.0	ND
GSV-017	10.0	ND
GSV-017	20.0	3.4
GSV-018	10.0	ND
GSV-018	20.0	ND
GSV-019	10.0	ND
GSV-019	20.0	ND
GSV-021	10.0	ND
GSV-021	20.0	ND
GSV-025	10.0	4.7

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
GSV-025	20.0	8.7
GSV-026	10.0	1.1
GSV-026	20.0	4.4
GSV-027	10.0	ND
GSV-027	20.0	ND
GSV-028	10.0	ND
GSV-028	20.0	ND
GSV-029	10.0	ND
GSV-029	20.0	ND
GSV-030	10.0	ND
GSV-030	20.0	ND
GSV-031	10.0	ND
GSV-032	10.0	ND
GSV-032	20.0	ND
GSV-033	10.0	ND
GSV-033	20.0	ND
GSV-035	10.0	17.3
GSV-035	20.0	17.0
GSV-036	10.0	ND
GSV-036	20.0	ND
GSV-037	10.0	ND
GSV-037	20.0	ND
GSV-038	10.0	ND
GSV-038	20.0	1.3
GSV-039	10.0	ND
GSV-039	20.0	2.0
GSV-040	10.0	ND
GSV-040	20.0	ND
GSV-041	10.0	ND
GSV-041	20.0	ND
GSV-042	10.0	1.4
GSV-042	20.0	ND
GSV-043	10.0	14.0
GSV-043	20.0	3.1
GSV-044	10.0	1.1
GSV-044	20.0	1.8
GSV-045	10.0	ND
GSV-045	20.0	ND
GSV-046	10.0	ND
GSV-046	20.0	2.4
GSV-047	10.0	3.2
GSV-047	20.0	3.8

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
GSV-048	10.0	4.6
GSV-048	20.0	6.4
GSV-049	10.0	1.3
GSV-049	20.0	1.6
GSV-050	10.0	ND
GSV-050	20.0	5.8
GSV-051	10.0	4.7
GSV-051	20.0	6.2
GSV-052	10.0	ND
GSV-052	20.0	3.0
GSV-053	10.0	1.4
GSV-053	20.0	4.3
GSV-054	10.0	1.2
GSV-054	20.0	3.3
GSV-055	10.0	2.2
GSV-055	20.0	ND
GSV-056	10.0	1.5
GSV-056	20.0	3.6
GSV-058	10.0	ND
GSV-058	20.0	12.0
GSV-059	10.0	52.3
GSV-059	20.0	22.4
GSV-060	10.0	ND
GSV-060	20.0	1.9
GSV-061	10.0	ND
GSV-061	20.0	ND
GSV-062	10.0	ND
GSV-062	20.0	ND
GSV-063	10.0	ND
GSV-063	20.0	ND
GSV-064	10.0	ND
GSV-064	20.0	2.5
GSV-065	10.0	ND
GSV-065	20.0	7.1
GSV-066	10.0	11.5
GSV-066	20.0	13.0
GSV-067	10.0	37.4
GSV-067	20.0	30.0
GSV-068	10.0	ND
GSV-068	20.0	ND
GSV-069	10.0	ND
GSV-069	20.0	ND

TABLE 1
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
GSV-070	10.0	ND
GSV-070	20.0	ND
GSV-071	10.0	ND
GSV-071	20.0	ND
GSV-072	10.0	2.9
GSV-072	20.0	ND
NOTES:		
ND = indicates a non-detected concentration		

TABLE 1A - HITS ONLY
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
GSV-059	10.0	52.3
GSV-067	10.0	37.4
GSV-067	20.0	30.0
GSV-059	20.0	22.4
GSV-035	10.0	17.3
GSV-035	20.0	17.0
GSV-043	10.0	14.0
GSV-066	20.0	13.0
GSV-058	20.0	12.0
GSV-066	10.0	11.5
GSV-025	20.0	8.7
GSV-065	20.0	7.1
GSV-048	20.0	6.4
GSV-051	20.0	6.2
FSV-014	20.0	5.9
GSV-050	20.0	5.8
FSV-014	10.0	5.6
A2SG-004	6.0	4.8
GSV-025	10.0	4.7
GSV-051	10.0	4.7
GSV-048	10.0	4.6
ASG-099	6.0	4.5
ASG-088	6.0	4.4
GSV-026	20.0	4.4
GSV-053	20.0	4.3
GSV-047	20.0	3.8
A2SG-006	14.0	3.7
GSV-056	20.0	3.6
GSV-017	20.0	3.4
GSV-054	20.0	3.3
GSV-047	10.0	3.2
GSV-043	20.0	3.1
GSV-052	20.0	3.0
GSV-007	20.0	2.9
GSV-072	10.0	2.9
ASG-100	6.0	2.8
ASG-078	6.0	2.7
GSV-064	20.0	2.5
GSV-046	20.0	2.4
A2SG-005	18.0	2.3
ASG-089	6.0	2.2
GSV-055	10.0	2.2

TABLE 1A - HITS ONLY
Soil Vapor Analytical Results
Former Building 360 Complex

Vapor Probe No.	Sample Depth	Total Volatile Organic Compounds (ug/l in air)
ASG-055	6.0	2.0
GSV-039	20.0	2.0
GSV-060	20.0	1.9
GSV-044	20.0	1.8
A2SG-001	6.0	1.6
GSV-049	20.0	1.6
GSV-056	10.0	1.5
GSV-042	10.0	1.4
GSV-053	10.0	1.4
ASG-032	6.0	1.3
ASG-098	6.0	1.3
GSV-038	20.0	1.3
GSV-049	10.0	1.3
ASG-086	6.0	1.2
ASG-097	6.0	1.2
GSV-054	10.0	1.2
ASG-077	6.0	1.1
GSV-007	10.0	1.1
GSV-026	10.0	1.1
GSV-044	10.0	1.1
ASG-033	6.0	1.0

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A360-SB12	2	ND	ND	ND	ND	ND
A360-SB12	5	NS	NS	NS	NS	NS
A360-SB12	10	ND	ND	ND	ND	ND
A360-SB12	15	ND	ND	--	--	--
A360-SB12	20	ND	ND	--	--	--
A360-SB12	25	ND	ND	--	--	--
A360-SB12	30	ND	ND	--	--	--
A360-SB13	2	ND	ND	ND	ND	ND
A360-SB13	5	ND	ND	ND	ND	ND
A360-SB13	10	ND	ND	ND	ND	ND
A360-SB13	15	ND	ND	--	--	--
A360-SB13	20	ND	ND	--	--	--
A360-SB13	25	ND	ND	--	--	--
A360-SB13	30	ND	ND	--	--	--
A360-SB16	2	16	ND	ND	ND	ND
A360-SB16	5	41	ND	ND	ND	ND
A360-SB16	10	29	ND	ND	ND	ND
A360-SB16	15	8	ND	--	--	--
A360-SB16	20	6	ND	--	--	--
A360-SB16	25	ND	ND	--	--	--
A360-SB16	30	ND	ND	--	--	--
A360-SB16	35	ND	ND	--	--	--
A360-SB16	40	8	ND	--	--	--
A360-SB16	45	8	ND	--	--	--
A360-SB16	50	11	ND	--	--	--
A360-SB16	55	ND	ND	--	--	--
A360-SB16	60	13	ND	--	--	--
A360-SB17	2	ND	ND	ND	ND	ND

BGPAA 1008

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A360-SB17	5	57	ND	ND	ND	ND
A360-SB17	10	ND	ND	ND	ND	ND
A360-SB17	15	42	ND	--	--	--
A360-SB17	20	5	ND	--	--	--
A360-SB17	25	ND	ND	--	--	--
A360-SB17	30	82	ND	--	--	--
A360-SB17	35	29	ND	--	--	--
A360-SB17	40	8	ND	--	--	--
A360-SB17	45	6	ND	--	--	--
A360-SB17	50	ND	ND	--	--	--
A360-SB17	55	NS	NS	NS	NS	NS
A360-SB17	60	ND	ND	--	--	--
A360-SB18	2	18	ND	ND	ND	ND
A360-SB18	5	7	ND	ND	ND	ND
A360-SB18	10	ND	ND	ND	ND	ND
A360-SB18	15	7	ND	--	--	--
A360-SB18	20	ND	ND	--	--	--
A360-SB18	25	ND	ND	--	--	--
A360-SB18	30	ND	ND	--	--	--
A360-SB19	2	90	ND	ND	ND	ND
A360-SB19	5	ND	ND	ND	ND	ND
A360-SB19	10	18	ND	ND	ND	ND
A360-SB19	15	11	ND	--	--	--
A360-SB19	20	6	ND	--	--	--
A360-SB19	25	10	ND	--	--	--
A360-SB19	30	12	ND	--	--	--
A360-SB27	2	13	ND	ND	ND	ND
A360-SB27	5	ND	ND	ND	ND	ND

BGPAA 1009

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A360-SB27	10	15	ND	ND	ND	ND
A360-SB27	15	5	ND	--	--	--
A360-SB27	20	ND	ND	--	--	--
A360-SB27	25	ND	ND	--	--	--
A360-SB27	30	ND	ND	--	--	--
A360-SB28	25	25	ND	--	--	--
A360-SB28	30	17	ND	--	--	--
A360-SB29	2	ND	ND	ND	ND	ND
A360-SB29	5	20	ND	ND	ND	ND
A360-SB29	10	ND	ND	ND	ND	ND
A360-SB29	15	ND	ND	--	--	--
A360-SB29	20	NS	NS	NS	NS	NS
A360-SB29	25	ND	ND	--	--	--
A360-SB29	30	ND	ND	--	--	--
A360-SB29	35	ND	ND	--	--	--
A360-SB29	40	ND	ND	--	--	--
A360-SB29	45	ND	ND	--	--	--
A360-SB29	50	ND	ND	--	--	--
A360-SB29	55	ND	ND	--	--	--
A360-SB29	60	ND	ND	--	--	--
A362-SB01	2	317	ND	ND	ND	ND
A362-SB01	5	121	ND	ND	ND	ND
A362-SB01	10	16	ND	ND	ND	ND
A362-SB01	15	NS	NS	NS	NS	NS
A362-SB01	20	ND	ND	--	--	--
A362-SB01	25	8	ND	--	--	--
A362-SB01	30	7	ND	--	--	--
A362-SB01	35	ND	ND	--	--	--

BGPAA 1010

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A362-SB01	40	10	ND	--	--	--
A362-SB01	45	ND	ND	--	--	--
A362-SB01	50	7	ND	--	--	--
A362-SB01	55	10	ND	--	--	--
A362-SB01	60	ND	ND	--	--	--
A362-SB02	2	66	ND	ND	ND	ND
A362-SB02	5	116	ND	ND	ND	ND
A362-SB02	10	53	ND	ND	ND	ND
A362-SB02	15	12	ND	--	--	--
A362-SB02	20	6	ND	--	--	--
A362-SB02	25	7	ND	--	--	--
A362-SB02	30	ND	ND	--	--	--
A362-SB02	35	ND	ND	--	--	--
A362-SB02	40	5	ND	--	--	--
A362-SB02	45	ND	ND	--	--	--
A362-SB02	50	7	ND	--	--	--
A362-SB02	55	ND	ND	--	--	--
A362-SB02	60	6	ND	--	--	--
A362-SB03	2	13	ND	ND	ND	ND
A362-SB03	5	NS	NS	NS	NS	NS
A362-SB03	10	ND	ND	ND	ND	ND
A362-SB03	15	NS	NS	NS	NS	NS
A362-SB03	20	6	ND	--	--	--
A362-SB03	25	ND	ND	--	--	--
A362-SB03	30	8	ND	--	--	--
A362-SB03	35	ND	ND	--	--	--
A362-SB03	40	NS	NS	NS	NS	NS
A362-SB03	45	ND	ND	--	--	--

BGPAA 1011

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A362-SB03	50	NS	NS	NS	NS	NS
A362-SB03	55	NS	NS	NS	NS	NS
A362-SB03	60	10	ND	--	--	--
A364-SB26	2	ND	ND	ND	ND	ND
A364-SB26	5	6	ND	ND	ND	ND
A364-SB26	10	71	ND	ND	ND	ND
A364-SB26	15	ND	ND	--	--	--
A364-SB26	20	9	ND	--	--	--
A364-SB26	25	ND	ND	--	--	--
A364-SB26	30	7	ND	--	--	--
A365-SB22	2	224	ND	ND	ND	ND
A365-SB22	5	249	ND	ND	ND	ND
A365-SB22	10	8	ND	ND	ND	ND
A365-SB22	15	ND	ND	--	--	--
A365-SB22	20	ND	ND	--	--	--
A365-SB22	25	32	ND	--	--	--
A365-SB22	30	ND	ND	--	--	--
A365-SB23	2	103	ND	ND	ND	ND
A365-SB23	5	ND	ND	ND	ND	ND
A365-SB23	10	NS	NS	NS	NS	NS
A365-SB23	15	6	ND	--	--	--
AFL-SB14	2	60	ND	ND	ND	ND
AFL-SB14	5	9	ND	ND	ND	ND
AFL-SB14	10	ND	ND	ND	ND	ND
AFL-SB14	15	ND	ND	--	--	--
AFL-SB14	20	ND	ND	--	--	--
AFL-SB14	25	ND	ND	--	--	--
AFL-SB14	30	ND	ND	--	--	--

BGPAA 1012

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AFL-SB15	2	7	ND	ND	ND	ND
AFL-SB15	5	NS	NS	NS	NS	NS
AFL-SB15	10	148	ND	ND	ND	ND
AFL-SB15	15	NS	NS	NS	NS	NS
AFL-SB15	20	ND	ND	--	--	--
AFL-SB15	25	ND	ND	--	--	--
AFL-SB15	30	ND	ND	--	--	--
AFL-SB15	35	ND	ND	--	--	--
AFL-SB15	40	7	ND	--	--	--
AFL-SB15	45	ND	ND	--	--	--
AFL-SB15	50	ND	ND	--	--	--
AFL-SB15	55	ND	ND	--	--	--
AFL-SB15	60	ND	ND	--	--	--
AFL-SB20	2	252	ND	ND	ND	ND
AFL-SB20	5	25	ND	ND	ND	ND
AFL-SB20	10	23	ND	ND	ND	ND
AFL-SB20	15	ND	ND	--	--	--
AFL-SB20	20	13	ND	--	--	--
AFL-SB20	25	ND	ND	--	--	--
AFL-SB20	30	12	ND	--	--	--
AFL-SB21	2	35	ND	ND	ND	ND
AFL-SB21	5	ND	ND	ND	ND	ND
AFL-SB21	10	10	ND	4400*	ND	ND
AFL-SB21	15	ND	ND	--	--	--
AFL-SB21	20	ND	ND	--	--	--
AFL-SB21	25	ND	ND	--	--	--
AFL-SB21	30	ND	ND	--	--	--
AFL-SB24	2	ND	ND	ND	ND	ND

BGPAA 1013

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AFL-SB24	5	ND	ND	ND	ND	ND
AFL-SB24	10	10	ND	ND	ND	ND
AFL-SB24	15	NS	NS	NS	NS	NS
AFL-SB24	20	ND	ND	--	--	--
AFL-SB24	25	ND	ND	--	--	--
AFL-SB24	30	ND	ND	--	--	--
AFL-SB24	35	ND	ND	--	--	--
AFL-SB24	40	ND	ND	--	--	--
AFL-SB24	45	ND	ND	--	--	--
AFL-SB24	50	ND	ND	--	--	--
AFL-SB24	55	ND	ND	--	--	--
AFL-SB24	60	ND	ND	--	--	--
AFL-SB25	2	18	ND	ND	ND	ND
AFL-SB25	5	42	ND	ND	ND	ND
AFL-SB25	10	43	ND	ND	ND	ND
AFL-SB25	15	8	ND	--	--	--
AFL-SB25	20	ND	ND	--	--	--
AFL-SB25	25	7	ND	--	--	--
AFL-SB25	30	7	ND	--	--	--
AFL-SB25	35	ND	ND	--	--	--
AFL-SB25	40	7	ND	--	--	--
AFL-SB25	45	8	ND	--	--	--
AFL-SB25	50	11	ND	--	--	--
AFL-SB25	55	9	ND	--	--	--
AFL-SB25	60	7	ND	--	--	--
AP32-SB04	2	154	ND	ND	ND	ND
AP32-SB04	5	40	ND	ND	ND	ND
AP32-SB04	10	9	ND	ND	ND	ND

BGPAA 1014

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AP32-SB04	15	7	ND	--	--	--
AP32-SB04	20	ND	ND	--	--	--
AP32-SB04	25	6	ND	--	--	--
AP32-SB04	30	ND	ND	--	--	--
AP32-SB04	35	ND	ND	--	--	--
AP32-SB04	40	ND	ND	--	--	--
AP32-SB04	45	5	ND	--	--	--
AP32-SB04	50	6	ND	--	--	--
AP32-SB04	55	ND	ND	--	--	--
AP32-SB04	60	ND	ND	--	--	--
AP32-SB11	2	206	ND	ND	ND	ND
AP32-SB11	5	345	ND	ND	ND	ND
AP32-SB11	10	12	ND	ND	ND	ND
AP32-SB11	15	ND	ND	--	--	--
AP32-SB11	20	NS	NS	NS	NS	NS
AP32-SB11	25	ND	ND	--	--	--
AP32-SB11	30	ND	ND	--	--	--
AP32-SB11	35	7	ND	--	--	--
AP32-SB11	40	5	ND	--	--	--
AP32-SB11	45	ND	ND	--	--	--
AP32-SB11	50	ND	ND	--	--	--
AP32-SB11	55	ND	ND	--	--	--
AP32-SB11	60	ND	ND	--	--	--
AP33-SB05	2	1081	ND	ND	ND	ND
AP33-SB05	5	123	ND	ND	ND	ND
AP33-SB05	10	NS	NS	NS	NS	NS
AP33-SB05	15	ND	ND	--	--	--
AP33-SB05	20	ND	ND	--	--	--

BGPAA 1015

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AP33-SB05	25	ND	ND	--	--	--
AP33-SB05	30	ND	ND	--	--	--
AP33-SB06	2	31	ND	ND	ND	ND
AP33-SB06	5	ND	ND	ND	ND	ND
AP33-SB06	10	11	ND	ND	ND	ND
AP33-SB06	15	ND	ND	--	--	--
AP33-SB06	20	ND	ND	--	--	--
AP33-SB06	25	ND	ND	--	--	--
AP33-SB06	30	ND	ND	--	--	--
AP33-SB06	35	ND	ND	--	--	--
AP33-SB06	40	ND	ND	--	--	--
AP33-SB06	45	ND	ND	--	--	--
AP33-SB06	50	ND	ND	--	--	--
AP33-SB06	55	ND	ND	--	--	--
AP33-SB06	60	ND	ND	--	--	--
AP33-SB07	2	ND	ND	ND	ND	ND
AP33-SB07	5	ND	ND	ND	ND	ND
AP33-SB07	10	ND	ND	ND	ND	ND
AP33-SB07	15	ND	ND	--	--	--
AP33-SB07	20	ND	ND	--	--	--
AP33-SB07	25	NS	NS	NS	NS	NS
AP33-SB07	30	ND	ND	--	--	--
AP33-SB07	35	ND	ND	--	--	--
AP33-SB07	40	ND	ND	--	--	--
AP33-SB07	45	ND	ND	--	--	--
AP33-SB07	50	ND	ND	--	--	--
AP33-SB07	55	29	ND	--	--	--
AP33-SB07	60	ND	ND	--	--	--

BGPAA 1016

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AP33-SB08	2	7	ND	ND	ND	ND
AP33-SB08	5	ND	ND	ND	ND	ND
AP33-SB08	10	ND	ND	ND	ND	ND
AP33-SB08	15	ND	ND	--	--	--
AP33-SB08	20	ND	ND	--	--	--
AP33-SB08	25	ND	ND	--	--	--
AP33-SB08	30	ND	ND	--	--	--
AP33-SB09	2	285	ND	ND	ND	ND
AP33-SB09	5	15	ND	ND	ND	ND
AP33-SB09	10	NS	NS	NS	NS	NS
AP33-SB09	15	NS	NS	NS	NS	NS
AP33-SB09	20	ND	ND	--	--	--
AP33-SB09	25	ND	ND	--	--	--
AP33-SB09	30	ND	ND	--	--	--
AP33-SB09	35	ND	ND	--	--	--
AP33-SB09	40	ND	ND	--	--	--
AP33-SB09	45	ND	ND	--	--	--
AP33-SB09	50	ND	ND	--	--	--
AP33-SB09	55	ND	ND	--	--	--
AP33-SB09	60	ND	ND	--	--	--
AP33-SB10	2	ND	ND	ND	ND	ND
AP33-SB10	5	214	ND	ND	ND	ND
AP33-SB10	10	5	ND	ND	ND	ND
AP33-SB10	15	15	ND	--	--	--
AP33-SB10	20	ND	ND	--	--	--
AP33-SB10	25	8	ND	--	--	--
AP33-SB10	30	ND	ND	--	--	--
AP33-SB10	35	ND	ND	--	--	--

BGPAA 1017

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AP33-SB10	40	ND	ND	--	--	--
AP33-SB10	45	ND	ND	--	--	--
AP33-SB10	50	9	ND	--	--	--
AP33-SB10	55	ND	ND	--	--	--
AP33-SB10	60	10	ND	--	--	--
GSB-04	2	ND	ND	--	--	--
GSB-04	10	ND	ND	--	--	--
GSB-04	20	ND	ND	--	--	--
GSB-04	50	ND	ND	--	--	--
GSB-04	70	ND	ND	--	--	--
GSB-04	80	ND	ND	--	--	--
GSB-04	100	ND	ND	--	--	--
GSB-04	2	ND	ND	--	--	--
GSB-06	10	ND	ND	--	--	--
GSB-06	20	ND	ND	--	--	--
GSB-06	30	ND	ND	--	--	--
GSB-06	40	ND	ND	--	--	--
GSB-06	50	ND	ND	--	--	--
GSB-06	60	ND	ND	--	--	--
GSB-06	70	ND	ND	--	--	--
GSB-06	80	ND	ND	--	--	--
GSB-09	2	ND	ND	--	--	--
GSB-09	10	ND	ND	--	--	--
GSB-09	20	ND	ND	--	--	--
GSB-09	30	ND	ND	--	--	--
GSB-09	40	ND	ND	--	--	--
GSB-09	50	ND	ND	--	--	--
GSB-09	80	ND	ND	--	--	--

BGPAA 1018

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
GSB-10	2	ND	ND	--	--	--
GSB-10	10	ND	ND	--	--	--
GSB-10	30	ND	ND	--	--	--
GSB-10	40	ND	ND	--	--	--
GSB-10	50	ND	ND	--	--	--
GSB-10	70	ND	ND	--	--	--
GSB-10	80	ND	ND	--	--	--
GSB-15	10	ND	ND	--	--	--
GSB-15	20	ND	ND	--	--	--
GSB-15	30	ND	ND	--	--	--
GSB-15	40	ND	ND	--	--	--
GSB-15	50	ND	ND	--	--	--
GSB-15	60	ND	ND	--	--	--
GSB-15	70	ND	ND	--	--	--
GSB-15	80	ND	ND	--	--	--
GSB-23	2	ND	ND	--	--	--
GSB-23	10	ND	ND	--	--	--
GSB-23	20	ND	ND	--	--	--
GSB-23	30	ND	ND	--	--	--
GSB-23	40	ND	ND	--	--	--
GSB-23	50	ND	ND	--	--	--
GSB-23	60	ND	ND	--	--	--
GSB-23	70	ND	ND	--	--	--
GSB-23	80	ND	ND	--	--	--
GSB-23	90	ND	ND	--	--	--
GSB-23	100	ND	ND	--	--	--
GSB-23	110	ND	ND	--	--	--
GSB-23	120	ND	ND	--	--	--

BGPAA 1019

TABLE 2
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
GSB-24	2	ND	ND	--	--	--
GSB-24	10	ND	ND	--	--	ND
GSB-24	30	ND	ND	--	--	ND
GSB-24	40	ND	ND	--	--	ND
GSB-24	50	ND	ND	--	--	--
GSB-24	60	ND	ND	--	--	--
GSB-25	2	ND	ND	--	--	ND
GSB-25	10	ND	ND	--	--	ND
GSB-25	20	ND	ND	--	--	ND
GSB-25	30	ND	ND	--	--	ND
GSB-25	50	ND	ND	--	--	--
GSB-25	60	ND	ND	--	--	--
GSB-25	80	ND	ND	--	--	--

NOTES:

ND = indicates a non-detected concentration within the Practical Quantitative Limit (PQL) for the analytical method

NS = Sample not collected

(--) = Sample not analyzed

4400* = concentration of bis (2-ethylhexyl) phthalate

BGPAA 1020

TABLE 2A - HITS ONLY
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AP33-SB05	2	1081	ND	ND	ND	ND
AP32-SB11	5	345	ND	ND	ND	ND
A362-SB01	2	317	ND	ND	ND	ND
AP33-SB09	2	285	ND	ND	ND	ND
AFL-SB20	2	252	ND	ND	ND	ND
A365-SB22	5	249	ND	ND	ND	ND
A365-SB22	2	224	ND	ND	ND	ND
AP33-SB10	5	214	ND	ND	ND	ND
AP32-SB11	2	206	ND	ND	ND	ND
AP32-SB04	2	154	ND	ND	ND	ND
AFL-SB15	10	148	ND	ND	ND	ND
AP33-SB05	5	123	ND	ND	ND	ND
A362-SB01	5	121	ND	ND	ND	ND
A362-SB02	5	116	ND	ND	ND	ND
A365-SB23	2	103	ND	ND	ND	ND
A360-SB19	2	90	ND	ND	ND	ND
A360-SB17	30	82	ND	--	--	--
A364-SB26	10	71	ND	ND	ND	ND
A362-SB02	2	66	ND	ND	ND	ND
AFL-SB14	2	60	ND	ND	ND	ND
A360-SB17	5	57	ND	ND	ND	ND
A362-SB02	10	53	ND	ND	ND	ND
AFL-SB25	10	43	ND	ND	ND	ND
A360-SB17	15	42	ND	--	--	--
AFL-SB25	5	42	ND	ND	ND	ND
A360-SB16	5	41	ND	ND	ND	ND
AP32-SB04	5	40	ND	ND	ND	ND

BGPAA 1021

TABLE 2A - HITS ONLY
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
AFL-SB21	2	35	ND	ND	ND	ND
A365-SB22	25	32	ND	--	--	--
AP33-SB06	2	31	ND	ND	ND	ND
A360-SB16	10	29	ND	ND	ND	ND
A360-SB17	35	29	ND	--	--	--
AP33-SB07	55	29	ND	--	--	--
A360-SB28	25	25	ND	--	--	--
AFL-SB20	5	25	ND	ND	ND	ND
AFL-SB20	10	23	ND	ND	ND	ND
A360-SB29	5	20	ND	ND	ND	ND
A360-SB18	2	18	ND	ND	ND	ND
A360-SB19	10	18	ND	ND	ND	ND
AFL-SB25	2	18	ND	ND	ND	ND
A360-SB28	30	17	ND	--	--	--
A360-SB16	2	16	ND	ND	ND	ND
A362-SB01	10	16	ND	ND	ND	ND
A360-SB27	10	15	ND	ND	ND	ND
AP33-SB09	5	15	ND	ND	ND	ND
AP33-SB10	15	15	ND	--	--	--
A360-SB16	60	13	ND	--	--	--
A360-SB27	2	13	ND	ND	ND	ND
A362-SB03	2	13	ND	ND	ND	ND
AFL-SB20	20	13	ND	--	--	--
A360-SB19	30	12	ND	--	--	--
A362-SB02	15	12	ND	--	--	--
AFL-SB20	30	12	ND	--	--	--
AP32-SB11	10	12	ND	ND	ND	ND

BGPAA 1022

TABLE 2A - HITS ONLY
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A360-SB16	50	11	ND	--	--	--
A360-SB19	15	11	ND	--	--	--
AFL-SB25	50	11	ND	--	--	--
AP33-SB06	10	11	ND	ND	ND	ND
A360-SB19	25	10	ND	--	--	--
A362-SB01	40	10	ND	--	--	--
A362-SB01	55	10	ND	--	--	--
A362-SB03	60	10	ND	--	--	--
AFL-SB21	10	10	ND	4400*	ND	ND
AFL-SB24	10	10	ND	ND	ND	ND
AP33-SB10	60	10	ND	--	--	--
A364-SB26	20	9	ND	--	--	--
AFL-SB14	5	9	ND	ND	ND	ND
AFL-SB25	55	9	ND	--	--	--
AP32-SB04	10	9	ND	ND	ND	ND
AP33-SB10	50	9	ND	--	--	--
A360-SB16	15	8	ND	--	--	--
A360-SB16	40	8	ND	--	--	--
A360-SB16	45	8	ND	--	--	--
A360-SB17	40	8	ND	--	--	--
A362-SB01	25	8	ND	--	--	--
A362-SB03	30	8	ND	--	--	--
A365-SB22	10	8	ND	ND	ND	ND
AFL-SB25	15	8	ND	--	--	--
AFL-SB25	45	8	ND	--	--	--
AP33-SB10	25	8	ND	--	--	--
A360-SB18	5	7	ND	ND	ND	ND

BGPAA 1023

TABLE 2A - HITS ONLY
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A360-SB18	15	7	ND	--	--	--
A362-SB01	30	7	ND	--	--	--
A362-SB01	50	7	ND	--	--	--
A362-SB02	25	7	ND	--	--	--
A362-SB02	50	7	ND	--	--	--
A364-SB26	30	7	ND	--	--	--
AFL-SB15	2	7	ND	ND	ND	ND
AFL-SB15	40	7	ND	--	--	--
AFL-SB25	25	7	ND	--	--	--
AFL-SB25	30	7	ND	--	--	--
AFL-SB25	40	7	ND	--	--	--
AFL-SB25	60	7	ND	--	--	--
AP32-SB04	15	7	ND	--	--	--
AP32-SB11	35	7	ND	--	--	--
AP33-SB08	2	7	ND	ND	ND	ND
A360-SB16	20	6	ND	--	--	--
A360-SB17	45	6	ND	--	--	--
A360-SB19	20	6	ND	--	--	--
A362-SB02	20	6	ND	--	--	--
A362-SB02	60	6	ND	--	--	--
A362-SB03	20	6	ND	--	--	--
A364-SB26	5	6	ND	ND	ND	ND
A365-SB23	15	6	ND	--	--	--
AP32-SB04	25	6	ND	--	--	--
AP32-SB04	50	6	ND	--	--	--
A360-SB17	20	5	ND	--	--	--
A360-SB27	15	5	ND	--	--	--

BGPAA 1024

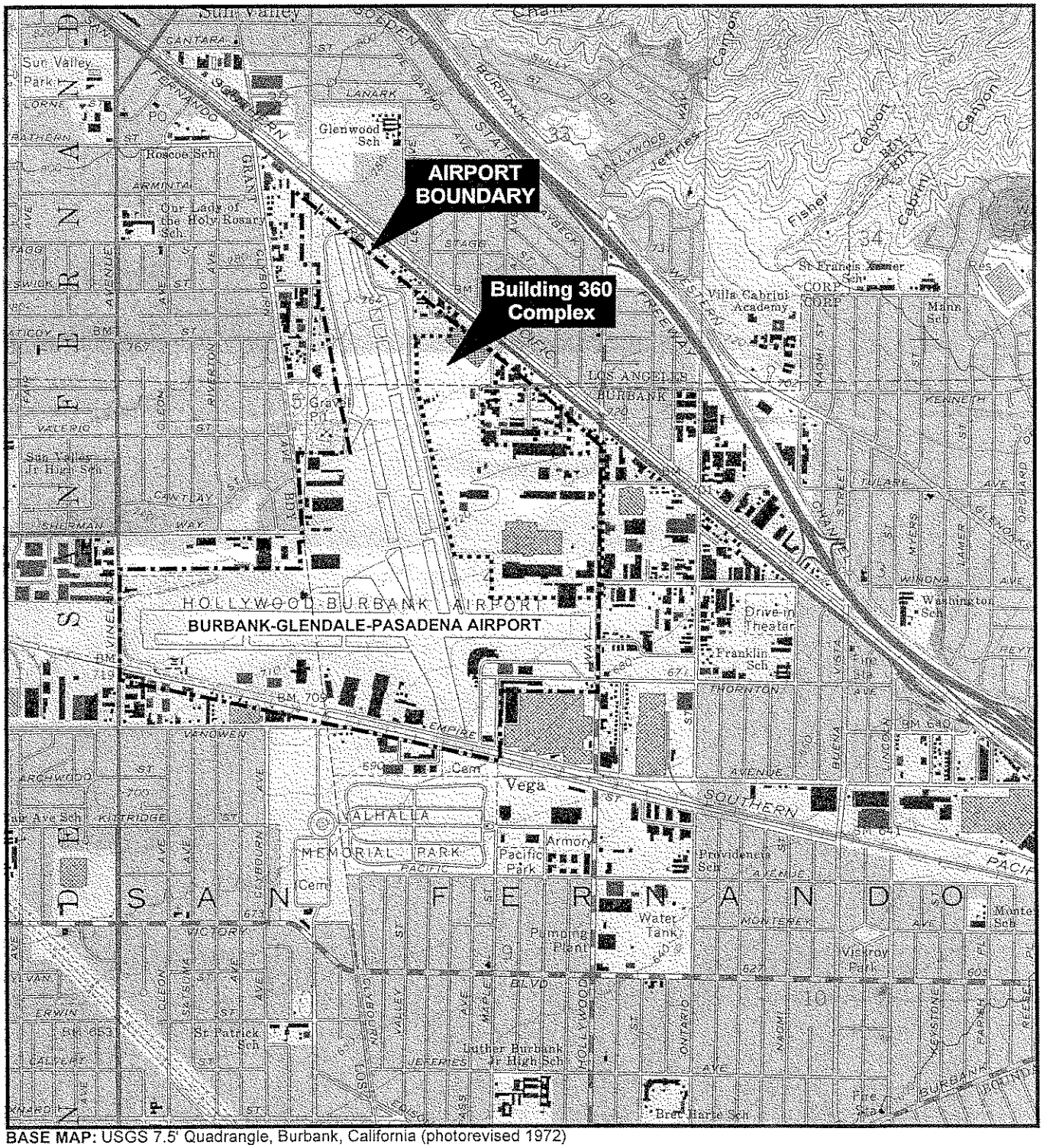
TABLE 2A - HITS ONLY
Soil Boring Analytical Results
Former Building 360 Complex

Boring No.	Sample Depth	Total Petroleum Hydrocarbon, (mg/kg)	Volatile Organic Compounds (ug/kg)	Semi-Volatile Organic Compounds (ug/kg)	Polychlorinated Biphenyl (ug/kg)	17 CAM Metals (mg/kg)
A362-SB02	40	5	ND	--	--	--
AP32-SB04	45	5	ND	--	--	--
AP32-SB11	40	5	ND	--	--	--
AP33-SB10	10	5	ND	ND	ND	ND
NOTES:						
ND = indicates a non-detected concentration within the Practical Quantitative Limit (PQL) for the analytical method						
(--) = Sample not analyzed						
4400* = concentration of bis (2-ethylhexyl) phthalate						

BGPAA 1025

TABLE 3
Photoionization Detector
Organic Vapor Results
Former Building 360 Complex

Sample Number	Sample Depth	Photoionization Detector Reading (ppm)
1	1.0	0.1
2	1.0	0.6
3	1.0	1.8
4	1.0	2.0
5	1.0	0.8
6	1.0	0.6
7	1.0	0.2
8	1.0	ND
9	1.0	ND
10	1.0	ND
11	1.0	ND
12	1.0	ND
13	1.0	ND
14	1.0	ND
15	1.0	ND
16	1.0	ND
17	1.0	0.6
18	1.0	0.6
19	1.0	ND
20	1.0	ND
21	1.0	ND
22	1.0	ND
23	1.0	ND
24	1.0	ND
25	1.0	ND
26	1.0	ND
27	1.0	ND
28	1.0	ND
29	1.0	ND
30	1.0	ND
31	1.0	ND
32	1.0	ND
33	1.0	ND
34	1.0	ND
35	1.0	ND



BASE MAP: USGS 7.5' Quadrangle, Burbank, California (photorevised 1972)

N

0 1000 2000

FEET

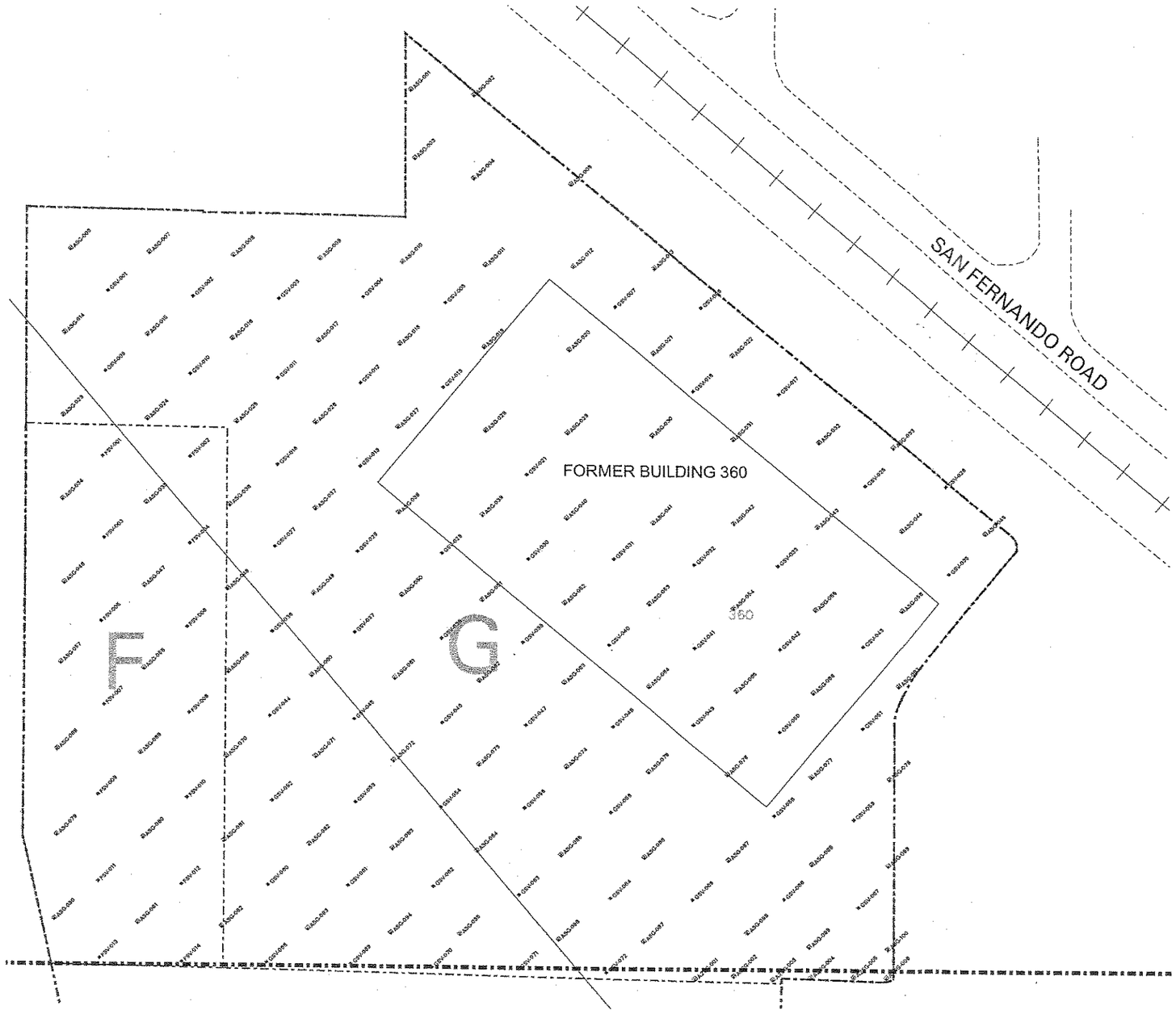
ENSR

FIGURE 1

SITE VICINITY MAP

Burbank-Glendale-Pasadena Airport
Burbank, California

Figure Name: 1123019a.ds4	Date: 9/28/01	Project Number 1123-019	Rev 00
Drawn by: J.Cook	Checked by: LD Parker		



LEGEND

- Soil Vapor Sample Locations
- Property Boundary
- Parcel Lines
- Streets
- Railroad
- City Boundary

N
W E
S

SCALE: 1" = 100'

0 100 200 FEET

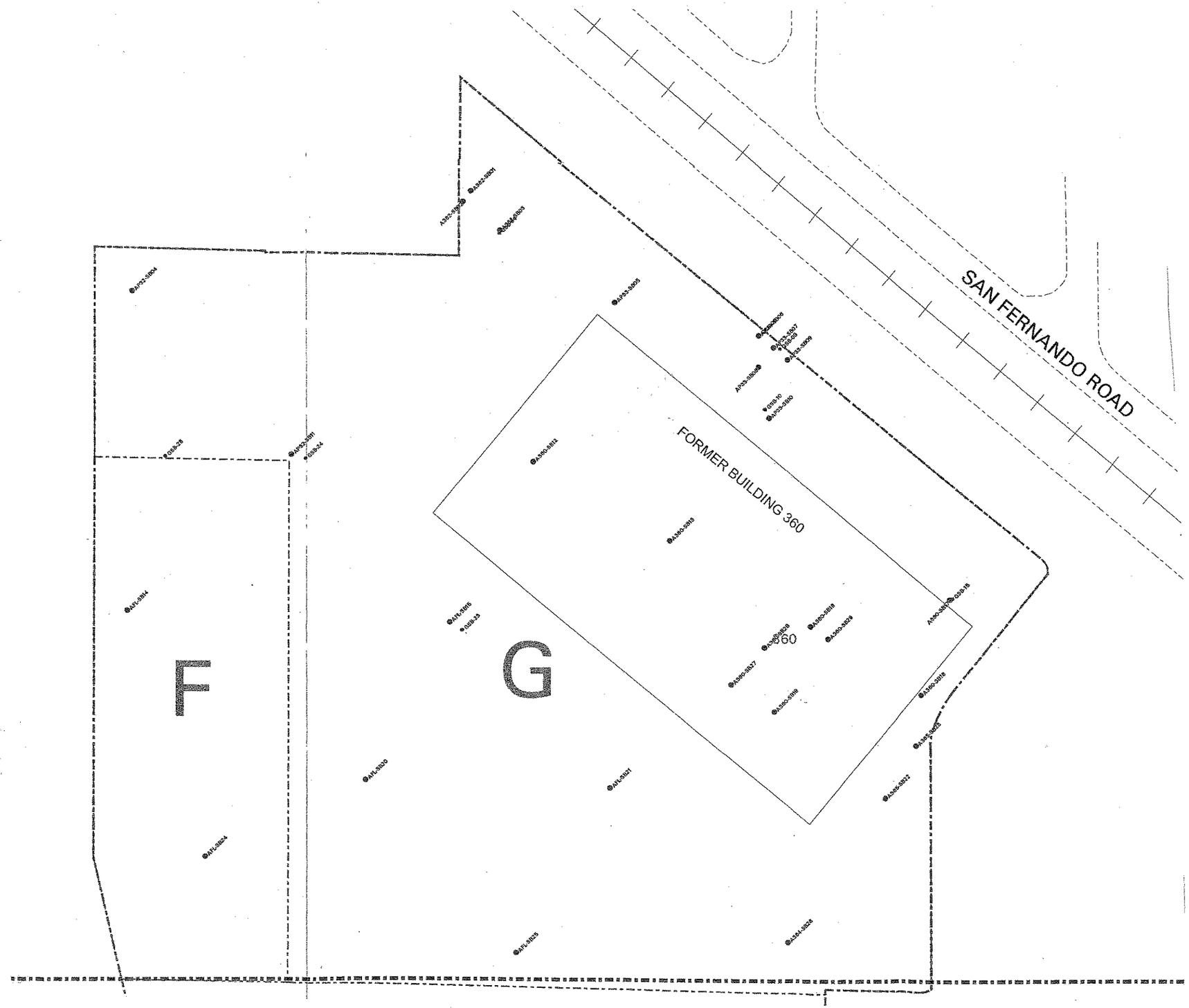
ENSR INTERNATIONAL

FIGURE 2

SOIL VAPOR SURVEY LOCATIONS

Burbank Glendale Pasadena Airport

DRAWN: M. SCOP	DATE: 4/5/02	PROJECT NO.	REV.
FILE NO. SV SURVEY	CHK BY: LDP	1123-019-000	



LEGEND

- Boring Locations
- Property Boundary
- Parcel Lines
- Streets
- Railroad
- City Boundary

N
W E
S

SCALE: 1" = 100'

0 100 200 FEET

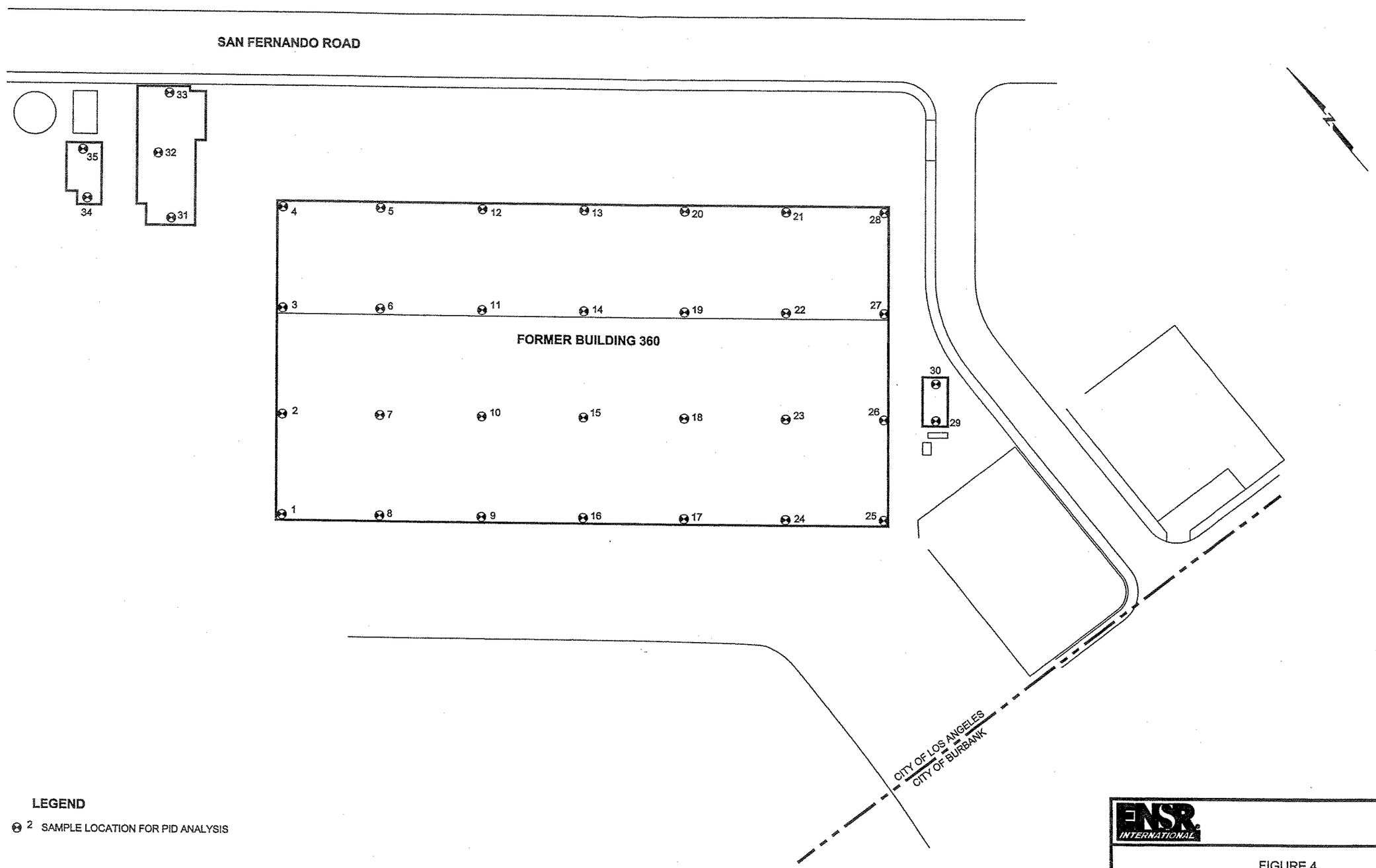
NSR INTERNATIONAL

FIGURE 3

SOIL BORING LOCATIONS

Burbank Glendale Pasadena Airport

DRAWN: M. SCOP	DATE: 4/5/02	PROJECT NO. 1123-019-000	REV.
FILE NO. SB SURVEY	CHK BY: LDP		



LEGEND

⊗ 2 SAMPLE LOCATION FOR PID ANALYSIS

0 50' 100' 200'

SCALE IN FEET

ENSR INTERNATIONAL

FIGURE 4

PID SAMPLE LOCATIONS

Burbank Glendale Pasadena Airport

DRAWN: M. SCOP	DATE: 4/4/02	PROJECT NO.	REV.
FILE NO. samples	CHK BY: LDP	1123-019-000	

ATTACHMENT 1

Regional Water Quality Control Board

No Further Requirements Letters

California Regional Water Quality Control Board

Los Angeles Region

Over 50 Years Serving Coastal Los Angeles and Ventura Counties
Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.swrcb.ca.gov/rwqcb4

APR-05-2002 09:54

File

December 19, 2001

Mr. Dan Feger
Burbank-Glendale-Pasadena Airport Authority
2627 Hollywood Way
Burbank, CA 91505-1055

NO FURTHER REQUIREMENTS (SOIL ONLY), BUILDING 360 COMPLEX, FORMER LOCKHEED MARTIN PLANT B-6, 2801 N. HOLLYWOOD WAY, BURBANK, CALIFORNIA (FILE NO. 104.0674)

Dear Mr. Feger:

We have reviewed the *Environmental Monitoring Report, Former Plant B-6 – Building 360 Complex, Burbank, California* dated October 3, 2001. This report describes the results of sampling and visual inspection conducted during the demolition of the Building 360 Complex at the former Lockheed Plant B-6. The purpose of the monitoring was to document the environmental condition of the soil directly beneath building slabs and foundations as these features are demolished. This monitoring was conducted based on the *Foundation and Infrastructure Demolition Monitoring Plan, Plant B-6: Burbank, California* dated January 23, 1997 which was previously approved by Regional Board staff in a letter to Lockheed Martin dated March 13, 1997. The report also summarizes the results of a supplementary soil gas investigation. Based on the results of the demolition monitoring and supplementary soil gas survey, the Burbank-Glendale-Pasadena Airport Authority (BGPAA) requested closure of the Building 360 Complex.

FINDINGS:

1. The Building 360 site consists of two parcels (Parcels F and G) at the northern section of the former Lockheed Plant B-6. Parcels F and G both add up to approximately 22 acres adjacent to the Burbank-Glendale-Pasadena Airport. Lockheed first used Parcels F and G during the early 1940's for parking and servicing aircraft. In 1957, Lockheed constructed Building 360 and other structures to support aircraft flight operations, testing and maintenance.

2. As part of the environmental site assessment, Lockheed subdivided Plant B-6 into 6 areas (Areas "A" through "F"). Parcels F and G were designated as Area "A". Between June 22, 1993 and July 6, 1993, a soil boring program was completed in Area "A" to document the presence or absence of contaminants beneath 18 potential source areas. These areas were identified based on site inspections and a review of previous investigation reports. A total of 270 soil samples were collected from 29 borings drilled to a maximum depth of 60 feet below ground surface (bgs) at potential source and non-point source areas. All samples were analyzed

for Total Recoverable Petroleum Hydrocarbons (TRPH) using EPA Method 418.1, volatile organic compounds (VOCs) using EPA Method 8240, polychlorinated biphenyls (PCBs) using EPA Method 8080, semi-VOCs using EPA Method 8270, and heavy metals using EPA Method 6000/7000 series. Samples from a former service station were also analyzed for Total Extractable Hydrocarbons (TEH) using EPA Method 8015 Modified.

Laboratory analyses detected contaminants with the following maximum concentrations: 1,081 mg/kg (2 feet bgs) of TRPH; 28 µg/kg of acetone; 82 µg/kg of methylene chloride; 12 µg/kg of napthalene; 6 µg/kg of 1,2,4-trimethylbenzene; 9 mg/kg of TEH and 4.4 mg/kg of bis (2-ethylhexyl) phthalate. PCBs were not detected in any of the samples analyzed. The concentrations of heavy metals, including chromium (total), were below the Total Threshold Limit Concentration (TTLC) and the Soluble Threshold Limit Concentration (STLC) based on the California Code of Regulations Title 22 (CCR, Title 22). Chromium (total) was detected at a maximum concentration of 19.1 mg/kg (10 feet bgs in boring A360-SB13). In July 1996, TRPH and VOC impacted soil in the area of former boring SB28 was excavated to a maximum depth of 20 feet. TRPH, TEH and VOCs were not detected in confirmation samples.

3. Between March 3, 1993 and June 2, 1993, a total 96 soil vapor samples were collected at 6 feet bgs adjacent to potential source areas and on a 100-foot grid throughout Area "A". Low VOC concentrations (< 4 µg/L) were detected, including tetrachloroethene (PCE), trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). VOC concentrations detected were below the Regional Board's VOC soil screening level of 116 µg/kg for groundwater protection.

4. Based on the investigation results, Regional Board staff issued *no further requirements* letters for Parcels F and G on July 26, 1996 and August 2, 1996, respectively.

5. In 1997, the ownership of the former Plant B-6 site was transferred to the BGPAA. During the same year, the BGPAA collected additional soil gas samples at depths of 10 and 20 feet bgs throughout the Building 360 area. Total VOCs detected ranged from non-detect to 52.3 µg/L (10 feet bgs).

6. Between April and September 2001, the BGPAA demolished all structures within the Building 360 Complex. Demolition activities included the removal of concrete slabs and foundations. The soil condition beneath the slabs and foundations were monitored for signs of contamination, such as staining, discoloration, odor or elevated photoionization detector (PID) readings. Based on a 100-foot grid, 35 soil samples were collected for headspace analysis approximately 1 foot below the slabs and foundations. Except for two samples, the majority of the samples had PID readings below the detection limit of 1 part per million (ppm). A maximum PID reading of 2 ppm was recorded. Organic vapors were not detected in ambient air samples.

Groundwater

1. Groundwater beneath the Building 360 area is approximately 273 feet bgs as measured in monitoring well 4948 on January 22, 2001. Based on water quality data from 1989 through 1997, heavy metals, including barium, lead, manganese and zinc have been detected at concentrations below the Maximum Contaminant Level (MCL) in monitoring wells 4948 and B6-CW17 located upgradient and downgradient, respectively from Building 360. Chromium (total) has not been detected in the above monitoring wells during the same monitoring period.

2. Elevated concentrations of VOCs (primarily PCE and TCE) have been detected in groundwater monitoring wells 4948 and B6-CW17. For example, PCE and TCE were detected at maximum concentrations of 710 µg/L and 140 µg/L, respectively in downgradient well B6-CW17. Under a Consent Decree with the U.S. Environmental Protection Agency, Lockheed Martin is extracting and treating VOC-polluted groundwater within the Burbank Operable Unit including the Plant B-6 area.

CONCLUSIONS:

Based on the subject submittal and other information in our files, we have no further soil requirements with respect to the San Fernando Valley Cleanup Program. The concentrations of heavy metals detected in soil matrix samples were below the TTLC and the STLC criteria based on the CCR, Title 22. Based upon the above information, these contaminants remaining in the soil appear not to pose a significant threat to groundwater quality. Therefore, further soil assessment or cleanup is not required. Water quality data obtained from monitoring wells in the vicinity of Building 360 indicate that some heavy metals have been detected in the groundwater, including barium, lead, manganese and zinc. However, these contaminants were also found in a monitoring well upgradient from Building 360. Based upon current concentrations of heavy metals in the groundwater beneath the site, groundwater cleanup is not required. However, the Regional Board will consider groundwater cleanup for heavy metals in the future if new information is obtained, such as concentrations that exceed drinking water standards or heavy metal pollution that threatens drinking water wells or water quality of lower aquifers.

VOC and TRPH impacted soil detected in the former boring SB28, located in a former degreaser and spray booth, was excavated to a maximum depth of 20 feet. bgs. TRPH, TEH and VOCs were not detected in confirmation samples. VOC concentrations detected in soil and soil gas samples beneath the Building 360 area are below the Regional Board's VOC screening concentrations for groundwater protection. Currently, Lockheed Martin is extracting and treating VOC-polluted groundwater within the Burbank Operable Unit under a Consent Decree with the U.S. Environmental Protection Agency.

The soil only *no further requirements* determination for Building 360 Complex does not affect the current or future requirements related to cleanup of polluted groundwater underlying the subject site. In addition, assessment or cleanup may be needed in the event that new information is obtained, such as previously undiscovered subsurface features or signs of soil contamination discovered during future site redevelopment activities. This Regional Board's "no further requirements" decision does not affect the jurisdictional requirements of other agencies, such as the U.S. Environmental Protection Agency. Such agencies may choose to make their own determinations regarding the site.

If you have any questions, please call Alex Carlos at (213) 576- 6726.

Sincerely,

Dennis A. Dickerson
Executive Officer

cc: Michael Lauffer, Office of the Chief Counsel, State Water Resources Control Board
Robert Sams, Office of the Chief Counsel, State Water Resources Control Board
Diane Strassmaier, U.S. EPA, Region IX
Sayareh Amirebrahimi, Department of Toxic Substances Control, Glendale Regional Office
Paul Lisak, L. A. County Fire Dept., Health Hazmat
Mel Blevins, ULARA Watermaster
Robert Ovrom, City of Burbank
Bruce Feng, City of Burbank
Roger Baker, City of Burbank
Dennis Barlow, City of Burbank
Devin Burns, City of Burbank
Dan Feger, Burbank-Glendale-Pasadena Airport Authority
David Parker, ENSR International

STATE OF CALIFORNIA—ENVIRONMENTAL PROTECTION AGENCY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
101 CENTRE PLAZA DRIVE
MONTEREY PARK, CA 91754-2156
(213) 266-7500
FAX: (213) 266-7600

COPY

L.E.S.A.T. B.P.O.
DATE REC'D. 7/19/96
WBS # Helgerson
COPIES TO: Yuen
Blackman
Levesque, Gilbert

July 18, 1996

Ron N. Helgerson
Lockheed Martin Corporation
Burbank Program Office
2550 North Hollywood Way, Suite 305
Burbank, CA 91505-1055

No Further Requirements, Parcels D and F, Lockheed Plant B-6 West, (File No. 104.0674)(Cleanup & Abatement Order No. 87-161)

We have reviewed your July 5, 1996, letter requesting closure for Parcels D and F of Plant B-6 as notated on the attached map. Upon review of the subject proposal and other information in our files, we have the following comments with respect to the Well Investigation Program:

Parcel D

1. A total of 228 soil matrix samples were collected from 28 boreholes during assessment in this area. The highest TPH concentration detected was 3,680 mg/kg at 2' bgs. The only VOCs detected in these samples were acetone (maximum 40 ug/kg), MEK (maximum 12 ug/kg), toluene (maximum 21 ug/kg) and xylenes (maximum 23 ug/kg). No significant levels of PCB's, metals or other contaminants were detected.

2. A total of 104 soil gas locations were sampled in the subject parcel. Elevated concentrations of PCE (maximum 166 ug/l), TCE (maximum 4 ug/l), 1,1,1-TCA (maximum 5 ug/l) and methylene chloride (maximum 133 ug/l) were detected in shallow samples. The highest VOC concentration in samples collected at depth below the highest shallow VOC concentrations was approximately 7 ug/l at 20' bgs. Ground water is at approximately 250' bgs in this area.

3. The ground water monitoring well located on this property may be a key well in the network established by USEPA and may be needed to evaluate adjacent properties. One or more additional wells may be required in the future to accomplish these objectives if this well is destroyed for new construction.

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LDR 10 1808

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LWL2 002320

BGPAA 1036

Parcel F

1. Acetone (maximum 16 ug/kg) was the only VOC detected above detection limits in the 28 soil matrix samples collected from 3 soil borings in this area. Total petroleum hydrocarbons (maximum of 252 mg/kg at 2' bgs) were detected in near surface samples. No other compounds were detected in any of the soil samples.

2. No VOCs were detected in any of the soil gas samples collected from eighteen locations during the initial soil gas investigation in this parcel.

Based on our inspections and information submitted, we have no further requirements with respect to the Well Investigation Program for the subject two parcels. The soil contamination detected on these parcels is not a threat to ground water quality and therefore cleanup is not necessary. This "no further requirements" determination for these two parcels does not affect requirements for assessment and cleanup on the other adjacent parcels covered by our Cleanup and Abatement Order No. 87-161. We have no information concerning other conditions that would adversely impact the value or usage of these properties. However, additional assessment or remediation may be needed depending on future use of these sites.

The jurisdictional requirements of other agencies, such as the U.S. Environmental Protection Agency, are not affected by this Board's "no further requirements" decision. Such agencies may choose to make their own determinations regarding the site.

We are pleased to release these two parcels from the obligations of the cleanup and abatement order. Your cooperation in completing the required work is appreciated. If you have any questions, please contact Alex Carlos at (213) 266-7583.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

cc: Mr. Jorge Leon, SWRCB, Office of the Chief Counsel
Mr. David Seter, USEPA, Region IX
Mr. Hamid Saebfar, CALEPA, DTSC, Region 3
Mr. Josef Solares, Burbank Fire Department, UST Section
Mr. Mel Blevins, ULARA Watermaster
Mr. Tom Blackman, Lockheed Martin
Mr. Bob Gilbert, Lockheed Martin
Ms. Michelle Levesque, Lockheed Martin

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LDR 10 1809

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LWL2 002321

BGPAA 1037

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
101 CENTRE PLAZA DRIVE
MONTEREY PARK, CA 91754-2156
(213) 266-7500
FAX: (213) 266-7600

E.S.A.T. E.P.O.

DATE REC'D. 8/7/96

WBS # 2A

COPIES TO: Helgerson, Yuya, Matsushita, Blackmon, Gilbert, Lovesque (Fisher)

LDR 10 1806

August 2, 1996

Ron N. Helgerson
Lockheed Martin Corporation
Burbank Program Office
2550 North Hollywood Way, Suite 305
Burbank, CA 91505-1055

No Further Requirements, Parcel G, Lockheed Plant B-6 West
(File No. 104.0674)(Cleanup & Abatement Order No. 87-161)

We have reviewed the July 26, 1996, letter requesting closure for Parcel G of Plant B-6 as notated on the map that accompanied the letter. Upon review of the subject proposal and other information in our files, we have the following comments with respect to the Well Investigation Program.

During multiple phases of assessment, a total of 242 soil matrix samples were collected and analyzed from 26 boreholes on this parcel. Laboratory analysis of these samples detected maximum concentrations of 1,081 mg/kg TRPH at 2' bgs, 28 ug/kg acetone, 82 ug/kg methylene chloride, 12 ug/kg napthalene, 6 ug/kg 1,2,4-trimethylbenzene, and 4.4 mg/kg of bis(2-ethylhexyl)phthalate at 10' bgs. Supplemental sampling demonstrated that the extent of soil contamination is limited to small areas and shallow depths. Laboratory analysis of a total of 96 shallow (6' bgs) soil vapor samples detected only low concentrations of PCE (maximum 3.1 ug/L), TCE (maximum 1.3 ug/L) and 1,1,1-TCA (maximum 2.2 ug/L). Ground water is at approximately 220' bgs in this area.

Based on our inspections and information submitted, we have no further requirements with respect to the Well Investigation Program for the subject parcel. The soil contamination detected on this parcel is not a threat to ground water quality and therefore cleanup is not necessary. This "no further requirements" determination for this parcel does not affect requirements for assessment and cleanup on the other adjacent parcels covered by our Cleanup and Abatement Order No. 87-161. We have no information concerning other conditions that would adversely impact the value or usage of this property. However, additional assessment or remediation may be needed depending on future use of this site.

The jurisdictional requirements of other agencies, such as the U.S. Environmental Protection Agency, are not affected by this Board's "no further requirements" decision. Such agencies may choose to make their own determinations regarding the site.

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We are pleased to release this parcel from the obligations of the cleanup and abatement order. Your cooperation in completing the required work is appreciated. If you have any questions, please contact Alex Carlos at (213) 266-7583.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

cc: Jorge Leon, SWRCB, Office of the Chief Counsel
David Seter, USEPA, Region IX
Hamid Saebfar, CALEPA, DTSC, Region 3
Josef Solares, Burbank Fire Department, UST Section
Mel Blevins, ULARA Watermaster
Tom Blackman, Lockheed Martin Corporation
Bob Gilbert, Lockheed Martin Corporation
Michelle Levesque, Lockheed Martin Corporation

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LDR 10 1807

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