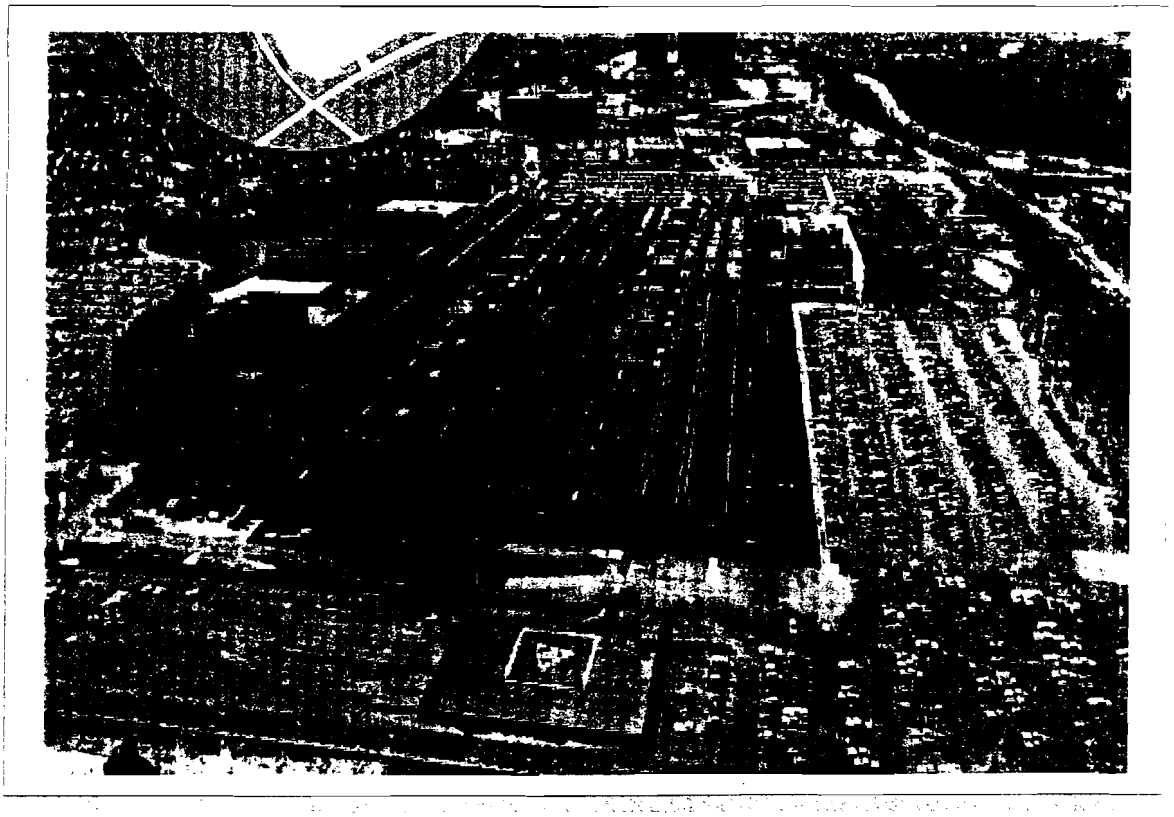
FINAL WORK PLAN

Soil Gas Survey Work Plan
Lockheed Martin Tactical Defense Systems
365 Lakeville Road
Great Neck, New York



LOCKHEED MARTIN
BURBANK PROGRAM OFFICE

Tetra Tech
Environmental Engineers & Scientists
TC-1505-01/June 20, 1997

Lockheed Martin Tactical Defense Systems
Soil Gas Survey
Work Plan

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Section 1
Introduction

On behalf of Lockheed Martin Corporation, Tetra Tech, Inc. has prepared the following Work Plan to conduct a soil gas survey of the Lockheed Martin Tactical Defense Systems (LMTDS) facility. The LMTDS facility is located at 365 Lakeville Road in Great Neck, New York. The objective of this soil gas survey is to provide a general areal assessment of the LMTDS property. The information derived from this survey will serve as the basis for further investigations to delineate any potential volatile organic compounds detected at the facility. To provide a consistent evaluation of the property, soil gas sample points will be established in a systematic 100-foot grid pattern across the facility.

This work plan is organized into the following sections:

- Section 2 - Site Overview, presenting a brief description of site background and geology,
- Section 3 - Soil Gas Survey Program, presenting the locations, field sampling methodology, and analytical scheme
- Section 4 - Data Evaluation and Report Preparation, presenting a description of the project deliverables
- Section 5 - References, presenting a list of previous reports referenced in this work plan
- Appendix A - Quality Assurance Project Plan, presenting the proposed methodologies for sample collection, laboratory analysis and quality assurance/quality control program,
- Appendix B - Site Safety and Health Plan, presenting the project specific site safety and health plan for the soil gas survey program.

section 2
Site Overview

2.1 SITE BACKGROUND

The LMTDS facility consists of approximately 94 acres and is located at 365 Lakeville Road in Great Neck, New York - *See Figure 2-1 and Figure 2-2.* The facility was constructed in 1941 and formerly consisted of manufacturing operations for the design and production of a wide range of defense related equipment, navigational systems, and radar tracking systems. Previous manufacturing activities included machining, metal casting, plating, chemical etching, degreasing, painting, metal finishing, and printed circuit board production and assembly. The former manufacturing operations have required the use of fuel oil, paints, cutting oil, acids, caustics, metal plating compounds, and halogenated/non-halogenated hydrocarbon solvents[1]. Currently, all manufacturing operations have been discontinued and present use of the facility includes program administration and engineering of on-going government contracted projects, prototype assembly and electronics integration, testing and development.

2.2 SITE GEOLOGY

The underlying soil at the facility consists of fine to medium grained sands. These sands are approximately 400 feet thick. A 100 to 150 foot thick clay layer separates the sands from lower geologic units. Groundwater at the site is encountered at 90 to 100 feet below ground surface (bgs).

[1] Information obtained from the Phase I Environmental Assessment Report prepared by H2M Associates, Inc. dated April 1997

FIGURE 2-1
SITE LOCATION MAP

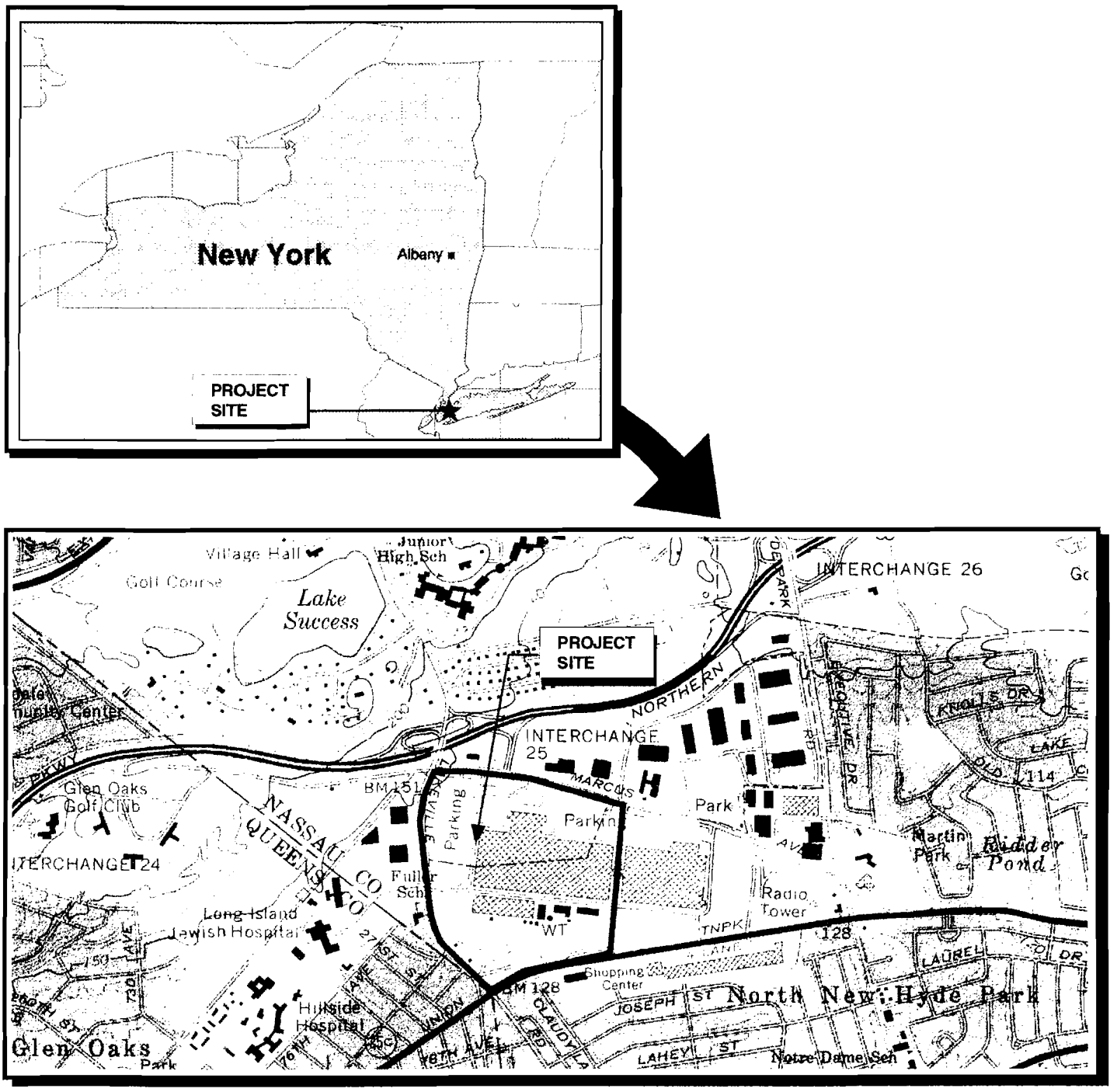
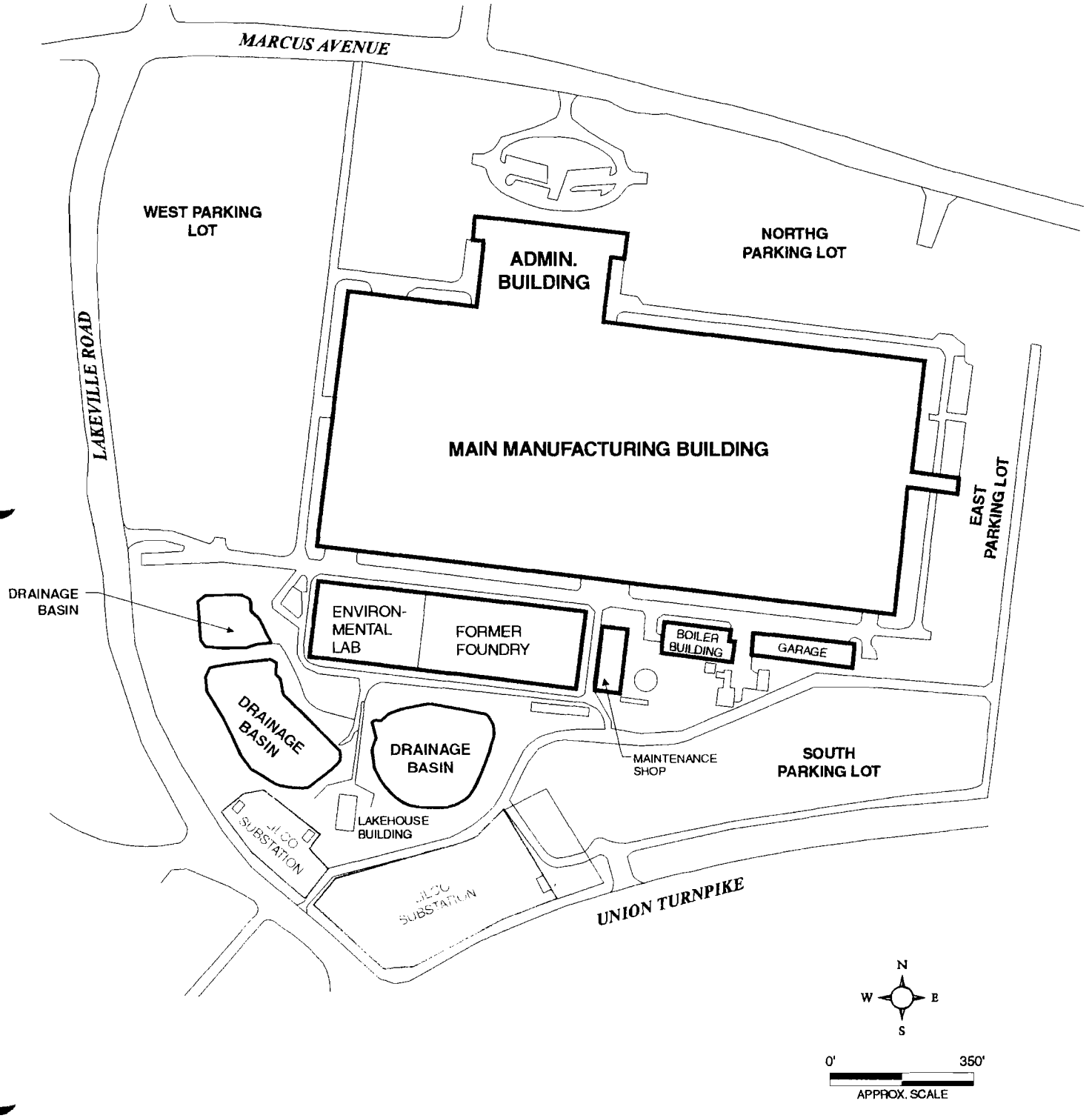


FIGURE 2-2
SITE OVERVIEW

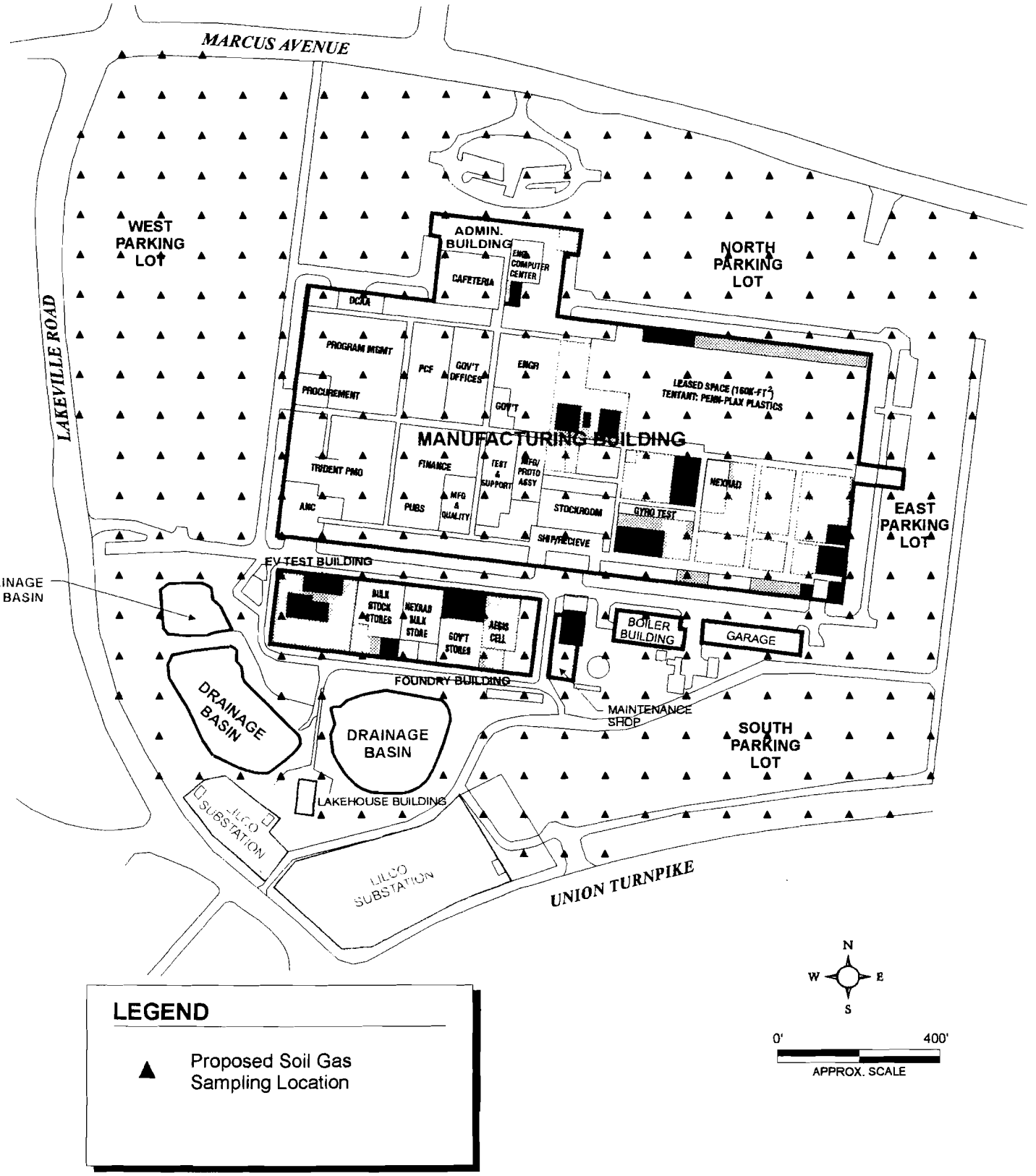


Section 3
Soil Gas Survey Program

The objective of the soil gas survey program will be to determine if Volatile Organic Compounds (VOCs) are present in the shallow subsurface soils beneath the site. Shallow subsurface soil gas sampling will be performed to provide an assessment of the entire site to evaluate all areas where solvents or other chemicals may have had the potential to have been discharged to the environment based on past operations at the facility.

In order to provide a comprehensive assessment of the site, soil gas samples will be collected from 100-foot grid locations throughout the entire property, including interior building areas. Based on the 100-foot grid pattern, 375 proposed locations will require shallow soil gas investigation. Each of these 375 locations will be assessed by collecting and analyzing soil gas samples from 5 to 6 feet below the ground surface (bgs). The collection of these soil gas samples will be accomplished by driving a steel rod to a target depth of bgs and extracting vapor through a sampling tube set within the steel rod. A detailed description of the shallow soil gas sampling and analysis procedures is presented in Section 3.1. A map of the proposed sampling locations is shown in Figure 3-1.

FIGURE 3-1
PROPOSED SOIL GAS SAMPLING LOCATIONS



3.1 TECHNICAL APPROACH

The purpose of the shallow soil gas sampling is to determine if VOCs are present in shallow subsurface soil beneath the site. Therefore, in order to fully evaluate the shallow soils for potential VOCs, a grid of shallow soil gas samples will be collected throughout the entire site. The intent of the shallow soil gas sampling will be to either detect and quantify VOCs at the facility or provide sufficient data to provide verification that no further assessment is warranted. The details of the proposed field methodologies are presented in Sections 3.1.1 to 3.1.4.

3.1.1 Site Preparation

The proposed soil gas survey points will be marked in paint, based on the locations identified in Figure 3-1. Prior to initiating the field activities, an underground utility location service will be notified to mark public utility lines. Additionally, a combination of facility drawings, ground penetrating radar (GPR), and electromagnetic resistivity (EM) will be used to clear all proposed soil gas sampling points. Utility lines which cross the proposed sampling locations will be identified and the sampling points will be relocated as necessary.

3.1.2 Shallow Soil Gas Collection

Shallow soil gas samples will be collected from a depth of 5 feet bgs. Sampling probes will be connected to $^1/_4$-inch Nylaflow™ tubing set within a steel rod driving pipe. The steel rods will be used to drive the vapor sampling probes to the desired sampling depth. The sampling probes will be driven to the 6 foot depth using a Geoprobe system that will allow penetration through coarse sediments. Once the probe has reached the desired sampling depth, the steel rod will be withdrawn approximately 6-inches to create a sampling annulus.

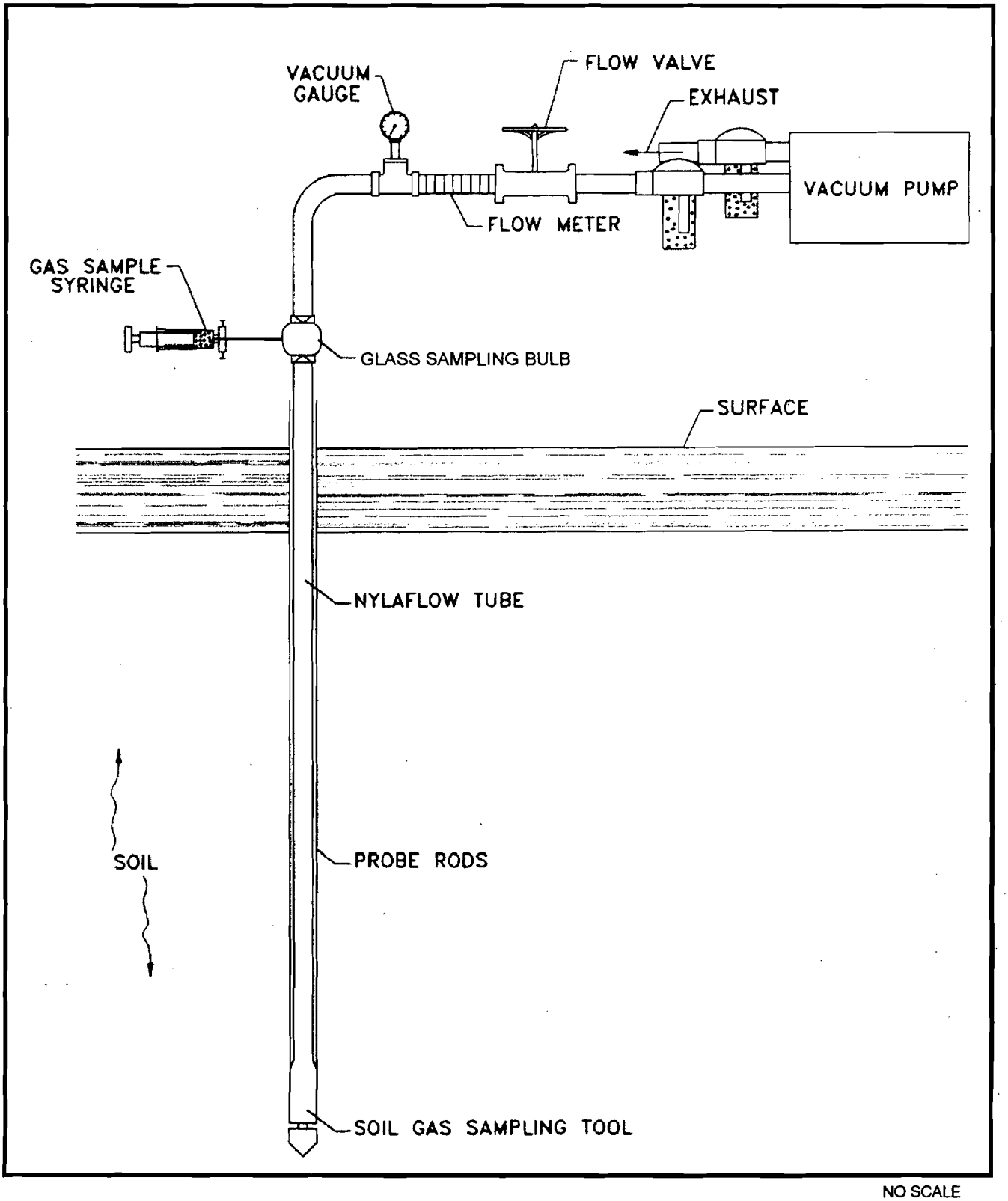
All down-hole sampling equipment will be decontaminated between soil gas points. At the completion of the soil gas sampling, the open boring will be backfilled with bentonite / cement grout.

3.1.3 Shallow Purging and Sampling of Vapor Probes

Soil gas samples will be collected using a soil gas sampling system shown in Figure 3-2. The soil gas sampling system will be constructed of stainless-steel, glass, Nylaflow™ , and Teflon™ components. Instrumentation associated with the sampling system will include a calibrated flow-meter and vacuum gauge. Vacuum integrity of the sampling system will be tested prior to, and after the soil gas survey. Soil gas sampling probes will be purged at a flow rate of approximately 150 milliliters per minute (ml/min).

An initial purge test will be performed to evaluate the appropriate volume of gas to be purged prior to sample collection. The purge test will consist of extracting 1, 2, 4, 6, 8 and 10 times the Nylaflow™ tube and sample probe volume prior to analysis. Analytical results associated with each purge volume will be plotted to determine the optimal purge volume prior to sampling. After purging, soil gas samples will be collected from the sample stream using a glass bulb with gas-tight valves. Samples will be withdrawn from the glass bulb using a glass syringe fitted with a disposable needle. Soil gas samples will be injected into a gas chromatograph or gas chromatograph/mass spectrometer after collection.

FIGURE 3-2
SHALLOW SOIL GAS SAMPLING SYSTEM



NO SCALE

3.1.4 Soil Gas Sample Analyses

The soil gas samples will be immediately analyzed at a dedicated on-site mobile laboratory. Soil gas samples will be analyzed in the field using a mobile laboratory equipped with a gas chromatograph or a gas chromatograph mass spectrometer. This instrument will be used to analyze soil gas samples for aromatic and halogenated hydrocarbons using a method similar to EPA Method 8010/8020 or EPA Method 8240. The detection limits for the aromatic and halogenated hydrocarbons analyses will be typically one microgram per liter (µg/L). The targeted VOCs are listed below in Table 3-1.

TABLE 3-1

TARGET HALOGENATED AND AROMATIC ORGANIC COMPOUNDS

Freon-11, 12, 113	cis-1,2-Dichloroethene	Tetrachloroethene
Vinyl Chloride	Chloroform	1,1,1,2-Tetrachloroethane
Chloroethane	1,1,1-Trichloroethane	Ethylbenzene
Trichlorofluoromethane	Carbon Tetrachloride	meta/para - Xylene
1,1,2-Trichloro-trifluoroethane	Benzene	ortho - Xylene
1,1-Dichloroethene	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Methylene Chloride	Trichloroethene	1,1,2-Trichloroethane
trans-1,2-Dichloroethene	Toluene	1,1-Dichloroethane

Section 4
Data Evaluation and Report Preparation

Tetra Tech will evaluate the analytical soil gas data and plot isoconcentration contours of volatile organic compounds detected at the facility upon receipt of the analytical results. A Final Report that presents the data, technical evaluation of the results and recommendations will be prepared at the completion of the soil gas survey.

Section 5
References

1. Phase I Environmental Assessment Report
Lockheed Martin Tactical Defense Systems
H2M Associates, Inc., April 1997

Appendix A

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1.0 INTRODUCTION

Tetra Tech, Inc. has been contracted by the Lockheed Martin Corporation to conduct a subsurface soil gas survey at the Lockheed Martin Tactical Defense Systems facility in Great Neck, New York. The purpose of the soil gas survey is to provide a preliminary assessment of the entire property to identify the presence or absence of Volatile Organic Compounds (VOCs) in the shallow subsurface soils beneath the site

This Quality Assurance Project Plan (QAPjP) provides the details of the methodologies to be followed during Tetra Tech's soil gas survey program including sampling and vapor extraction procedures, laboratory testing, and QA/QC procedures. The scope of work addressed in this QAPjP is limited to shallow subsurface soils.

2.0 SOIL GAS SAMPLING PROCEDURES

2.1 Selection of Sampling Locations and Sample Analyses

The primary objective of this soil gas survey is to determine if VOCs are present in the shallow subsurface soils beneath the entire site. In order to conduct a comprehensive assessment, soil gas samples will be collected at 100-foot grid locations throughout the entire site.

The proposed soil gas survey sampling points will be marked by Tetra Tech staff based on the locations identified in the Work Plan. Prior to initiating field activities, a combination of facility drawings, ground penetrating radar (GPR), electromagnetic resistivity (EM), and an underground utility location service will be used to clear all proposed soil gas sampling points. Utility lines which cross the proposed sampling locations will be identified and the sampling points will be relocated as necessary.

2.2 Soil Gas Probe Installation

A self-contained soil gas survey mobile laboratory that includes a gas chromatograph (GC) or gas chromatograph/ mass spectrometer (GC/MS) analytical capability will be used for this project. Soil gas samples will be withdrawn directly from the soil and transported to an on-site laboratory for analysis. Samples will be collected by using a Geoprobe percussion hammer to drive the vapor sampling probes to the desired sampling depth of 5 to 6 feet below ground surface (bgs).

Once the probe has reached the desired sampling depth, the steel rod will be withdrawn approximately six inches, thus allowing the well point to drop off and expose the pipe to the open annulus. Perforated polyethylene tubing (1/4 inch) is inserted through the pipe into the open annulus. A small amount of coarse sand is allowed to flow through the inside of the steel pipe to form a permeable sand pack at the sampling depth. The steel pipe is then withdrawn,

while bentonite slurry is added to seal the sampling zone. The polyethylene tubing is connected to the sampling train, and soil vapor sampling is initiated.

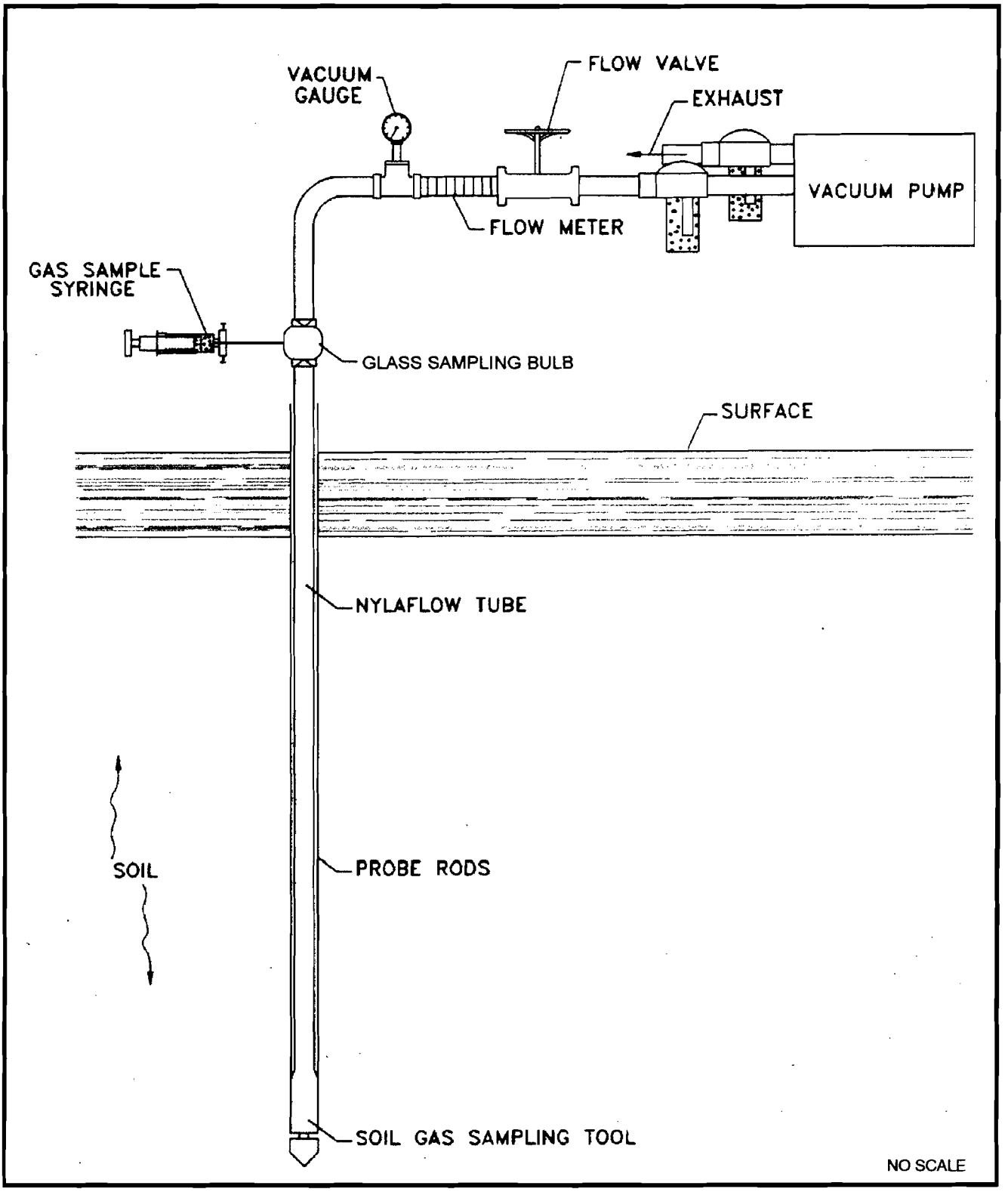
2.3 Soil Gas Sample Collection

An initial purge test will be performed to evaluate the appropriate volume of gas to be purged prior to sample collection. The purge test will consist of extracting 1, 2, 4, 6, 8 and 10 times the Nylaflow™ tube and sample probe volume prior to analysis. Analytical results associated with each purge volume will be plotted to determine the optimal purge volume prior to sampling. After purging, soil gas samples will be withdrawn from the sample stream using a glass sampling bulb. The bulb is fitted with Teflon stopcocks and a viton rubber sampling port. No preservatives are required for the soil gas sample containers. The glass bulb will be connected in-line to a vacuum gage, flow meter, and portable sampling pump - *See Figure 1.* Once the sampling system is determined to be leak tight, the bulb will be opened and a flow of approximately 150 ml/min will be maintained for sample collection. The stopcocks will then be closed and the sample will be retained within the container (glass bulb).

2.4 Decontamination Procedures

Probe installation and sampling equipment in contact with site soil or the soil gas sample stream will be decontaminated prior to collection of each soil gas sample. Decontamination of probe installation equipment will be performed by immersion and scrubbing in Alconox™ detergent solution, rinsing in tap-water, rinsing in VOC-free water, followed by air drying. Decontamination of soil gas sampling equipment will be performed by baking at elevated temperatures (>160° Celsium) inside the GC oven.

FIGURE 1
SHALLOW SOIL GAS SAMPLING SYSTEM



3.0 SAMPLE HANDLING PROCEDURES

Documentation of each step in the sample collection, preservation, handling and analysis process is essential to track and evaluate the validity and quality of the data that will be generated. For documentation of sample collection and handling, Tetra Tech uses three separate forms:

- Soil gas log;
- Sample chain of custody form; and
- Daily field work log.

These forms contain much of the same information and are filled out by different members of the sampling crew which provides an internal cross check of the sampling location numbers, sampling depths, sample numbers, and analyses requested per sample.

The soil gas log is kept by the site manager. Its primary function is to record sample information. However, it is also used to record the depths where samples were collected, sample numbers and the sampling location number.

The soil gas samples will be collected by the laboratory chemist. This individual will seal the sample, prepare the sample label and fill out the sample chain of custody form. The chain of custody forms include the soil gas boring/sampling location numbers, the individual sample numbers and the analyses. The sampler will also record the date and time that each sample is collected and comments about any sampling difficulties.

The third form (daily work log) is kept by the field supervisor. This form is used to record and summarize all of the site investigation work completed each day. In addition to recording the names of the personnel on-site, equipment in use, materials used and waste generation information; the daily work log also contains the boring/sampling location numbers completed that day and the number and depths of samples collected.

4.0 ANALYTICAL LABORATORY PROCEDURES

4.1 Soil Gas Sample Analyses

Soil gas samples will be analyzed in the field using a mobile laboratory equipped with a GC or GC/MS. This instrument will be used to analyze soil gas samples for aromatic and halogenated hydrocarbons using a method similar to EPA Method 8010/8020 or EPA Method 8240. The detection limits for the aromatic and halogenated hydrocarbons analyses will be typically one microgram per liter (µg/L).

4.2 Initial Multi-Point Equipment Calibration

The GC or GC/MS used for soil gas analyses will be calibrated using high-purity solvent-based standards obtained from certified vendors. GC calibration standards will be prepared in high-purity methanol solvent. GC calibration using solvent-based standards will be performed using varying injection volumes of the undiluted solvent-based standard. If necessary, stock solvent-based standards will be diluted to an appropriate concentration. Diluted standards will be prepared by introducing a known volume of stock solvent-based standard into a known volume of high-purity solvent.

Initial calibration will be performed for target analyte compounds. The GC will be calibrated using three standard injections to establish a three-point calibration curve. The lowest standard will not be higher than five times the method detection limit (or 5 µg/L), or re-calibration of the GC will be conducted. Identification and quantification of compounds in the field will be based on calibration under the same analytical conditions as for three-point calibration.

4.3 Laboratory Control Sample

A laboratory control sample (LCS) from a different source or lot number other than the initial calibration standard will be used to verify the true concentration of the initial

calibration standard. The LCS included target compounds, and the RF for each compound will be within 15 percent of the initial calibration.

4.4 Daily Mid-Point Calibration Check

Daily field calibration of the GC will consist of a mid-point calibration using standard target compounds. If any compound is outside 25% relative frequency during the daily mid-point calibration, the GC will be re-calibrated. Daily calibration will be performed prior to the first soil gas sample analysis of the day. One-point calibration will be performed for all compounds detected at the site to ensure accurate quantification. Subsequent calibration episodes, if deemed necessary, will consist of at least one injection of the standard exhibiting a similar detector response as that of samples encountered in the field.

4.5 Blank Injections

The syringes used for soil gas sample collection will be periodically filled with ambient air or high-purity carrier-grade gas from a compressed gas cylinder. The ambient air or high-purity gas will be injected directly into the gas chromatograph. Blank injections serve to detect potential cross-contamination of the sampling equipment and to verify the effectiveness of decontamination procedures.

4.6 End of Day GC Test Run

A LCS will be analyzed at the end of each field day. The LCS will contain the same compounds as the daily mid-point calibration standard. The LCS will be procured from a source other than the initial multi-point calibration standard. The RF for each LCS compound will be within 20 percent of the average RF for the initial calibration, or additional LCSs will be analyzed.

5.0 BOREHOLE ABANDONMENT

After sampling, each soil gas tube will be removed and the boreholes will be sealed to eliminate any conduit from the surface to the underlying soil. Each borehole will be backfilled using bentonite chips/cement grout. The surface of each borehole will be paved with asphalt/concrete to match the surrounding pavement.

Appendix B

TETRA TECH SITE SAFETY AND HEALTH PLAN

Site Name: Lockheed Martin Tactical Defense Systems Facility
Soil Gas Survey

Project Number: TC 1505-01

Original Site Safety Plan: Yes (X) No ( ) Revision Number 0

Plan Prepared by Nisha Bansal Date June 20, 1997
Nisha Bansal
Project Manager

Plan Approved by Christine McClain Date June 20, 1997
Christine McClain, CIH
Corporate Health and Safety Manager

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FIGURES

ATTACHMENTS

EMERGENCY PHONE NUMBERS

Person	Title		Phone #
	Fire		911
	Police		911
	Ambulance		911
	Poison control center		911
Dan Batrack	Program Manager		(626) 351-4664
Nisha Bansal	Project Manager		(626) 351-4664
	Nearest on-site phone (Project Site)		(516) 574-1283
Dr. Elayne Theriault	Medical advisor		(800) 229-3674 ext.326
Bob Gilbert	Lockheed Martin, Burbank Client contact		(818) 847-0210
Eric Wang	Lockheed Martin, Burbank Client contact		(818) 847-0511
Tony Dimino	Lockheed Martin, Local Client contact		(516) 574-1283
Al Krischker	Lockheed Martin, Local Client contact		(516) 574-2386
	U.S. EPA-Emergency Response Team		(201) 321-6660
	Centers for Disease Control	(day)	(404) 639-3534
		(night)	(404) 639-2888
	National Response Center		(800) 424-8802
	Superfund/RCRA Hotline		(800) 424-9346
	TSCA Hotline		(800) 424-9065
	National Pesticide Information Service		(800) 845-7633
	Bureau of Alcohol, Tobacco, and Firearms		(800) 424-9555

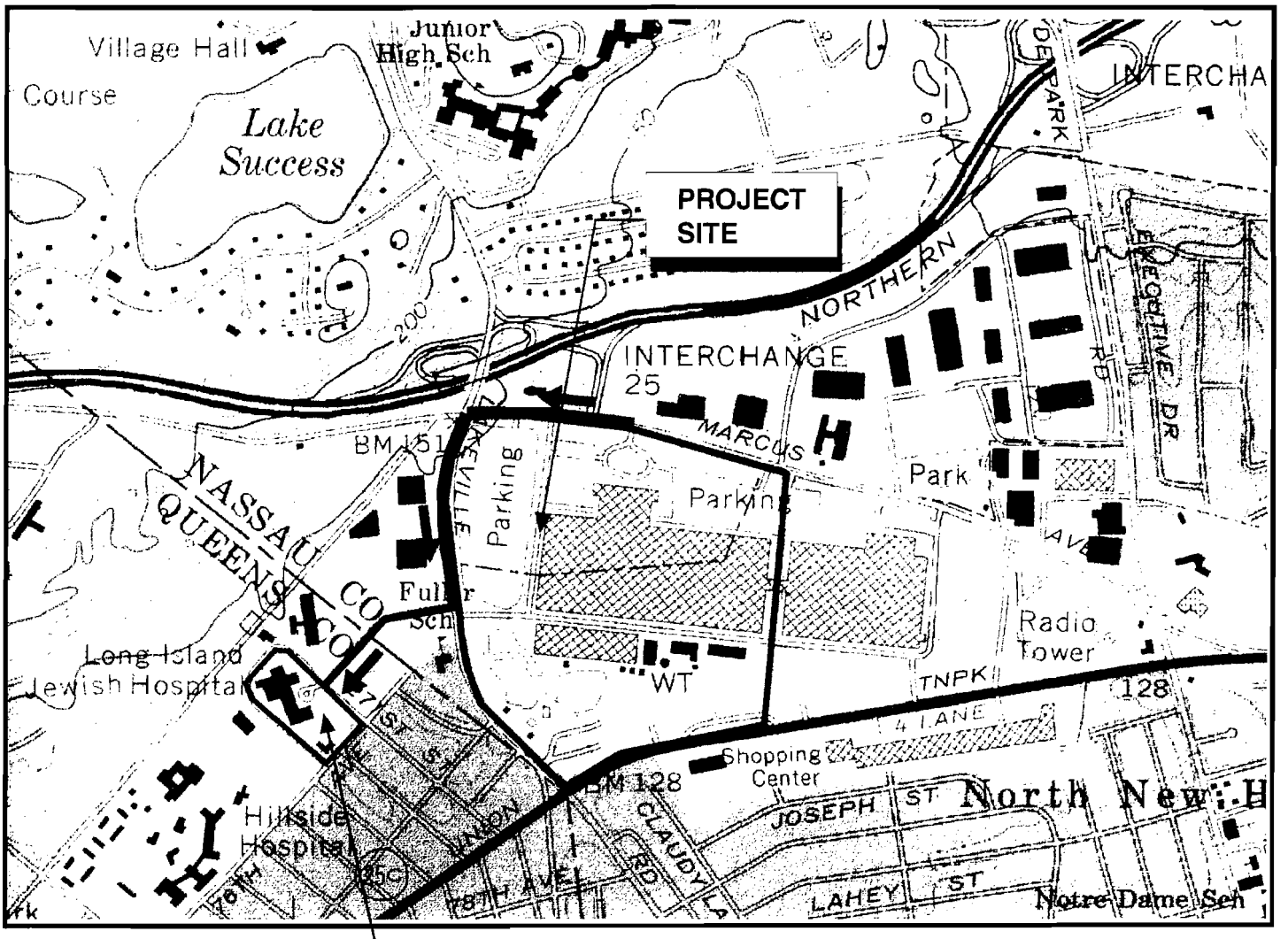
Long Island Jewish Medical Center (718) 470-7000
270-05 76th Avenue
New Hyde Park, New York 11042

Facility emergency response procedures will also be followed.

Written and visual(next page) directions to the nearest hospital:

Turn left from project site onto Marcus Avenue. Proceed west on Marcus Avenue to Lakeville Road and turn left. Proceed south on Lakeville Road to the Long Island Jewish Medical Center.

FIGURE 1
ROUTE TO HOSPITAL



1.0 FACILITY BACKGROUND

1.1 Site Description

Type: Spill ( ) Fire ( ) HW Site ( ) Industrial Facility (X)
Lockheed Martin Tactical Defense Systems (LMTDS)

History: The LMTDS facility was formerly a manufacturing facility for design and production of a wide range of defense related products. The facility was constructed in 1941 and occupies approximately 94 acres.

Physical Description: LMTDS property consists of approximately 94 acres with 1.5 million square feet of buildings (one main building and six support buildings). All manufacturing operations have been discontinued. The surface area of the project site is currently paved with asphalt.

Location: LMTDS is located at 365 Lakeville Road in Great Neck, New York.

Status: Active (X) Inactive ( )
Manufacturing operations have been terminated. Current activity includes program administration and engineering, prototype assembly and electronics integration, testing and development.

Surrounding Population: Industrial/Commercial/Residential

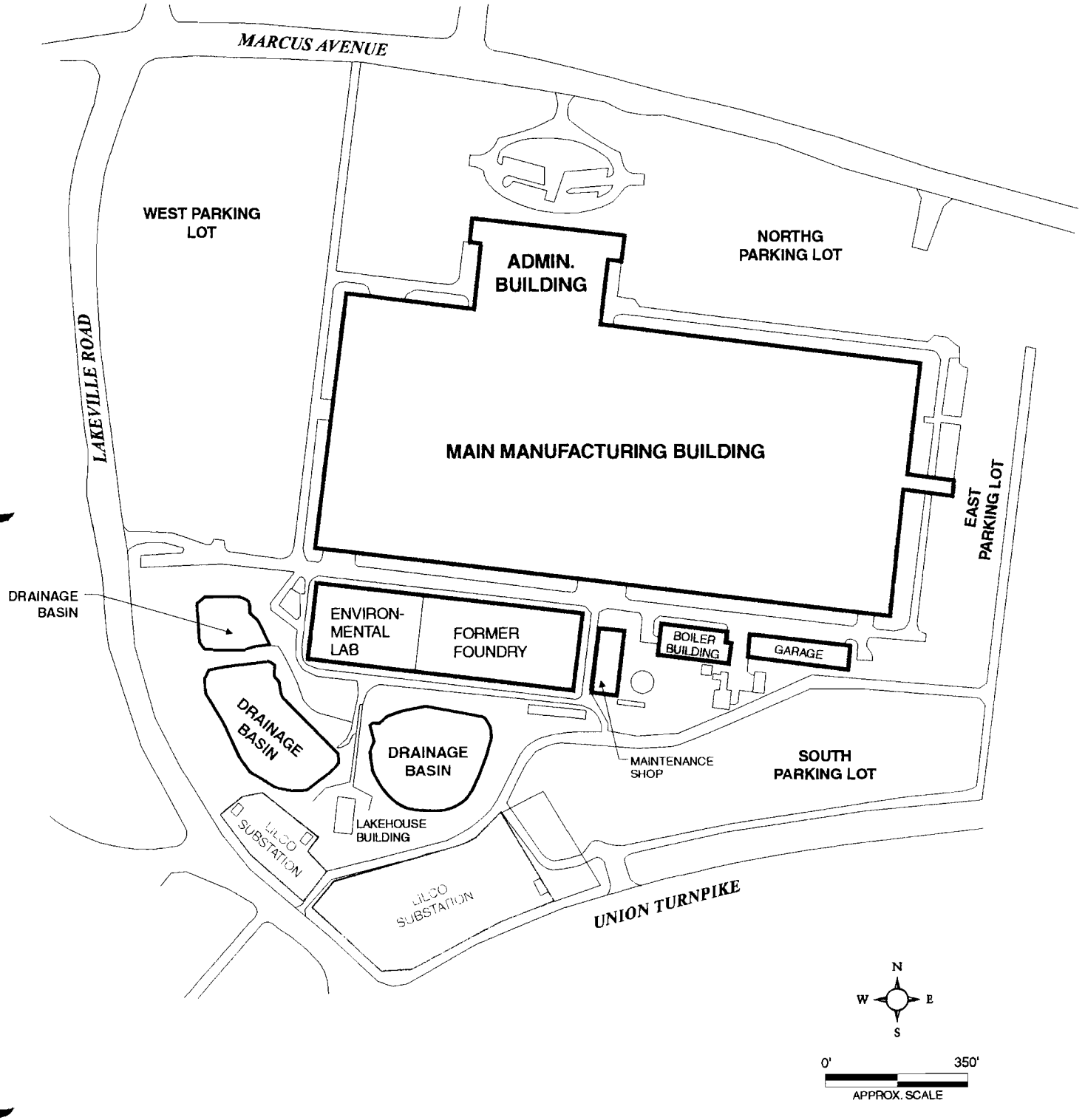
Topography: Generally flat

Site Plan/Sketch completed (next page): Yes (X) No ( )

1.2 Goals

The scope of work for this project is to conduct a preliminary soil gas survey at 100 foot grid locations across the entire site to evaluate the entire property for the potential presence or absence of volatile organic compounds (VOCs) in the subsurface soils. All soil gas samples will be collected from a depth of 5 feet below ground surface using a Geoprobe. Samples will be collected from exterior areas and inside the buildings. All soil gas samples will be analyzed by an on-site laboratory.

FIGURE 2
SITE OVERVIEW



2.0 HAZARD RISK ANALYSIS

2.1 Job Hazard Evaluation

The following is a task-specific evaluation of hazards associated with the soil gas survey. The evaluation includes the types of hazards that may occur and the preventive measures that will be undertaken to reduce the hazard risk.

1) Concrete Coring

Hazards:

- Trauma-related accidents may occur by either mechanical failure or improper handling of the coring machine.
- Noise generated from the coring machine
- Dust (crystalline silica) generated during concrete coring.

Preventive Measures:

- Only trained personnel will be permitted to operate the equipment. These personnel will be outfitted in Level "D" safety equipment, with special emphasis on safety goggles, work gloves and steel-toed boots to reduce the risk of trauma-type injuries.
- Noise hazards will be controlled by wearing hearing protection (i.e. ear plugs).
- Dust will be controlled by using wet methods during concrete coring.

2) Installation of Soil Gas Probes

Hazards:

- Trauma-type injuries may occur by mechanical failure of heavy equipment (Geoprobe), improper storage or handling of equipment and tools, or by accidents (slips, trips, falls) around the job site.
- Potential hazards associated with overhead or subsurface pipelines/obstructions may be present.
- Hazards associated with elevated ambient temperature, such as heat stress or stroke, may occur during field operations.
- Exposure to chemicals in soil that is removed during excavation may be caused through contact, ingestion and/or inhalation pathways.
- Operation of Geoprobe equipment inside the buildings may create a carbon monoxide hazard.
- Hazards associated with vehicular traffic in the parking lots.

- Prior to operation of Geoprobe equipment in the buildings, suspected ACM floor tiles at the proposed sampling locations may be encountered.

Preventive Measures:

- To reduce trauma-type injuries, only trained and properly attired (Level D) personnel will be permitted to operate the Geoprobe. An exclusion zone will be installed to clearly indicate restricted areas for untrained or nonessential personnel.

- Overhead power lines will be considered live and dangerous. The Geoprobe will not be positioned within 20 feet of an overhead line. Known buried utilities will be identified and marked. Each sampling location will be cleared using geophysical surveying equipment (GPR, EM, etc.). The sampling location will be moved if buried utility lines are present which cannot be identified. Lockheed Martin drawings and utility as-built's will be reviewed, if available. An underground utility location service will be contacted prior to the initiation of any field activities.

- To aid in the prevention of heat-related medical problems, potable water or Gatorade will be available on-site. Alternating work/rest intervals will be employed, based on recommendations by the Site Safety Officer. All workers will be monitored for obvious symptoms related to heat stress / heat stroke (through heart rate monitoring). A detailed description of medical surveillance and heat-related emergency response procedures is presented in Section 5.4.

- A toxic gas meter equipped with O_2 and CO sensors will be used during drilling operations inside buildings to monitor oxygen and carbon monoxide. All doors will be open during the field operations and industrial fans may be utilized to ventilate the equipment's exhaust. VOC monitoring will also be performed during drilling operations. A contingency for LEL monitoring will be implemented if high concentrations of VOCs are detected with the PID.

- During field operations in the parking areas, traffic control devices (i.e. orange cones) will be placed around the delineated work area and high visibility vests will be worn by field personnel.

- During Geoprobe operations in the buildings, suspected ACM floor titles at the proposed sampling locations will be removed by appropriate personnel as necessary.

3) Sample Collection / Sample Handling

Hazards:

- Trauma-type injuries may occur by accidents or improper handling of sampling equipment and tools.

- Chemical hazards associated with VOC-containing vapor in the samples may be caused through inhalation routes.

Preventive Measures:

- Sampling will be conducted only by staff that are trained and properly attired (Level D) to handle potential VOC-containing soil gas.

- Field monitoring with a PID instrument will be conducted in the breathing zone and perimeter of the work area to evaluate personal exposures and potential PPE upgrades.

2.2 Chemical Hazard Evaluation

Based on the previous investigations conducted at the site, the known or suspected volatile organic compounds most commonly detected on-site are the following:

(1) 1,2-Dichloroethylene (1,2-DCE): Poison by inhalation. Symptoms from inhalation include irritation to the eyes, respiratory system, and CNS. 1,2-DCE is moderately toxic by ingestion and other routes. When heated to decomposition it emits highly toxic fumes of Cl^-.

(2) Tetrachloroethene (PCE): PCE affects the CNS causing incoordination, headache, vertigo (loss of balance), light narcosis, dizziness, and unconsciousness. In extremely high concentrations death may occur. Various types of irritable effects have been attributed to PCE exposure. Some of the symptoms involved include: eye, nose, and throat irritation, indications of nausea and intestinal gas, and possible changes to both the liver and kidneys. Skin exposure to PCE has not been seen to produce harmful effects in cases where the PCE was allowed to evaporate immediately after contact. However, in cases where skin was exposed to PCE frequently and for prolonged periods of time without evaporating, symptoms of dermatitis by defatting of the skin was evident.

(3) Trichloroethylene (TCE): Moderate exposure to TCE cause symptoms similar to those of alcohol inebriation. Higher concentrations cause narcotic effects. Ventricular fibrillation has been cited as the cause of death following heavy exposures. Organ systems affected by overexposure to TCE are the CNS, degeneration of the liver and kidneys, the lungs, heart, and skin. Contact with liquid defats the skin, causing topical dermatitis. Other reported symptoms of TCE exposure include abnormal fatigue, headache, irritability, gastric disturbances, and intolerance to alcohol.

The compounds described above have been previously detected in soil gas samples collected near the southeastern corner of the manufacturing building and the northeastern corner of the foundry building.

COMPOUND	ACGIH TLV	STEL
1,2-DCE	200 ppm	Not Established
PCE	25 ppm	100 ppm
TCE	50 ppm	100 ppm

ACGIH = American Conference of Governmental Industrial Hygienists
TLV = Threshold Limit Value. The time weighted average concentration for a conventional 8-hour work day and a 40-hour work week to which nearly all workers may be repeatedly exposed without adverse effect.
STEL = Short Term Exposure Limit. A 15 minute time weighted average which should not be exceeded at any time during the work day.
ppm = parts per million

- Chemical exposure via inhalation during soil gas probe purging and sampling is expected to be minimal due to the low sampling rates and purge volumes. Field monitoring with a PID instrument will be conducted in the breathing zone and perimeter of the work area to evaluate potential personal exposures and PPE upgrades. An MSDS sheet for the PID calibration gas (isobutylene) is included in Attachment A.

2.3 Physical Hazard Evaluation

The principal physical hazards at the site include:

- Temperature stress;
- Severe weather;
- Heavy Equipment, and
- Slip, trip and fall.

2.3.1 Temperature Stress

A potential hazard due to heat stress is associated with high ambient temperatures, use of protective clothing, heavy physical labor, and/or any combination thereof. Procedures that shall be implemented to reduce the risk of heat stress include:

- Training to familiarize individuals with heat stress syndrome;
- Implementation of work/rest cycles, as appropriate, to periodically allow employees to remove protective clothing and cool down;
- Availability of liquids to replace loss of body fluids;
- Monitoring of employee stress levels; and,
- Utilization of cooling devices, such as ice vests or fans, if necessary.

Employees shall be encouraged to take rest breaks, as necessary. This approach has been found very effective because individual tolerances to heat vary considerably. Additional mandatory breaks shall be scheduled at the discretion of the site safety and health officer (SSHO). Specific areas or activities shall have all work halted temporarily in extreme conditions.

2.3.2 Severe Weather

Severe weather conditions may generate electrical hazards, from lightning, and possible chemical exposure hazards from wind shifts. All personnel shall be responsible for monitoring weather conditions, particularly wind direction. Tetra Tech field personnel plan to protect themselves from other severe weather hazards by observing the following guidelines:

ELECTRICAL STORMS

- Cease drilling or dismantling operations. If possible, have equipment masts lowered.

- Seek shelter in the field vehicles.
- Do not stand near or under high objects, such as trees and heavy equipment.

HIGH WINDS

- Seek shelter in the field vehicles.
- Do not drive high profile vehicles at high speeds.
- Park vehicles heading into the wind.
- Don a respirator covering your nose and mouth or wear safety goggles.

HEAVY RAIN OR HAIL

- Seek shelter in the field vehicles.
- Do not attempt to drive a vehicle if you are in an area that is, or has a potential for, flooding.

2.3.3 Heavy Equipment

Personnel shall be made aware of the hazards of working in close proximity to heavy equipment. Control of these hazards is accomplished through hazard recognition, inspection of the site and equipment, and coordination of hazard control with supervisory personnel and the SSHO.

2.3.4 Slip, Trip and Fall

All on-site personnel will be made aware of protruding objects or concrete berms at the site. The site is generally flat, however risks may come from tripping or falling over obstacles, pipes, or tools. Personnel must maintain clear footing and identify obstructions, holes, and other tripping hazards at the job site.

2.4 Hazard Assessment Summary

Due to the nature of the site and the results of past sampling activities, chemical exposure via inhalation during soil gas probe purging and sampling is expected to be minimal due to the low sampling rates and purge volumes. The principal hazard for this project will be from accidents involving trauma type injuries.

3.0 KEY PERSONNEL AND RESPONSIBILITIES

3.1 PROJECT MANAGER:

The Project Manager (PM), Nisha Bansal, is responsible for ensuring that all project personnel implement the requirements set forth in this plan. She will review the Site Safety and Health Plan (SSHP) for completeness and accuracy and will coordinate with the Site Safety Officer (SSHO) regarding the level of personnel protection as necessary. The PM in conjunction with the SSHO will ensure that all subcontractor employees have received appropriate training and medical clearance.

3.2 SITE SAFETY and HEALTH OFFICER:

The SSHO, Rodney Brott, in conjunction with the PM, will be responsible for field implementation of the SSHP Plan. This will include communicating site requirements to all personnel, field supervision, and consultation with the Corporate Health and Safety Manager (CHSM) regarding changes to the SSHP Plan. The SSHO will be responsible for informing the CHSM of changes in work based on site conditions so that the SSHP may be appropriately modified. Responsibilities include:

- Enforcing the SSHP;
- Conducting and documenting Tailgate Safety Meetings at beginning of each work day or shift.
- Stopping work as required to ensure personal safety and protection of property, or when noncompliance with safety requirements is found;
- Determining routes to emergency medical facilities, providing telephone numbers (including poison control centers), and arranging for emergency transportation to medical facilities;
- Entering the exclusion zone in emergencies, if appropriate, when at least one other member of the field team is available to stay behind and notify emergency services (or after emergency services have been notified);
- Conduct air monitoring;
- Examine work party members for symptoms of exposure or stress
- Ensuring that each team member has been given the proper medical clearance by a qualified medical consultant, and monitor all team members to determine compliance with the applicable physical requirements as stipulated in the SSHP; and
- Performing weekly work area inspections to determine the effectiveness of the SSHP. Inspection forms are included in Attachment B.

3.3 SUBCONTRACTORS

Subcontractors and other personnel on the site will be responsible for understanding and complying with all requirements in this document. SSHP requirements will be included in subcontracts. The written requirements will be copied and distributed to personnel working on the site, and individuals receiving the written requirements will be required to sign off as having received and reviewed the document (see Attachment C).

4.0 TRAINING

4.1 All Site Personnel

All personnel subject to exposure to contaminants shall be trained in accordance with 29 CFR 1910.120 (e). Employees performing intrusive field work will have received a minimum of 40 hours of classroom training and a minimum of 3 days actual field experience under the direct supervision of a trained, experienced supervisor. In addition, all personnel subject to exposure to contaminants shall have received notification of all potential carcinogens and other hazardous chemicals that they may be exposed to, shall be trained in the proper selection, use and maintenance of respirators, and will have had a current respirator fit test.

4.2 Refresher Training

Personnel engaged in field activities that are subject to the training described in Section 4.1 above shall receive 8 hours of refresher training annually (29 CFR 1910.120 (e)(8)).

4.3 Pre-Entry Briefings and Informational Materials

The following training sessions and informational materials will be provided on the site:

- Tailgate Safety Meetings - A tailgate safety meeting will be conducted at the beginning of each shift or work day by the SSHO. The H & S considerations for the day's activities will be discussed and the necessary protective equipment outlined. The tailgate safety meeting form is included as Attachment D.

- Pre-job health and safety conference - the SSHO may conduct a pre-job health and safety conference before the start of actual work. When a new subcontractor begins work or when a major new task mobilizes, work parties will be assembled to review the work plan and QA requirements.

- Site Safety and Health Plan - All workers at the site shall be informed of the contents of the SSHP. Signing the daily tailgate form is an acknowledgment of the worker that he/she understands the SSHP.

5.0 MEDICAL SURVEILLANCE

5.1 Physical Examination

As required by Tetra Tech, all Tetra Tech personnel will have successfully completed a baseline or periodic/update physical examination. This will comply with OSHA 1910.120(f) requirements for hazardous waste site operations.

The Tetra Tech medical surveillance program examination consists of:

- An occupational and general physical history;

- Complete physical examination which incorporates the head, torso, abdomen, limbs, and musculo-skeletal system;

- Chest X-ray, as required;
- Pulmonary function test;
- Audiometric exam;
- Laboratory testing of blood and urine;
- Vision test; and
- Electrocardiogram as required.

The following information is provided to the examining physician:

- Description of employee's duties;
- Anticipated exposure levels;
- Description of the personal protective equipment to be used; and
- Information from the previous medical exams.

A copy of the medical examination is provided to the employee at his/her request. The employee will be informed of any medical conditions that would result in work restrictions the would preclude him/her from working at hazardous waste sites.

Subcontractor personnel who have the potential for exposure to hazardous materials will have successfully completed an examination equivalent to Tetra Tech's. All physicals will be approved by a physician who is Board Certified in Occupational Medicine.

5.2 Medical Records

Medical and personnel exposure monitoring records will be maintained in accordance with the requirements of 29 CFR 1910.120 and will be kept for 30 years.

5.3 Injury and Illness Treatment

If an injury/illness is the result of a chemical exposure the SSHO and/or the PM will promptly initiate the steps necessary to identify the chemical(s). Chemical identification will be accomplished through use of monitoring equipment and any prior sampling results that are available. Such information will be made available to treating physician and the PM.

Any injury/illness not limited to a first-aid response will require the SSHO to immediately notify the PM. This notification allows the coordination of resources to assist the responding parties and the treating physician in rendering appropriate care.

Any employee of Tetra Tech or of a subcontractor who is suspected of having an overexposure to the chemicals on the site will be given another complete physical examination. Any employee or contractor who develops a lost-time illness or sustains a lost-time injury will be re-examined. The

physician will certify that the employee is fit to return to work by completing a "Return to Work Authorization Following Medical absence Form."

Lockheed Martin will be notified immediately in the event of an employee or subcontractor injury/illness.

5.4 Heat Stress Monitoring

- To aid in the prevention of heat stress, the following will be provided for personnel working at the site, if required:

  Potable Water
  - Fresh Water
  - Potable water with 1% salt or commercial mix (such as Gatorade) will be within easy access to all workers

  Work Schedules
  - Work/rest regimens will be developed on recommendations by the Health & Safety Officer. The initial work schedule will consist of a 55-minute work regime followed by a 5-minute rest period. This work schedule will be modified as is necessary to conform with the heat stress monitoring criteria outlined below.

Personnel will be instructed to look for the following initial symptoms of heat stress:

- Heat Exhaustion:
  - pale, clammy skin
  - profuse perspiration
  - tiredness, weakness
  - headache, perhaps cramps
  - nausea, dizziness (possible vomiting)
  - possible fainting
- Heat Cramps:
  - cramping of muscles in legs and abdomen

- Heat Stroke:
  - high body temperature
  - skin is characteristically hot, red, and dry (the sweating mechanism is blocked).

Heat stress monitoring will commence when the ambient temperature reaches 70 Degrees Fahrenheit if Tyvek or Saranex (level C) garments are in use. Otherwise, heat stress monitoring will commence at an ambient temperature of 85 degrees Fahrenheit. The monitoring will consist of the following:

- Heart rate (HR) will be measured by the radial pulse during 30 seconds as early as possible in the resting period. The heart rate at the beginning of the rest period should

not exceed 110 beats per minute. If the HR is in excess of the above value, the next work period will be shortened by 33% while the length of the rest period stays the same. If the pulse rate is in excess of 110 beats per minute at the beginning of the next rest period, the following work cycle will be further shortened by 33%.

- Workers will be asked to report any dizziness, faintness, cramps, or other symptoms of heat stress as discussed above.

- Workers will also be questioned about any history of asthma, or if currently taking asthma medications. Persons taking asthma medications are typically more susceptible to heat stress reactions.

First aid for heat stress will include the following:

- Heat Stress
  - exposed person will be removed from the work zone and placed in shade.
  - person will be required to rest in a recumbent position.
  - fluids will be administered (Gatorade).
  - workload will be reduced to a level which will prevent heat stress symptoms from recurring.

- Heat Cramps and Heat Exhaustion
  - same first aid procedures as described above except that exposed person will be requested to leave the site for the remainder of the day.

- Heat Stroke
  - exposed person will be placed in a shaded area and medical attention (Paramedics) will be sought immediately.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

6.1 Rationale for Selection of PPE

Selection of appropriate PPE is required prior to the commencement of work. Key factors involved in this process are identification of known and suspected hazards, routes of entry and the performance of the PPE in providing a barrier to these hazards. Based on the scope of work and expected hazards specific to the site, the PPE outlined in this document will provide adequate protection to affected personnel. This approved SSHP shall serve as written certification that a work place hazard assessment has been performed in accordance with 29 CFR 1910.132(d).

All site workers shall wear, at a minimum, steel-toed shoes or boots, safety glasses, hard hats, and hearing protection (Level D ensemble). Those site personnel in the work zone (within 10 feet of the Geoprobe) shall wear Level C PPE outlined in Section 6.2 if "level C" action levels prescribed in Section 8.1 are reached or exceeded. Persons outside the work zone will be required to wear a level D ensemble, including neoprene and viton gloves if handling soil gas samples, unless breathing zone readings exceed "level C" action levels set in Section 8.1, in

which case, work zone PPE and upgrade criteria will apply to persons handling soil gas samples. In the event that persons inside the work zones are required to wear level C or greater respiratory protection, periodic monitoring at the downwind perimeter of the work zone with a PID instrument will be performed to insure that downwind personnel breathing zone levels do not exceed those defined in Section 8.1. The exclusion will be expanded when Level C action levels are exceeded outside the work zone.

6.2 Equipment

Level of Protection: **Level D**
Respiratory Protection: None
If Air-Purifying: None
Canister/Cartridge Type: N/A
Protective Clothing:

Suit Type: Work Clothes	Boot Type: Steel Toed
Glove Type(s): Neoprene	Head Protection: Type Hard Hat
Eye Protection Type: Glasses/Goggles	Other Protective Clothing: N/A
Hearing Protection: Muff Type/Foam Inserts	

Level of Protection: **Level C**
Respiratory Protection: Yes
If Air-Purifying: Half-Face or Full-Face w/ Cartridge
Canister/Cartridge Type: North N7500-83 or equivalent
Protective Clothing:

Suite Type: Tyvek*	Boot Type: Steel Toe
Glove Type: Neoprene	Head Protection: Hard Hat
Eye Protection Type: Glasses/Goggles	Other Protective Clothing: N/A
Hearing Protection: Muff Type or Foam Inserts	

Level of Protection: **Level B**
(Will not be utilized on this project)

** if high splash situation exists, upgrade to Saranek or equivalent liquid-resistant suit.*

7.0 WORK ZONES AND SECURITY MEASURES

The following general work zone and security guidelines will be implemented:

(1) No field operation shall be left unattended.

(2) Visitors will not enter the work zone unless they have attended a project safety briefing. Visitors who do not have business related to the project will be excluded from the site.

(3) The Geoprobe will not be placed within 20 feet of overhead electrical wires with the arm in the upright position.

(4) Soil gas Geoprobe drilling operations will occur only in inactive portions of the buildings during regular work hours. Field work at occupied portions of the buildings will only be conducted during after hours and/or weekends when facility personnel are not present.

The work zone for this site shall consist of the area within 10 feet of the Geoprobe. No equipment other than that needed to install, transport or sample soil should be placed in this area. Persons outside this area should place their equipment and themselves upwind of any field activities. Persons outside the work zone will be considered in the support/decontamination zone and are not required to comply with the respiratory protection requirements inside the work zone unless vapor levels outside the work zone exceed the action levels specified in Section 8.4. In such case, workers handling soil gas samples in the support zone will be required to comply with work zone PPE criteria. Persons handling soil gas samples outside of the work zone will be required to wear upgraded hand protection (neoprene outer gloves and viton inner gloves) regardless of vapor level readings. It is recommended that all site workers wear hearing protection when equipment is in operation, regardless of their location. Smoking will not be permitted in work area.

8.0 MONITORING PLAN

8.1 Air Monitoring and Action Levels

Periodic air monitoring will be performed at the work zone, perimeter, and in the support zone. Action levels for upgrade and downgrade of respiratory personal protective equipment (PPE) are shown in Table 1.

Table 1

Air Monitoring and Action Levels

Operation	Potential Contaminant	Monitoring Device	Frequency	Action Level	Action to be taken
Soil Gas Probe Installation and Sampling	VOCs (PCE)	PID	Every 30 minutes	Background to 12 ppm >12 ppm to 120 ppm >120 ppm >1000 ppm	Level D PPE Level C PPE Stop work ; implement vapor suppression controls Initiate LEL monitoring
Soil Gas Probe Installation Inside Buildings	Carbon Monoxide/ Oxygen Deficiency	Toxic Gas Meter with O_2 and CO sensors	Every 30 minutes	O_2 < 19.5% CO > 12 ppm	Stop work, ventilate area Stop work, ventilate area

Rationale for upgrade/downgrade matrix:

The decision to upgrade to Level C protection at 12 ppm PID readings is based on half of the ACGIH TLV for PCE.

8.2 Monitoring Equipment

(1) A Photovac Microtip photoionization detector, utilized to monitor volatile organic compounds, zeroed with hydrocarbon-free air and calibrated with isobutylene. Instrument calibration and direct-reading air monitoring data will be recorded and documented in the field log book.

(2) A toxic gas meter equipped with oxygen and carbon monoxide sensors will be used to monitor carbon monoxide and oxygen levels.

9.0 DECONTAMINATION PROCEDURES

All sampling equipment and tools contaminated by site soils will be decontaminated using a water solution of non-phosphate detergent, then rinsed in tap water and final-rinsed in distilled water. All site equipment will be decontaminated both before and after use. All uncontaminated site equipment should be wiped with a wet towel at the close of site activities to remove dust.

The following decontamination equipment and supplies will be used during the field program:

- Non-phosphate Detergent
- Distilled Water
- Scrub Brushes
- Towels
- Plastic Buckets
- Plastic Trash Bags

10.0 EMERGENCY RESPONSE PLAN

The objective of this SSHP is to minimize chemical or physical hazards and operational incidents. The following directions are provided to ensure that personnel respond to emergency situations in a calm reasonable manner.

- Prior to commencement of filed operations, an emergency medical assistance network will be established. The hospital, fire department, ambulance, and emergency room are identified on the list of emergency phone numbers at the beginning of this document. A vehicle will be available on-site during all activities to transport injured personnel to the identified emergency medical facility. From there, an ambulance or air-rescue would be used to transport any seriously injured worker to the nearest medical facility experienced in handling the particular type of emergency.

- Telephone numbers and locations, including the fastest routes to the emergency room facilities, will be posted at the site.

- In no instance will fewer than two people be present at the project site during the excavation activities.

- Two 20 pound ABC fire extinguishers will be available in the work area at all times.
- The SSHO will be the lead person in all emergency situations.

- The SSHO will be certified to render first aid and cardiopulmonary resuscitation (CPR) prior to initiation of field activities. A first aid kit will be available at the work site, as well as an adequate supply of fresh water and emergency eye wash.

- Site personnel will be trained in emergency procedures during the personnel training sessions described previously.

- Evacuation routes from the sampling area will be established by the SSHO and communicated to all personnel during the initial safety conference conducted before field work begins.

- A wind direction device, such as a wind sock or surveyor ribbon, will be set up in the vicinity of the exclusion zone.

- The SSHO will carry a compressed air horn. In the event of fire, hazardous substance spill, vapor release, or other hazardous event, three short blasts will be the signal to evacuate the site. All personnel evacuating the exclusion zone will proceed to a predetermined upwind location where the SSHO will conduct a head count and provide further instructions.

- The SSHO will be responsible for assuring that all personnel understand the specific emergency signals and procedures.

- In the event of an unexpected continuous vapor release, fire, or explosion, all site work will cease and the exclusion zone will be evacuated. The SSHO will notify the Lockheed point of contact and Tetra Tech's Project Manager, both of whom will be relied upon to determine the appropriate action.

Emergency signals

The following communication signals will be utilized, if necessary, in case of emergency on-site.

Gesture		Message
Hand clutching throat	-	Out of air/can't breathe
Hands on top of head	-	Need assistance
Thumbs up	-	OK/I'm all right/I understand
Thumbs down	-	No/negative
Grip partner's wrists	-	Informing partner to leave area immediately

Emergency Decontamination

Emergency Decontamination

In an emergency, the primary concern is to prevent the loss of life or severe injury to site personnel. If immediate medical treatment is required to save a life, decontamination should be delayed until the victim is stabilized. If decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed immediately. If an emergency due to heat-related illness develops, protective clothing should be removed from the victim as soon as possible to reduce heat injury. All emergency decontamination procedures must be supervised by the Site Safety Officer and the Project Manager.

11.0 GENERAL SAFE WORK PRACTICES

Tetra Tech, Inc. is responsible for the safety of all Tetra Tech employees on-site. Subcontractors are responsible to provide the required training and equipment to subcontractor employees. Each contractor shall provide all the equipment necessary to meet safe operating practices and procedures for their personnel on-site (this includes respirators, cartridges, steel toed boots, eye protection, Tyvek suits, hearing protectors, and neoprene latex, and viton gloves) and be responsible for the safety of their workers. All general safety guidelines and procedures will conform to:

- 29 CFR 1910.120.
- Standard Operating Safety Guidelines (U.S.E.P.A., November 1984).

Tetra Tech will update versions of these safety guidelines and procedures if changes in the Operations Plan occur.

Tetra Tech will utilize a "three warning" system to enforce compliance with Health and Safety procedures as follows:

⇒ First infraction - violator receives a verbal warning.
⇒ Second infraction of same rule - violator receives a written warning.
⇒ Third infraction of same rule - violator will be requested to leave the site.

The "three warning" system applies to the following safe work practices which will be implemented at the site for worker safety:

- Eating, drinking, chewing gum or tobacco, and smoking will be allowed only in designated areas.
- Wash facilities will be utilized by workers in the work areas before eating, drinking, or use of the toilet facilities.
- Personnel at the site will use the "buddy system" when wearing any respiratory protective equipment. No one will be allowed to engage in drilling or sampling operations alone.

- No facial hair which interferes with a satisfactory fit of the mask-to-face seal will be allowed. (no beards, large mustaches, or long sideburns).

- All respiratory protection selection, use, and maintenance will meet the requirements of established procedures, recognized consensus standards (AIHA, ANSI, MSHA, and NIOSH), and will comply in all respects to the requirements set forth in 29 CFR 1910.134.

- All site personnel will be required to wear hard hats, protective glasses and adequate hand protection when in the work zone.

- MSDSs will be available for all hazardous materials brought on-site.

- All Tetra Tech personnel and subcontractors will follow facility security clearance requirements (i.e. badging).

12.0 REFERENCES

LMC-BPO Contractor's ESH Handbook, Rev. January 1997 (Attachment E)

Title 29 - Labor Part 1910 Occupational Safety and Health Standards

Casarett and Doull's Toxicology. Eds. Curtis Klaasen, et. al. Macmillan Co., New York, 1986.

The Merck Index, 10th ed., Ed. M. Windholz, Merck & Co., Inc. Rahway, NJ, 1983.

ATTACHMENT A

SCOTT SPECIALTY GASES

MATERIAL SAFETY DATA SHEETS
DATE: 6/18/97

SUPPLIER ADDRESS: 1750 EAST CLUB BLVD

DURHAM, NC 27704
EMERGENY PHONE NUMBER: (919) 220-0803

1. CHEMICAL PRODUCT

PRODUCT NAME: ISOBUTYLENE IN AIR SYNONYMS: None

2. COMPOSITION, INFORMATION ON INGREDIENTS

				Exposure Limits (PPM)			
				ACGIH	OSHA		Other
Ingredient Name	Formula	CAS#	Concentration	TLV	PEL	MAC	STEL
ISOBUTYLENE	C4H8	115-11-7	1-1500 PPM	NE	NE	NE	NE
AIR	O2	132259-10-0	BALANCE	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

3. HAZARD IDENTIFICATION

*** EMERGENCY OVERVIEW ***
High pressure gas.
May accelerate combustion.

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation

ACUTE EFFECTS: None

CHRONIC EFFECTS: None known

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US Only):
NTP - No
IARC MONOGRAPHS - No
OSHA REGULATED - No

Continued ...

4. FIRST AID MEASURES

INHALATION: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

EYE CONTACT: None

SKIN CONTACT: None

INGESTION: None

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

5. FIRE FIGHTING MEASURES

FLASH POINT: Nonflammable

AUTOIGNITION TEMPERATURE: N/Ap

FLAMMABLE LIMITS: Nonflammable
LOWER:
UPPER:

EXTINGUISHING MEDIA: Use what is appropriate for surrounding fire.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

HAZARDOUS COMBUSTION PRODUCTS: None

UNUSUAL FIRE AND EXPLOSION HAZARDS: Cylinder rupture may occur under fire conditions. Compressed air at high pressure will accelerate the combustion of flammable materials.

6. ACCIDENTAL RELEASE MEASURES

CLEAN UP PROCEDURES: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat.

SPECIALIZED EQUIPMENT: None

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation.

PERSONAL PROTECTION

EYE/FACE PROTECTION: Safety glasses

SKIN PROTECTION: None

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless
ODOR: Odorless
PHYSICAL STATE: Gas
VAPOR PRESSURE: N/Ap
VAPOR DENSITY (AIR=1): 0.991
BOILING POINT (C): N/Ap
SOLUBILITY IN WATER: @20deg.celsius: 18.68cm3/l
SPECIFIC GRAVITY (H2O=1): Gas
EVAPORATION RATE: Gas
ODOR THRESHOLD: N/Ap

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

Continued ...

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: None

11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED
LETHAL DOSE 50 (LD50): N/Ap
TERATOGENICITY: N/Ap
REPRODUCTIVE EFFECTS: N/Ap
MUTAGENICITY: N/Ap

12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

14. TRANSPORT INFORMATION

CONCENTRATION: 1-1500ppm
DOT DESCRIPTION (US ONLY):
PROPER SHIPPING NAME: Compressed Gas, N.O.S.
HAZARD CLASS: 2.2 (nonflammable)
IDENTIFICATION NUMBER: UN1956
REPORTABLE QUANTITIES: None
LABELING: Nonflammable Gas

ADR/RID (EU Only): Class 2, 12

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

15. REGULATORY INFORMATION

OSHA: Process Safety Management: Minor component is not listed in appendix A of 29 CFR 1910.119 as a highly hazardous chemical.

TSCA: Mixture is not listed in TSCA inventory.

SARA: The threshold planning quantity for this mixture is 10,000 lbs.

EU NUMBER: N/Ap

NUMBER IN ANNEX 1 OF DIR 67/548: Mixture is not listed in annex 1.

EU CLASSIFICATION: N/Ap

R: 20

S: 9

16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR)

ABBREVIATIONS:
N/Ap - Not Applicable
N/Av - Not Available
SA - Simple Asphyxiant
NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

ATTACHMENT B

Tetra Tech, Inc.

Form 23.4-2
Health and Safety Field Audit Checklist

Date _____ Auditor _____

Site Name _____

Location _____

Project Number _____

Project Manager _____

Tetra Tech Regional Health and Safety Representative _____

Site Safety Coordinator _____

TEAM MEMBERS

NAME	RESPONSIBILITY

SITE / AGENCY REPRESENTATIVES PRESENT

NAME	AFFILIATION

A. Site Safety Plan

_____ Site safety plan posted on site or maintained in an area easily accessible by project manager and site safety coordinator?

_____ Is the plan in effect and being followed?

_____ Are daily pre-entry briefings held and documented on the Tailgate Safety Meeting Form?

B. Work Zones

_____ Work zones established and clearly identified (exclusion zone, contamination reduction zone, support zone)?

_____ Contamination Reduction Zone and Exclusion Zone Access Log maintained?

_____ Site Security Log maintained?

_____ Visitor Log maintained?

_____ Vendor/Service Log maintained?

C. Equipment

_____ Is the appropriate monitoring equipment on site and operational?

_____ Are daily calibration logs maintained?

D. Personal Protective Clothing And Equipment

_____ Is the proper level of personal protective clothing used?

_____ Is the appropriate personal protective equipment on site, such as hard hats, ear protectors, coveralls, boots, gloves, etc.?

_____ Is the necessary equipment on site and available for an upgrade to a higher level of protection?

E. Decontamination

_____ Has an appropriate decontamination line been established?

_____ Are all personnel following decontamination procedures?

_____ Are respirators segregated and properly decontaminated?

_____ Are other pieces of equipment and field samples properly decontaminated?

F. MONITORING

_____ Does the site logbook document that perimeter monitoring was conducted?

_____ Does the site logbook document that initial site entry monitoring was conducted?

_____ Is periodic monitoring conducted?

_____ Is monitoring conducted for such physical hazards as heat stress, cold exposure, noise exposure, etc.?

G. General Evaluation

ATTACHMENT C

HEALTH AND SAFETY COMPLIANCE STATEMENT

I, _____, have received and read a copy of the project Site Safety and Health Plan for the following site: Lockheed Martin Tactical Defense Systems Facility

(TC #) 1505-01

I understand that I am required to have read the aforementioned document and have received proper training under the Occupational Safety and Health Act (29 CFR, Part 1910.120) prior to conducting site activities at the site.

_____ _____

Signature Date

TETRA TECH, INC.

SITE SAFETY PLAN CONSENT AGREEMENT

I have reviewed the Tetra Tech, Inc. Site-Specific Safety and Health Plan for Lockheed Martin Tactical Defense Systems. I understand its purpose and consent to adhere to its policies, procedures, and guidelines with an employee, or subcontractor, of Tetra Tech.

Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date

Copies of this page, with signatures of all field personnel, will be submitted to the Project Manager (Nisha Bansal) and the Tetra Tech Corporate Health and Safety Manager (Christine McClain).

ATTACHMENT D

TAILGATE SAFETY MEETING

DATE _____ TIME _____ JOB NUMBER _____

CLIENT _____ ADDRESS _____

SPECIFIC LOCATION: AREA _____ BUILDING NO. _____

TYPE OF WORK _____

SAFETY TOPICS PRESENTED

PROTECTIVE CLOTHING/EQUIPMENT _____

CHEMICAL HAZARDS _____

PHYSICAL HAZARDS _____

EMERGENCY PROCEDURES _____

HOSPITAL/CLINIC _____ PHONE ( ) _____ PARAMEDIC PHONE ( ) _____

HOSPITAL ADDRESS _____

SPECIAL EQUIPMENT _____

OTHER _____

ATTENDEES

PRINTED NAME	SIGNATURE

MEETING CONDUCTED BY:

PRINTED NAME _____ SIGNATURE _____

SITE SUPERVISOR _____ PROJECT MANAGER _____

ATTACHMENT E

"SECTION II"

CONTRACTOR'S ESH HANDBOOK

GENERAL

The Contractor agrees to comply with all rules and procedures contained in this document, known as the *Contractor's ESH Handbook*, unless Lockheed Martin specifically agrees, in writing, to a modification or exemption. In addition, to the *Contractor's ESH Handbook* provisions, the Contractor, Contractor's officers, employees and agents, subcontractors at any tier and subcontractor employees at any tier shall:

1) Take all prudent and proper environmental, safety and health (ESH) precautions to protect Lockheed Martin employees, all other workers, and the public;

2) Comply with all applicable Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority (including but not limited to *Title 29, Code of Federal Regulations Parts 1910* and *1926*);

3) Comply with all applicable Federal, State, municipal, local, and any other applicable air pollution statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority; and

4) Comply with all Federal, State, municipal, local and any other applicable hazardous materials, hazardous waste, and non-hazardous waste statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority (including but not limited to *Title 40, Code of Federal Regulations*).

5) Obtain the necessary ESH permits to conduct the work in compliance with ESH regulations and site requirements.

6) Ensure that all employees and subcontractors have received the appropriate level of ESH training in accordance with applicable ESH regulations necessary for the performance of the work.

7) Ensure appropriate controls are in place to protect Lockheed Martin employees and visitors from safety and health hazards associated with contractor activities.

GENERAL (cont.)

Contractor also agrees:

1) To instruct, prior to commencement of operations, all agents and employees about relevant governmental laws and regulations, specific hazards expected to be encountered, and proper safety precautions to be observed;

2) To submit for Lockheed Martin review a copy of your company's written comprehensive **safety and health / accident prevention program (Section I)**.

3) To submit to Lockheed Martin a completed **ESH Questionnaire (Section III)**;

4) If conducting hazardous waste-type operations, to submit for Lockheed Martin review a copy of your **site specific safety and health plan** at least two (2) weeks prior to field mobilization. This plan shall meet the requirements of *Title 29, Code of Federal Regulations, Section 1910.120 - Hazardous Waste Operations and Emergency Response* and, at a minimum, shall contain the following elements:

   a. Safety and health risk or hazard analysis for each anticipated site task and operation.
   b. Employee training requirements.
   c. Personal protective equipment to be used by employees for each of the site tasks and operations.
   d. Medical surveillance requirements.
   e. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.
   f. Site control measures.
   g. Decontamination requirements and procedures.
   h. Emergency response plan.
   i. Confined space procedures (if applicable)
   j. Spill containment program.
   k. Periodic safety meetings.
   l. Periodic work area safety inspections.

5) To ensure Contractor's on-site foreman or supervisor has received a copy of the *Contractor's ESH Handbook*, maintains a copy at the site, and that employees, Contractor's officers, agents, subcontractors at any tier and subcontractor employees are supplied a copy of the *Contractor's ESH Handbook* for their implementation and information;

6) That Lockheed Martin may immediately stop Contractor's work if Contractor violates any applicable Federal, State, municipal, or local, or any other rules, regulations, and requirements, *Contractor's ESH Handbook* provisions, or other contract terms and conditions regarding environmental, safety and health;

7) That Lockheed Martin may conduct periodic inspections (surveillance) of Contractor work areas. Periodic Lockheed Martin surveillance in no way relieves the Contractor of the obligation to maintain its own safety program and conduct its own safety inspections to identify unsafe conditions or acts. ESH violations will be considered in evaluation of Contractor's performance.

8) That Lockheed Martin is not responsible for training or supervising the contractor's employees or abating workplace hazards created by the contractor or to which the contractor's employees are exposed.

9) To maintain copies of all pertinent safety and health records at the job site. These records will be made available to Lockheed Martin and will be subject to periodic inspection by Lockheed Martin. Pertinent records include, but is not limited to, personnel training documentation, evidence of enrollment in a medical surveillance program, accident/injury reporting, work area safety inspections, periodic safety meetings, MSDS's, air monitoring data, etc.;

10) To contact Lockheed Martin immediately in the event of a fatal or serious injury, an unpermitted environmental release, or any ESH incident that is likely to generate significant publicity or an adverse situation for Lockheed Martin (e.g., alleged releases of contaminants beyond property boundaries, purported fish or wildlife impacts, allegations of adverse community health or property impacts, etc.)

RULES AND PROCEDURES

I. DEFINITIONS

A. Contractor: any agent/agency engaged by Lockheed Martin through written contract (or other written agreement) to perform work on Lockheed Martin owned properties and those for which Lockheed Martin has operating responsibilities. For the purposes of this *Contractor's ESH Handbook*, "Contractor" shall also include Contractor's subcontractors at any tier.

B. Contractor's ESH Handbook: Section II in Attachment "C" of the Lockheed Martin-BPO bid package (this document).

C. EPA: the Environmental Protection Agency.

D. Fed/OSHA: the Federal Occupational Safety and Health Administration.

E. Hazard Communication Program: a written program meeting the requirements of *Title 29, Code of Federal Regulations, Section 1910.1200 - Hazard Communication.*

F. Lockheed Martin: Lockheed Martin Corporation - Burbank Program Office (BPO).

G. Lockheed Martin Project Coordinator: the Lockheed Martin-BPO individual that has been designated by management to manage a specific project.

H. Lockheed Martin Contract Representative: the Lockheed Martin-BPO contract representative (Buyer) for the project.

I. Lockheed Martin Safety and Health Coordinator: the Lockheed Martin-BPO Injury and Illness Prevention Program Administrator, who will also be known as and referred to as the Safety & Health (S & H) Coordinator.

J. RCRA: the Federal Resource Conservation and Recovery Act and all amendments or revisions.

K. Safety Program, Accident Prevention Program or Injury and Illness Prevention Program (IIPP): a comprehensive written safety and health program which includes the applicable OSHA required written programs. Contents of the written safety program are dependent on the contractors' primary type of work.

L. UFC: the Uniform Fire Code.

II. SAFETY & HEALTH

Contractor shall comply with applicable provisions of Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations and requirements. Contractor shall take all precautions for the protection of the safety and health of Contractor employees and Lockheed Martin employees to prevent accidents or injury to them or to other persons on, about, or adjacent to site of work performance.

A. PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

1. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

   a. Eye Protection. Safety eyewear meeting ANSI Z87.1 shall be worn in areas designated as "Eye Protection Required" and on all jobs where a potential injury to the eyes is possible whether or not the area is posted.

   b. Foot Protection. Affected employee(s) shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards. Safety shoes and boots which meet the ANSI Z41 Standard shall be provided when impact and/or compression hazards exists. Soft shoes, including but not limited to, tennis shoes, athletic shoes, moccasins, sandals, and open-toed or open-heeled shoes shall not be worn.

   c. Respiratory Protection Devices. Appropriate, MSHA/NIOSH-approved respiratory protective devices must be worn when applicable state and/or federal action levels or permissible exposure levels (PELs) are exceeded. Contractor must have fully implemented a respiratory protection program meeting the requirements of *Title 29, Code of Federal Regulations, Section 1910.134 / 1926.103* prior to issuing and using respiratory equipment. Contractor shall supply and maintain appropriate air monitoring and respiratory protection equipment if inhalation hazards are anticipated.

   d. Protective Clothing such as suits, aprons, boots, or gloves shall be worn where there is a hazard to the body through dermal contact with chemicals, dusts, heat or other harmful agents or conditions.

e. Hearing Protection (muffs and/or plugs) must be worn in all areas posted to indicate high noise level or where Contractor employees are exposed to noise levels in excess of the OSHA action level . Action level=an 8-hour time-weighted average of 85 decibels or a dose of fifty percent.

f. Hard Hats will be worn in all areas where there is a danger of impact to the head or hazard from falling or moving objects. Hard hats must meet the ANSI Z89.1 Standard.

2. Contractor will issue or cause to be issued prior to commencing the job all necessary personal protective equipment and air monitoring equipment to all its agents and employees, together with full instructions and training on the use of said equipment.

3. Contractor will meet all applicable Federal, Sate, municipal, local, and Lockheed Martin requirements for protective clothing and equipment. Contractor will properly supervise all its agents and employees to ensure protective clothing and equipment is used in conformance with applicable rules and regulations.

B. CONFINED SPACE ENTRY

1. A confined space is a space that: 1) Is large enough and so configured that an employee can bodily enter and perform assigned work; 2) Has limited or restricted means for entry or exit; and 3) Is not designed for continuous employee occupancy.

2. If Contractor or any other employee must enter a confined space (tank, vat, pit, sewer, etc.), the entry must be performed in accordance with applicable state and federal OSHA regulations; *Title 29 Code of Federal Regulations, Section 1910.146.*

3. In all instances, the Contractor shall notify the Lockheed Martin Project Coordinator prior to entering a confined space.

4. To ensure the safety of Contractor personnel during entry into confined spaces (such as tanks, man-holes and sewers, vessels, etc.) where access and egress is difficult and the possibility of dangerous air contamination exists, Contractor shall have a written confined space entry program that shall require, at a minimum, the following provisions:

a. Only persons trained in confined space entry will be allowed to enter a confined space or participate in any way on a confined space entry team.

b. Furnish atmosphere monitoring equipment and perform appropriate space monitoring which includes, but is not limited to, testing for oxygen deficiency, explosive gas levels (%LEL). and potential toxic air contaminants (if applicable);

c. Complete a entry permit and post such permit at the entry portal; and

d. Furnish the appropriate retrieval devices and ventilation equipment as needed.

e. Ensure presence of adequately trained rescue personnel (permit-required spaces only).

C. HOT WORK REQUIREMENTS (i.e., welding, torching cutting, brazing, etc.)

1. All aspects of welding and cutting operations shall comply with applicable federal, state, and local regulations.

2. Prior to performing any welding or cutting operation outside of a welding booth, Contractor will contact the local fire department to determine if cutting and welding permits (hot work or burn permits) are required. All hot work activities shall be conducted in accordance with the permit requirements (i.e., fire suppression equipment availability, removal of combustibles, fire watch, etc.). Notify the Lockheed Martin Project Coordinator of any permit requirements.

3. Contractor personnel must secure all oxygen and acetylene cylinders in a manner which will prevent them from falling or tipping over. Oxygen and acetylene cylinders must be stored separately. Oxygen cylinders in storage must be separated from fuel gas cylinders a distance of 20 feet or by a noncombustible barrier 5 feet high. Acetylene cylinders shall not be stored horizontally; laying on their side.

4. When welding, Contractor personnel shall use welding curtains and/or suitable protective devices to protect persons from indirect exposure to welding flashes.

D. LOCKOUT / TAGOUT - Control of Hazardous Energy

1. Contractor shall not service and/or maintain machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. Servicing and/or maintaining such equipment shall not be conducted until appropriate energy control methods have been initiated.

2. Contractors are required to establish a written program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start-up or release of stored energy in order to prevent injury to employee; *Title 29 Code of Federal Regulations, Section 1910.147.*

3. The Contractor shall provide training to ensure that the purpose and function of the energy control program are understood by their employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by the employees.

4. If Contractor needs to lockout/tagout Lockheed Martin equipment, Contractor(s)4 shall notify the Lockheed Martin Project Coordinator and/or on-site facility operator (if applicable) to inform each other of their respective lockout or tagout procedures.

5. Upon completion of the job, Contractor is to notify the Lockheed Martin Project Coordinator and/or on-site facility operator (if applicable) so power can be resumed to the equipment after the lock-outs and tags have been removed.

E. USE OF Lockheed Martin MATERIALS AND EQUIPMENT

1. Contractor's employees shall not use Lockheed Martin tools, equipment, materials, or personal protective equipment unless otherwise authorized by Lockheed Martin.

2. Contractor shall not start or stop any production equipment without the approval of the Lockheed Martin Project Coordinator.

3. Contractor shall not adjust or relocate any Lockheed Martin process equipment without the approval of the Lockheed Martin Project Coordinator.

F. DANGEROUS OPERATIONS - WARNINGS AND BARRICADES

1. Contractor shall isolate their work areas from Lockheed Martin operations, employees, and the public by using barricades or other effective means of isolation.

2. Prior to commencing work, Contractor must inform the Lockheed Martin Project Coordinator (who will contact appropriate Lockheed Martin production or supervisory personnel) of any work posing a potential danger to Lockheed Martin personnel.

3. Contractor personnel shall erect and properly maintain, at all times, all necessary safeguards for the protection of both Contractor personnel, Lockheed Martin employees and the public. This includes:

   a. If doing any overhead work, Contractor must utilize warning signs and barricades, or station someone on the ground to prevent passers-by from entering the area below the overhead work;

   b. Contractor must effectively barricade excavations, floor openings, etc., as required by OSHA regulations;

c. Contractor must construct and maintain all scaffolds and working platforms in accordance with OSHA regulations; and

d. If Contractor's equipment, barricades or other safeguards restrict fire lanes or fire equipment access, the Contractor shall notify the Lockheed Martin Project Coordinator, who will inform the local fire department.

G. ELECTRICAL SAFETY

1. Only qualified persons are permitted to work on electrical systems; as defined by *Title 29 Code of Federal Regulation 1910.269(a)(2)*. Qualified persons shall be trained and competent in:

   a. The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment;

   b. The skills and techniques necessary to determine the nominal voltage of exposed live parts;

   c. The minimum approach distances specified by OSHA corresponding to the voltages to which the qualified employee will be exposed; and

   d. The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.

2. Contractor personnel shall properly ground all electrical tools, mechanical digging or concrete breaking equipment, and all other electrical equipment while in use.

3. All electrical equipment shall be appropriately rated (under OSHA and NEC regulations) for the work done.

4. As applicable, electrical systems shall be deenergized utilizing appropriate lockout/tagout procedures prior to conducting work.

H. ELEVATED WORK / FALL PROTECTION

Contractor must provide fall protection systems whenever a worker is exposed to a fall of four feet or more (in construction the threshold is six feet). Guardrails are the most common form of fall protection systems. If guardrail systems are not feasible, safety nets, personal fall arrest systems, positioning device systems, warning line systems, or some other demonstrated, effective means of fall protection shall be used.

I. HEAVY EQUIPMENT, INDUSTRIAL VEHICLES, AND CRANES

1. Only trained and authorized workers may operate heavy equipment, industrial vehicles, and/or cranes.

2. The Contractor shall designate a competent person who shall inspect all machinery and equipment prior to each use to make sure it is in safe operating condition.

3. The Contractor shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all heavy equipment, industrial vehicles, and cranes.

4. Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

   a. For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.
   b. For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet.
   c. A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
   d. Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized.

J. HOUSEKEEPING / CLEANUP

1. Contractor shall continuously clean-up their respective work area(s). Contractor shall maintain their work areas free from all slip, trip, fall hazards at all times.

2. The work area must be left free from accumulation of waste and rubbish at the end of each work shift.

3. At the end of each working day and/or the conclusion of work being performed, Contractor shall restore the work area to the same degree of neatness as when work commenced.

4. Contractor shall furnish necessary equipment and/or receptacles to remove waste and rubbish from the job site unless otherwise specified by the Lockheed Martin.

II. SAFETY & HEALTH (cont.)

K. ACCIDENT, INJURY, ILLNESS, INCIDENT, and SPILL REPORTING

1. Contractor shall immediately contact the Lockheed Martin Project Coordinator in the event of a fatal or serious injury, environmental release (spill), near-miss incident, or any ESH incident that is likely to generate significant publicity. A written report of the incident/injury/spill and corrective action(s) taken shall be submitted to the Lockheed Martin Project Coordinator within one (1) day of the incident. Representatives from Lockheed Martin may conduct joint investigations with the contractor if deemed necessary.

2. In case of a spill or release of hazardous chemicals, Contractor shall immediately notify the Lockheed Martin Project Coordinator, and/or if the severity of the spill warrants, the local fire department by calling 9-1-1. Contractor shall take all necessary steps to control the spread of the release and to provide site control to prevent unauthorized personnel from entering the affected area. The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

L. FIRE PREVENTION / FLAMMABLE LIQUIDS

1. Contractor shall familiarize Contractor's employees with the locations of fire extinguishers in their respective work areas and ensure they are prepared to use them safely if necessary. In certain remote field locations or within abandoned facilities where fire extinguishers may not exist in the immediate work area, contractor shall provide and locate fire extinguisher(s) in close proximity to the active work areas.

2. In case of fire, Contractor shall turn in an alarm (via telephone) to the local fire department or call 9-1-1. Contractor shall then inform all Contractor and Lockheed Martin employees in the area to evacuate to a safe place and direct arriving fire response personnel to the fire. Notify the Lockheed Martin Project Coordinator as soon as reasonably possible.

3. Contractor employees shall only attempt to put out a fire when such action can be performed safely.

4. Contractor shall not use water to extinguish fires near electrical equipment. CO_2 or dry chemical extinguishers shall be used.

5. If a Contractor employee uses a Lockheed Martin fire extinguisher, Contractor shall report its use to the Lockheed Martin Project Coordinator.

6. Contractor shall report all fires extinguished by the Contractor to the Lockheed Martin Project Coordinator. The Lockheed Martin Project Coordinator will determine if the local fire department is to be notified.

7. Cigarette smoking inside of Lockheed Martin buildings is prohibited. Smoking outside of buildings is allowed only where a potential for fire does not exist. No smoking is allowed within 50 feet of aircraft, within paint hangers or spray booths, or within 20 feet of any painting operations or fueling operations. Smoking is not allowed within any delineated work zone.

8. Prior to commencing hot work (burning, cutting, welding or tar pot work), Contractor shall contact the local fire department to determine hot work or burn permit requirements.

9. Contractors are to store, dispense, and use flammable and combustible liquids in accordance with OSHA regulations and the Uniform Fire Code. Bonding and grounding of containers containing flammable liquids will be required.

10. Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

11. Contractor shall provide sufficient fire extinguishers necessary for their work activities.

M. HAZARD COMMUNICATION - USE OF HAZARDOUS MATERIALS

1. Contractor personnel shall not bring any hazardous substances (as defined by OSHA) onto Lockheed Martin premises unless accompanied by a Material Safety Data Sheets (MSDS) and the container is appropriately labeled. MSDS's must be maintained at the job site.

2. Contractor shall notify the Lockheed Martin Project Coordinator prior to bringing onto Lockheed Martin property large quantities of hazardous materials (i.e., >55 gallons liquid, >500 lb solid, >200 ft^3 gaseous).

3. Contractor shall ensure all containers of hazardous materials are labeled in accordance with the OSHA Hazard Communication Standard; *29 CFR 1910.1200.*

4. Do not handle or use any hazardous material that does not have adequate safety warning labels.

5. Do no dump, drain or discharge any hazardous materials or wastes into any sink, drain or sewer.

6. The Lockheed Martin Project Coordinator shall inform the Contractor(s) of the identity of hazardous chemicals to which Contractor's employees may be exposed from Lockheed Martin operations, if applicable. The Lockheed Martin Project Coordinator shall provide the following information:

a. Where to obtain information concerning any hazardous substances used in Lockheed Martin operations that the Contractor's employees may come in contact with while performing their work;

b. Lockheed Martin shall make available to the Contractor, Material Safety Data Sheets (MSDS), and sufficient information to permit the Contractor to train its employees;

c. Appropriate protective measure Contractor employees may take to protect themselves from exposure to known hazards from Lockheed Martin operations; and

d. Appropriate work practice procedures (safety rules) for the location where work is to be performed.

7. Contractor shall ensure its' employees are trained in the safe handling and use of hazardous materials in accordance with *29 CFR 1910.1200 - Hazard Communication*.

8. Contractor shall ensure that all applicable employees are medically qualified (as defined by OSHA) to perform the work assigned.

9. Hazardous materials shall be stored in designated areas and all containers effectively closed. Spill equipment/supplies shall be readily available to contain and/or mitigate accidental spills of hazardous materials.

N. TRAFFIC CONTROL REQUIREMENTS

It is the responsibility of the Contractor or organization performing work on, or adjacent to, a highway or street to install and maintain traffic control devices which are necessary to provide safe passage for the traveling public through the work, as well as for the safeguard of workers. Before work begins, traffic control plans for handling traffic through a construction or maintenance project shall be approved by the Engineer of the public agency or authority having jurisdiction over the highway.

O. INCIDENTAL CONTACT WITH ASBESTOS

This section applies to all contractors who incidentally disrupt the matrix of asbestos containing material (ACM) or presumed asbestos containing material (PACM); i.e., contractors who have not been specifically hired to perform ACM abatement.

1. Contractor shall immediately report to the Lockheed Martin Project Coordinator and to other employers of employees working at the job site any discovery, disturbance, and/or spill of ACM and/or PACM. Contractor(s) is to cease all operations in the

immediate area of the suspect ACM and/or PACM and demarcate the area. The approval of Lockheed Martin is required before resuming operations.

2. Contractor shall not disturb any pipe insulation, boiler insulation, or any other material reasonably suspected of containing asbestos until the Contractor notifies the Lockheed Martin Project Coordinator. Lockheed Martin approval is required before operations may commence.

3. Abatement of asbestos can only be performed by persons properly trained and licensed to perform such activities.

P. ASBESTOS ABATEMENT CONTRACTORS

This section applies to Contractors performing maintenance, construction, repair, renovation, demolition, salvage, or any other operation in which any material containing more than 0.1% asbestos is sanded, abrasive blasted, sawed, shoveled, removed, or otherwise handled in a manner that would generate airborne asbestos fibers. These requirements are in addition to any requirements contained in Contractor's scope of work.

1. All Contractors working with asbestos shall comply with applicable federal and state OSHA, EPA, local air district, and other applicable Federal, State, municipal, and local statutes, regulations, rules, and ordinances; specific contract terms and conditions; and specific instructions from Lockheed Martin regarding the handling of, use of, and work involving asbestos.

2. The contractor shall ensure that all asbestos work performed within regulated areas is supervised by a competent person, as defined by OSHA.

3. All Contractors working with asbestos must be approved by Lockheed Martin.

4. Before commencing work, all Contractors shall supply to Lockheed Martin proof of:

   a. Asbestos abatement contractor certification by the state Contractor's License Board;

   b. Liability insurance for Contractor employees engaged in asbestos work operations;

   c. Copies of asbestos work notification letters to state OSHA;

   d. Local air district Asbestos Demolition/Renovation Notification;

5. Contractors shall minimize the creation and spread of airborne asbestos fibers by using appropriate work practices, engineering controls, and established procedures (i.e., wet methods, HEPA filter vacuums, negative pressure enclosure, local exhaust ventilation equipped with HEPA filter dust collection system, etc.)

6. All Class I, II and III asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed at each location where a regulated area is required to be established. Signs shall be posted at such a distance from such a location that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Warning signs shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

7. On multi-employer worksites requiring the establishment of a regulated area, Contractor shall inform other employers on the site of the nature of the work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

8. Contractors shall package and label asbestos waste in accordance with federal and state OSHA and federal and state hazardous waste regulations. Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Labels shall be printed in large, bold letters on a contrasting background and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

9. Contractors shall properly dispose of all asbestos waste. Proper disposal includes the use of hazardous waste manifests and Lockheed Martin approved and licensed waste haulers, and disposal facilities according to federal RCRA law and applicable state hazardous waste regulations. Contractor shall contact the Lockheed Martin Project Coordinator before transporting or disposing of any hazardous waste. Lockheed Martin must review all hazardous waste manifests prior to shipment.

10. Contractors shall ensure that employee exposure air monitoring is conducted as required by federal and state OSHA regulations. All other air monitoring (i.e. clearance sampling) shall be conducted by a third-party contracted air monitoring firm not affiliated with the Contractor.

11. Contractor shall, at no cost to the employee, institute a training program for all employees who are likely to be exposed in excess allow Lockheed Martin or its designated representative to inspect the work area.

Q. HAZARDOUS WASTE OPERATIONS

This section applies to Contractors performing hazardous waste-type activities. This includes operations that pose a potential or reasonable possibility for employee exposure to hazardous waste/chemical contaminants during site investigations, clean-up operations, abatement, or hazardous substance removal work (remedial actions). These requirements are in addition to any requirements contained in Contractor's scope of work.

1. All Contractors performing hazardous waste-type operations shall perform all site operations in accordance with *29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response*.

2. Training: Contractor employees must have training for work on hazardous waste operations, in accordance with *29 CFR 1910.120(e)*. If respiratory protection devices are to be worn, contractor employees shall be medically qualified and trained in accordance with *29 CFR 1910.134*. Lockheed Martin does not provide training for contractor employees. In addition, contractor shall hold pre-entry briefings prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. Documentation of the above mentioned training must be maintained at the job site and be available for Lockheed Martin inspection.

3. Medical Surveillance: Contractor employees must be enrolled in a medical surveillance program prior to performing hazardous waste operations, in accordance with *29 CFR 1910.120(f)*. Upon request, contractor must provide documentation of medical surveillance for project employees. Lockheed Martin does not provide medical surveillance examinations for contractor employees.

4. Site specific safety and health plan: Contractor must develop and implement a written site/task-specific safety and health plan. This plan must meet the requirements of *29 CFR 1910.120 (b)(4) - Site-specific safety and health plan part of the program.*

II. SAFETY & HEALTH (cont.)

5. Daily work area inspections: Contractor agrees to perform daily work area inspections to determine the effectiveness of the site safety and health plan and to identify and correct unsafe conditions in contractor's responsible work area. These inspections shall be documented and available to Lockheed Martin upon request for review.

6. Pre-entry safety briefings: Contractor agrees to conduct and document periodic safety meetings.

7. For contractors performing any remedial work, cleaning activity, or general earthmoving with heavy equipment; the contractor shall maintain in writing that maintenance and inspections are performed on equipment on a regularly scheduled basis in accordance with *29 CFR 1910/1926* and any other applicable state requirements.

III. ENVIRONMENTAL

Contractors shall comply with all applicable provisions of Federal, State, municipal, local, and other environmental statutes, rules, and regulations. Contractor shall take all necessary precautions to protect the environment; and to store, transport, dispose, or otherwise handle hazardous wastes and non-hazardous wastes; and to prevent discharges of materials into the environment except in accordance with applicable governmental regulations.

A. HAZARDOUS WASTE HANDLING, STORAGE, TRANSPORT, AND DISPOSAL

1. Contractor shall handle, transport, and dispose of all hazardous wastes in accordance with Federal, State, municipal, local, and other rules, regulations, ordinances and requirements.

2. Contractor must segregate hazardous from non-hazardous waste; all hazardous waste generated by its operations must be labeled in accordance with all governmental regulations.

3. Contractor shall dispose of all hazardous waste within 60 days of its accumulation start date. Contractor shall not leave behind on Lockheed Martin property any containers of hazardous materials or waste (including drums, roll-offs, maintenance chemicals, etc.), empty or not, after the termination of operations.

4. All Contractors generating hazardous waste in its operations must have its own EPA Generator Identification Number (EPA ID Number) for use on manifests.

a. Contractor shall use its own EPA ID Number, sign manifests, and arrange for transportation and disposal for all Contractor-generated hazardous wastes unless Lockheed Martin determines otherwise.

b. Lockheed Martin accepts no liability for the transportation and disposal of wastes generated by the Contractor. The Contractor shall indemnify and hold harmless Lockheed Martin, its officers, employees, representatives, and agents from any and all liability, loss, cost, damage, or expense (including attorney's fees) arising out of Contractor's transportation or disposal of wastes.

c. Where Lockheed Martin determines that hazardous wastes are Lockheed Martin-generated, Lockheed Martin's EPA ID Number shall be used on corresponding manifests. Only an authorized Lockheed Martin person may sign manifests for Lockheed Martin-generated waste.

5. Transporting, disposal, and landfill locations must be approved by Lockheed Martin prior to work commencement.

6. To ensure compliance with the above procedures, Contractor shall contact Lockheed Martin before transporting or disposing of any hazardous waste. Lockheed Martin must review all hazardous waste manifests prior to the shipment of any hazardous wastes.

7. If Contractor's transportation or disposal arrangements are inappropriate and require Lockheed Martin to dispose of Contractor's waste, Lockheed Martin reserves the right to bill the Contractor for the reasonable costs of transportation and disposal.

8. In case of a spill or release of hazardous chemicals or waste, Contractor shall immediately notify the Lockheed Martin Project Coordinator and if the severity of the spill warrants, notify the local fire department (Call 9-1-1). The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

B. NON-HAZARDOUS WASTE DISPOSAL

1. Contractor shall handle, transport, and dispose of all non-hazardous wastes in accordance with Federal, State, municipal, local and other rules, regulations, ordinances and requirements.

2. Contractor shall not dispose of any non-hazardous wastes on Lockheed Martin property without the express written permission of Lockheed Martin.

III. ENVIRONMENTAL (cont.)

C. WORK INVOLVING AIR EMISSIONS

1. If Contractor's operations require an air pollution permit, Contractor must provide copies of local air district Permit(s) to Operate (or Applications for Permits to Operate) to the Buyer or the Lockheed Martin Project Coordinator for all equipment to be used by the Contractor on Lockheed Martin property. In the alternative, Contractor shall document an exemption from the permit requirements.

2. Contractor shall submit to the Lockheed Martin Project Coordinator daily records of all coatings, solvents and other materials used for which a local air district Permit is required, or for which documentation justifying a permit exemption is required.

D. WORK INVOLVING WATER DISCHARGES

Contractor shall notify the Lockheed Martin Project Coordinator and obtain the approval of Lockheed Martin before discharging any material into storm drains or sewers.

IV. FINES, PENALTIES AND COSTS

Contractor shall indemnify and hold Lockheed Martin harmless from any and all liability (including but not limited to fines and penalties), loss, cost, damage, or expense (including attorney's fees) suffered or incurred by Lockheed Martin by reason of Contractor's failure to comply with Federal, State, municipal, local or other laws, rules, regulations, ordinances and requirements, or failure to comply with generally accepted environmental safety and health practices.

V. LOCKHEED MARTIN POINTS OF CONTACT

Title	Name	Phone
Project Coordinator	See Subcontract Agreement Article #32	
Hazardous Waste Coordinator	Ruben Esparza	(818) 847-7653
Safety & Health Coordinator	Brian Shaughnessy	(818) 847-0232
General Office	Receptionist	(818) 847-0793
Purchasing Manager	Dean Horton	(818) 847-0584

"SECTION II"

CONTRACTOR'S ESH HANDBOOK

ACKNOWLEDGMENT

Contractor has read and understands the contents of the *Contractor's ESH Handbook*. Contractor agrees while performing work on Lockheed Martin-owned or Lockheed Martin-controlled premises, that the Contractor shall, and shall require its subcontractors at any tier, to comply with the contents of this *Contractor's ESH Handbook*. A copy of this handbook shall be maintained at the site, and employees, Contractor's officers, agents, subcontractors at any tier and subcontractor employees are supplied a copy of the *Contractor's ESH Handbook* for their information and implementation. This handbook in no way relieves the contractor of their obligation to implement and enforce their own written ESH programs.

COMPANY _____

Name _____

Signature _____

Title _____

Date _____

Complete, sign and return this certificate to Lockheed Martin