

**Groundwater Monitoring Well Installation Work Plan
Lockheed Martin Corporation
Great Neck, New York**



LOCKHEED MARTIN
BURBANK PROGRAM OFFICE



TC Tetra Tech

Environmental Engineers & Scientists
TC 1768-01/February 9, 1998

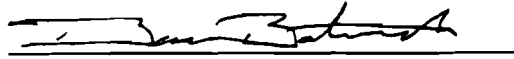
Lockheed Martin Corporation Groundwater Monitoring Well Installation Work Plan

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Section 1

Introduction

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. has prepared the following Work Plan to install groundwater monitoring wells at the Lockheed Martin Great Neck facility. The Lockheed Martin facility is located at 365 Lakeville Road in Great Neck, New York. The objective of this well installation is to monitor groundwater quality at two specific locations of the site as identified in the New York State Department of Environmental Conservation (NYSDEC) Record of Decision (ROD). This work plan will be submitted to the NYSDEC for review and approval.

This work plan is organized into the following sections:

- Section 2 - Site Overview, presenting a brief description of site background and geology;
- Section 3 - Groundwater Monitoring Well Installation Program, presenting the technical approach, well locations, and a description of the field methodology to be employed;
- Section 4 - References, presenting a list of previous reports referenced in this work plan.

A site safety and health plan is included in Appendix A.

Section 2

Site Overview

2.1 SITE BACKGROUND

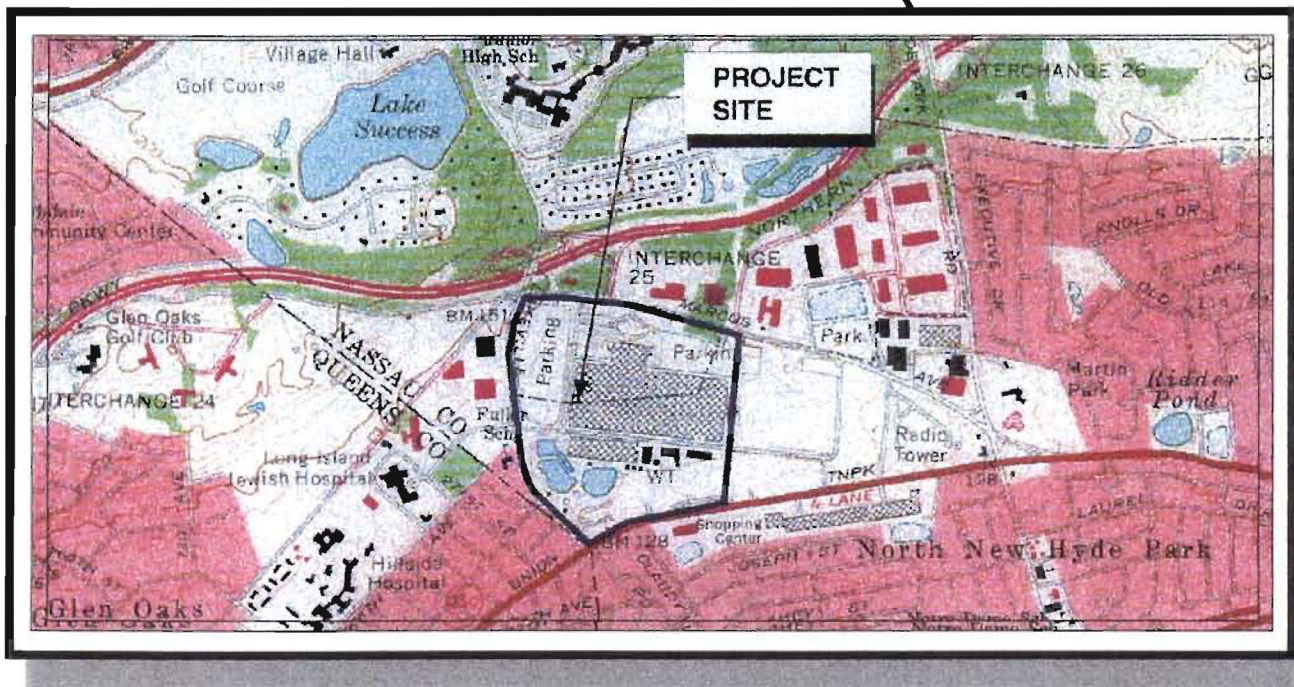
The Lockheed Martin facility consists of approximately 94 acres and is located at 365 Lakeville Road in Great Neck, New York - See *Figure 2-1 and Figure 2-2*. The facility was constructed in 1941 and formerly consisted of manufacturing operations for the design and production of a wide range of defense related equipment, navigational systems, and radar tracking systems. 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. 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 solvents¹. The facility is currently undergoing decommissioning and closure for potential redevelopment of the property.

2.2 SITE GEOLOGY

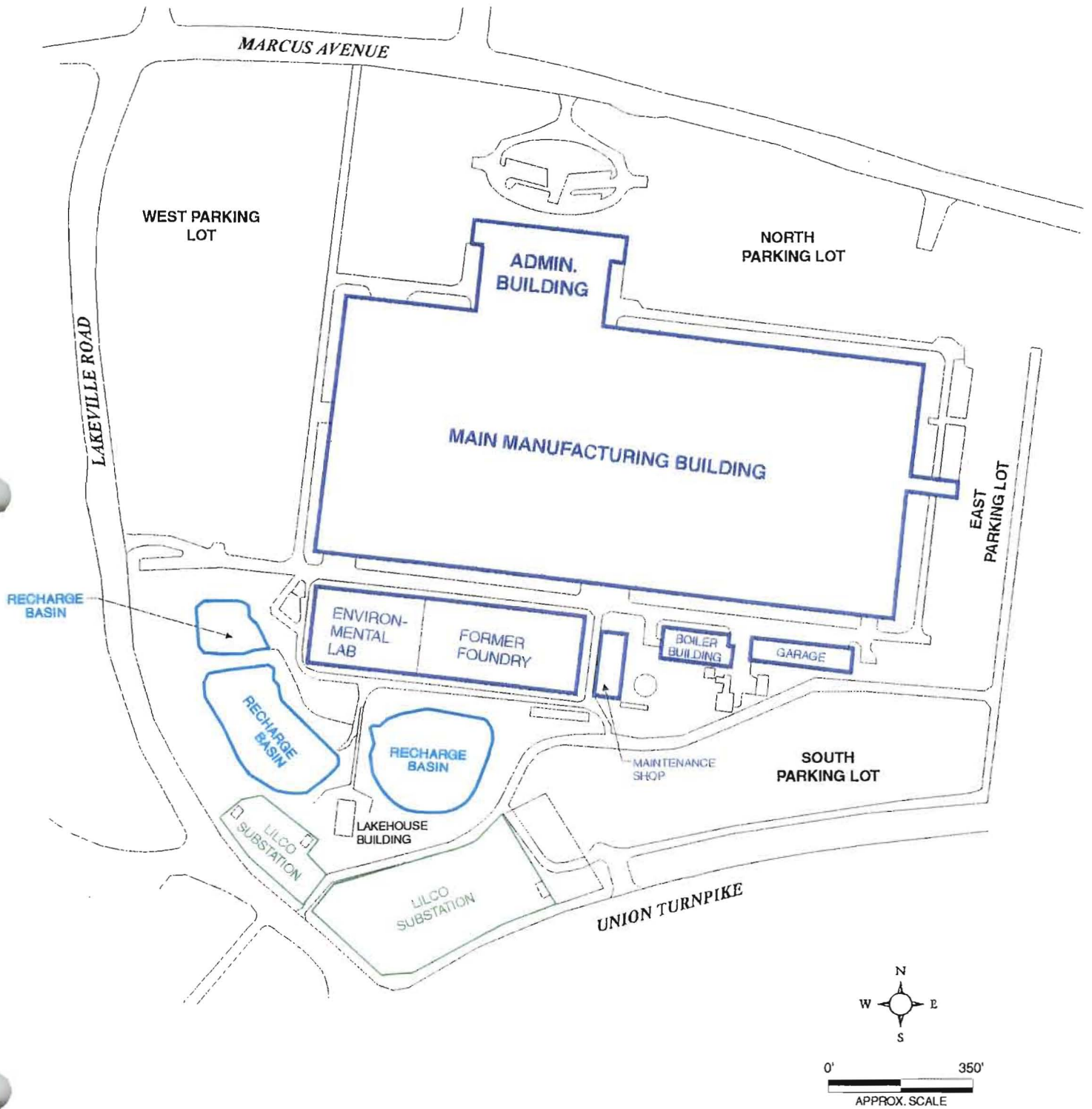
The Lockheed Martin site and surrounding area is underlain by unconsolidated sedimentary deposits and Precambrian Age bedrock. Based upon boring logs and geologic publications of the surrounding area, the unconsolidated deposits are approximately 700 feet thick and lie unconformably upon the

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**



bedrock. The unconsolidated deposits are comprised of the following formations (from youngest to oldest: Upper Pleistocene glacial deposits, Late Cretaceous Magothy Formation, and Late Cretaceous Raritan Formation).

The glacial deposits are comprised of stratified, fine to coarse sands and gravels interbedded with silts and thin clay lenses. Based upon boring logs, glacial deposits at this site are approximately 150 feet thick. The glacial deposits lie unconformably over the Magothy Formation, which is composed primarily of fine to coarse sand with silt and clay lenses and is believed to be approximately 250 feet thick. This formation coarsens with depth and lies unconformably upon the Raritan Formation.

The Raritan Formation is composed of two members, the Upper Clay Member and the Lloyd Sand. The Upper Clay Member consists predominantly of light to dark clay with some silt and is approximately 200 feet thick in the study area. The Lloyd Sand is approximately 190 feet thick and is composed of light colored sand and gravel with, in some locations, a clayey matrix. The Lloyd Sand lies unconformably upon the Precambrian bedrock which generally consists of gneiss and biotite schist. The Bedrock, Magothy, and Raritan Formations gently slope (50 ft/mile) to the southeast.

Based upon measurements collected from the on-site monitoring well network, the depth to water at the site varies between 80 and 100 feet below ground surface (bgs).

Section 3

Groundwater Monitoring Well Installation Program

3.1 TECHNICAL APPROACH

The purpose of the groundwater monitoring well installation is to provide current data on groundwater quality at two specific locations of the site to monitor the selected remedial alternatives as agreed in the OU-1 ROD. The wells will be installed in accordance with requirements of the NYSDEC ROD for the Lockheed Martin site. The details of the proposed field methodologies are presented in Sections 3.1.1 to 3.1.6.

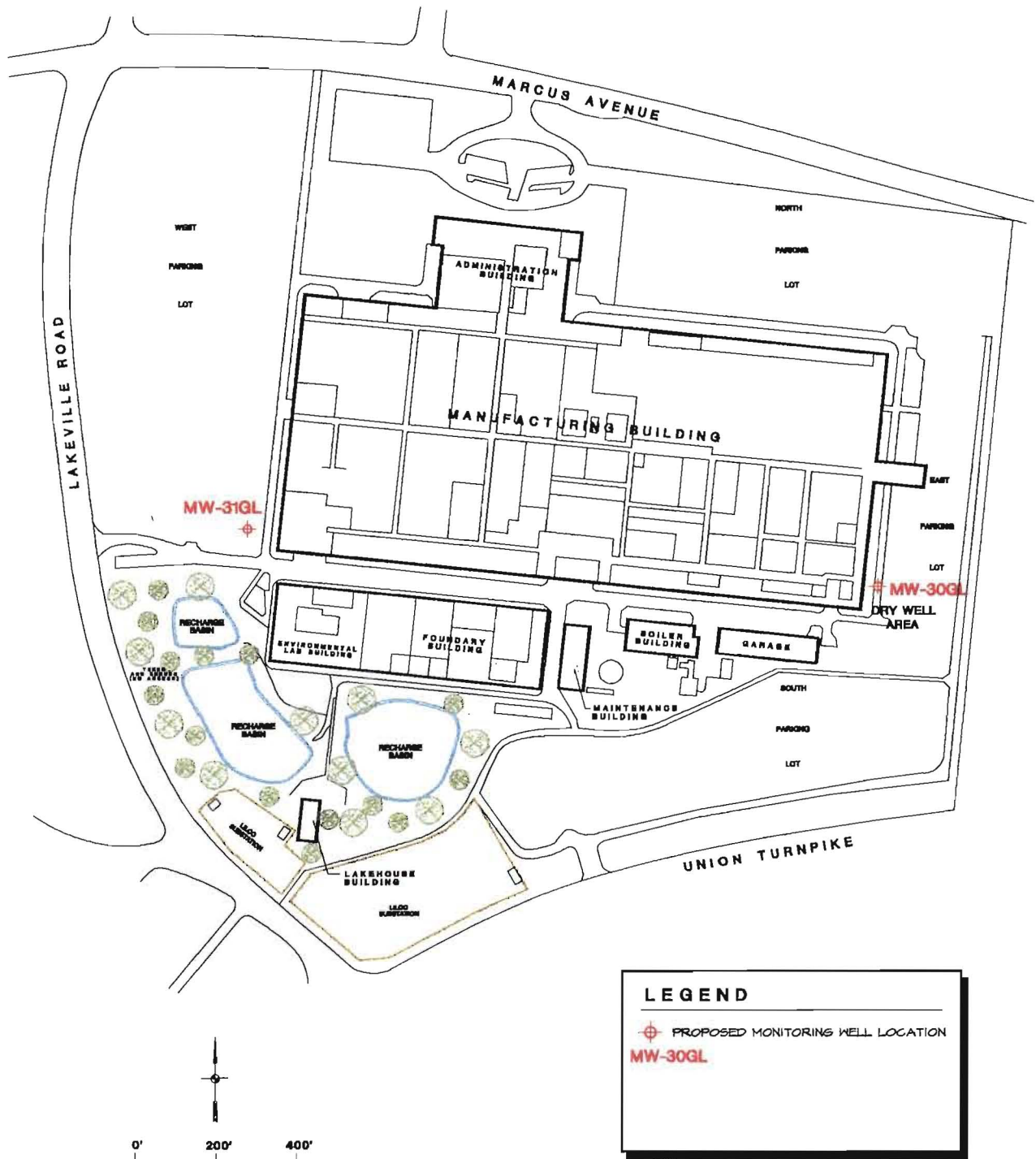
3.1.1 Site Preparation

Prior to initiating the field activities, an underground utility location service will be notified to mark public utility lines. The first 5 feet of each borehole will be hand augered to check for the presence of underground utilities. Utility lines which cross the proposed well locations will be identified and the well locations will be relocated, as necessary. If relocation is required, the wells will be moved to an alternative location within 20 feet of their original location.

3.1.2 Proposed Monitoring Well Locations

Two groundwater monitoring wells will be installed at the Lockheed Martin facility at the locations shown on Figure 3-1. One well (MW-GL30) will be installed immediately downgradient of the Dry Well Area, adjacent to the existing soil vapor extraction (SVE) system.

FIGURE 3-1
 PROPOSED MONITORING WELL LOCATIONS



Section 3

Groundwater Monitoring Well Installation Program

3.1 TECHNICAL APPROACH

The purpose of the groundwater monitoring well installation is to provide current data on groundwater quality at two specific locations of the site to monitor the selected remedial alternatives as agreed in the OU-1 ROD. The wells will be installed in accordance with requirements of the NYSDEC ROD for the Lockheed Martin site. The details of the proposed field methodologies are presented in Sections 3.1.1 to 3.1.6.

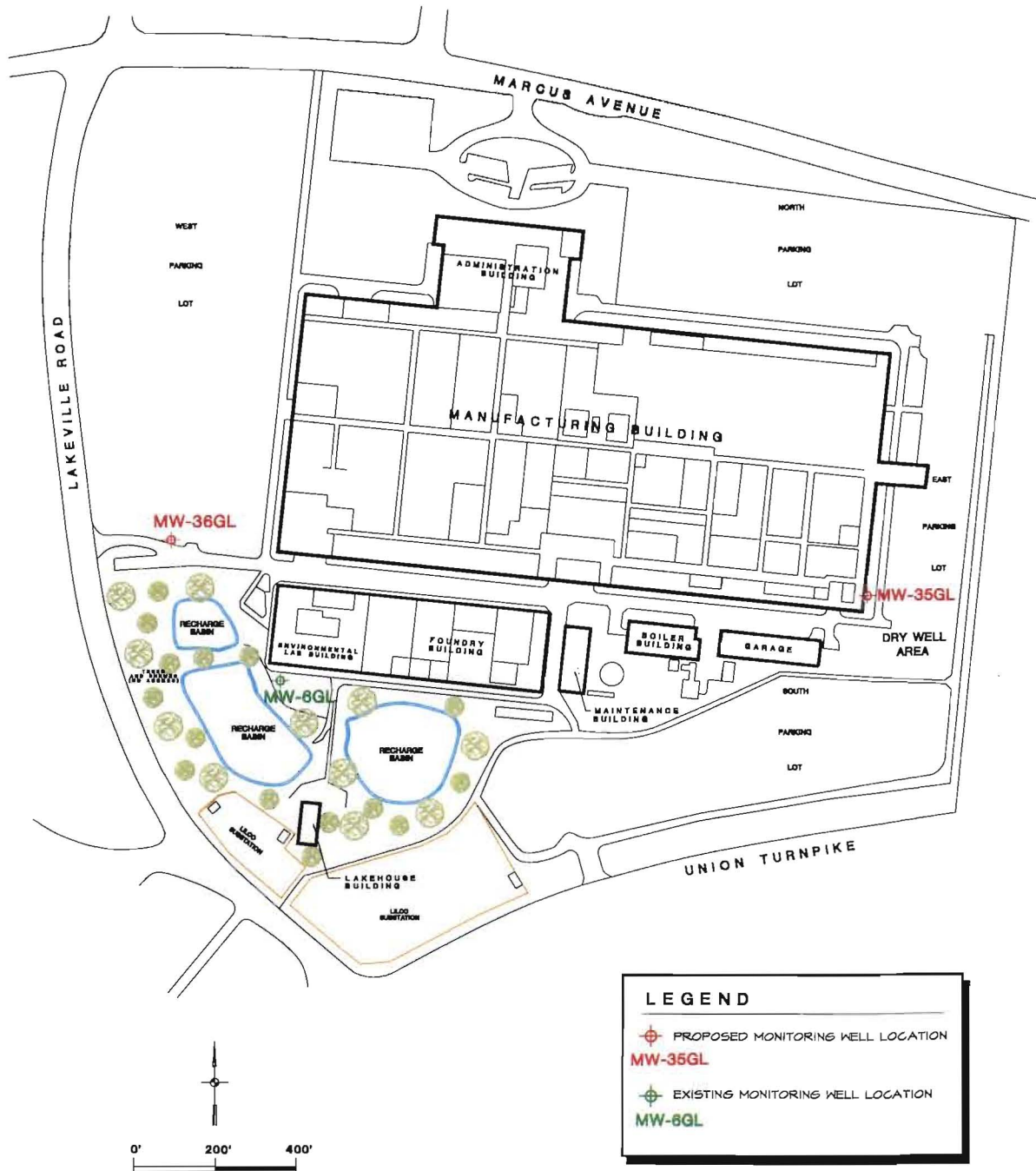
3.1.1 Site Preparation

Prior to initiating the field activities, an underground utility location service will be notified to mark public utility lines. The first 5 feet of each borehole will be hand augered to check for the presence of underground utilities. Utility lines which cross the proposed well locations will be identified and the well locations will be relocated, as necessary. If relocation is required, the wells will be moved to an alternative location within 20 feet of their original location.

3.1.2 Proposed Monitoring Well Locations

Two groundwater monitoring wells will be installed at the Lockheed Martin facility at the locations shown on Figure 3-1. One well (MW-GL35) will be installed immediately downgradient of the Dry Well Area, adjacent to the existing soil vapor extraction (SVE) system.

**FIGURE 3-1
PROPOSED MONITORING WELL LOCATIONS**



The purpose of MW-35GL is to monitor and evaluate the effectiveness of the SVE system on groundwater quality. A second well (MW-36GL) will be installed downgradient to the northwest of the site recharge basins. The purpose of MW-36GL is to monitor the groundwater quality downgradient of the facility's three storm water retention basins.

3.1.3 Installation Procedures

Well MW-35GL will be installed within 30 feet of the Dry Well Area at the location shown in Figure 3-1 (36 feet north and 9 feet east of the building corner). The well will be installed in the Upper Glacial Aquifer with a 20-foot screen to a terminal depth of approximately 135 feet bgs.

Based on discussions with NYSDEC, MW-36GL will be completed in the Upper Glacial Aquifer with a 20-foot screen to a terminal depth of approximately 135 feet bgs at the location shown in Figure 3-1.

The wells will be installed using a CME-75 drill rig fitted with hollow stem augers, or equivalent, to reach the desired well depth¹. A split spoon sampler will be used to collect samples at 10-foot intervals in each of the two borings. The samples will be collected for on-site evaluation and logging of the lithology. One sample from the screened interval will be delivered to a Lockheed Martin representative for analysis of total organic carbon.

Soil cuttings generated during the well installation will be stored at a designated staging area. All drill cuttings and associated waste will be characterized and disposed of in accordance with the NYSDEC Final Division Technical and Administrative Guidance Memorandum - Disposal of Drill Cuttings.

¹ Rather than using mud rotary drilling techniques, the hollow stem auger method will be used to prevent the introduction of foreign materials into the borehole or aquifer. Further, use of hollow stem augers will allow the collection of undisturbed samples from the borehole for logging and analysis

3.1.4 Monitoring Well Construction

Each of the wells will be constructed using 4-inch, flush threaded, schedule 80 PVC risers, and 4-inch diameter 0.02-inch slot screen. The screens will not exceed 20 feet in overall length. The annular space around the well screen will be filled with a Morie #2 gravel pack, or equivalent, extending from 1 foot below the bottom of the screen to 2 feet above the top of the screen. Two feet of hydrated bentonite pellets will be placed above the sand pack. The remaining annular space will be tremie-grouted with bentonite cement slurry to approximately 3 feet below grade. Each well will be finished with a water tight locking cap and a protective steel monument set in concrete. The wells will also be surveyed into the existing monitoring well network system.

3.1.5 Well Development

After the wells have been allowed to set for 24 hours, they will be developed. Development consists of two steps: (1) surging; and (2) bailing. Surging consists of operating a submersible pump or equivalent to force water into and out of the screen. The surging settles the sand pack and helps remove silt that may have entered the sand pack or screen during the installation procedure. The well will then be bailed to remove any suspended sediment and other materials that may have been introduced into the well during the installation and surging process. Bailing will continue until approximately four well volumes of water or until an acceptable water quality is achieved.

Specific conductivity, pH, and temperature will be measured during well development until parameters have stabilized. Well development will continue until turbidity measurements below 50 NTUs have been achieved.

The development water will be containerized and transported to the on-site groundwater IRM system for treatment.

3.1.6 Field Quality Assurance / Quality Control Procedures

Field quality assurance and quality control procedures include several actions that will minimize cross-contamination:

- Soil augers will be steam cleaned prior to the start of each new boring;
- The split spoon sampler will be washed in a solution of non-phosphate detergent and clean tap water, and final rinsed in distilled water between each sample;
- Clean stainless steel liners will be used for each sample.

In addition to a field notebook, which will be used to record the daily log of site activities, the following forms will be used to record data generated in the field:

- **Daily Record of Work Progress:** This form will be used to record the names of project personnel on the site, equipment on-site, materials delivered to the job, items of work completed, and a daily summary.
- **Boring Description Log:** The field geologist will use this form to record soil types and other relevant data for each boring;
- **Well Development Log:** The field geologist will use this form to record specific conductivity, pH, temperature, and turbidity measurements for each well;
- **Tailgate Safety Meeting:** This form is used to record all safety issues that are discussed by the Site Safety Officer with all personnel prior to starting work. These issues include hazards that may be encountered during work, preventive health and safety measures, and emergency hospital routes.

Section 4

References

1. Phase I Environmental Assessment Report
Lockheed Martin Tactical Defense Systems
H2M Associates, Inc., April 1997
2. Scope of Work for Monitoring Well Installation
Lockheed Martin Tactical Defense Systems
H2M Associates, Inc., July 1997

Appendix A

TETRA TECH SITE SAFETY AND HEALTH PLAN

Site Name: Lockheed Martin Great Neck Facility
Project Monitoring Well Installation
Project SVE Evaluation Drilling and Sampling

Project Numbers: TC 1768-01 and TC 1768-05

Original Site Safety Plan: Yes (X) No ()

Revision Number 0

Plan Prepared by Nisha Bansal Date February 9, 1998
Nisha Bansal
Project Manager

Plan Approved by Christine McClain Date February 9, 1998
Christine McClain, CIH
Corporate Health and Safety Manager

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- Attachment A MSDS for Isobutylene
- Attachment B Site Safety Inspection Form
- Attachment C Health and Safety Compliance Statement
Site Safety Plan Consent Agreement
- Attachment D Tailgate Safety Meeting Form
- Attachment E LMC Contractor's ESH Handbook

EMERGENCY PHONE NUMBERS

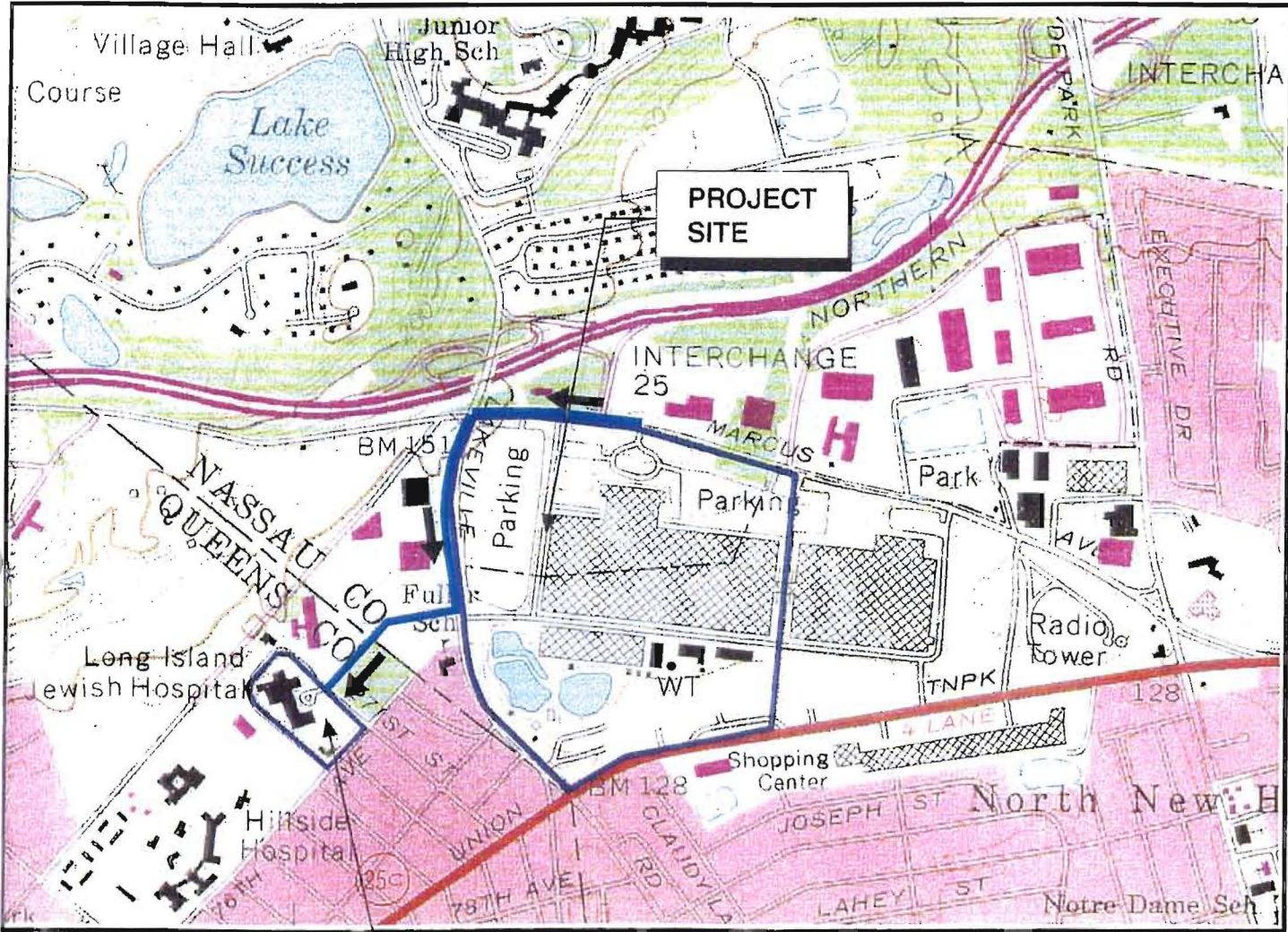
<u>Person</u>	<u>Title</u>	<u>Phone #</u>
	Fire	911
	Police	911
	Ambulance	911
	Poison control center	911
Dan Batrack	Program Manager	(626) 351-4664
Nisha Bansal	Project Manager	(626) 351-4664
	Nearest on-site phone (Project Site)	(516) 574-1283
Dr. Elayne Theriault	Medical advisor	(800) 229-3674 ext.326
Bob Gilbert	Lockheed Martin, Burbank Client contact	(818) 847-0210
Eric Wang	Lockheed Martin, Burbank Client contact	(818) 847-0511
Brian Shaughnessy	Lockheed Martin, Safety & Health Manager	(818) 847-0232
Robert Gibbons	Lockheed Martin, Local Client contact	(516) 574-1828
	Pager	(516) 560-3686
Facility Internal Emergency Number		(516) 574-3333
	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.

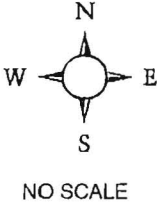
Written and visual(next page) directions to the nearest hospital:

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**



**LONG ISLAND
JEWISH HOSPITAL**



1.0 FACILITY BACKGROUND

1.1 Site Description

Type: Spill () Fire () HW Site () Industrial Facility (X)

Lockheed Martin Great Neck Facility

History: The 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: The 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: The facility is located at 365 Lakeville Road in Great Neck, New York.

Status: Active (X) Inactive ()

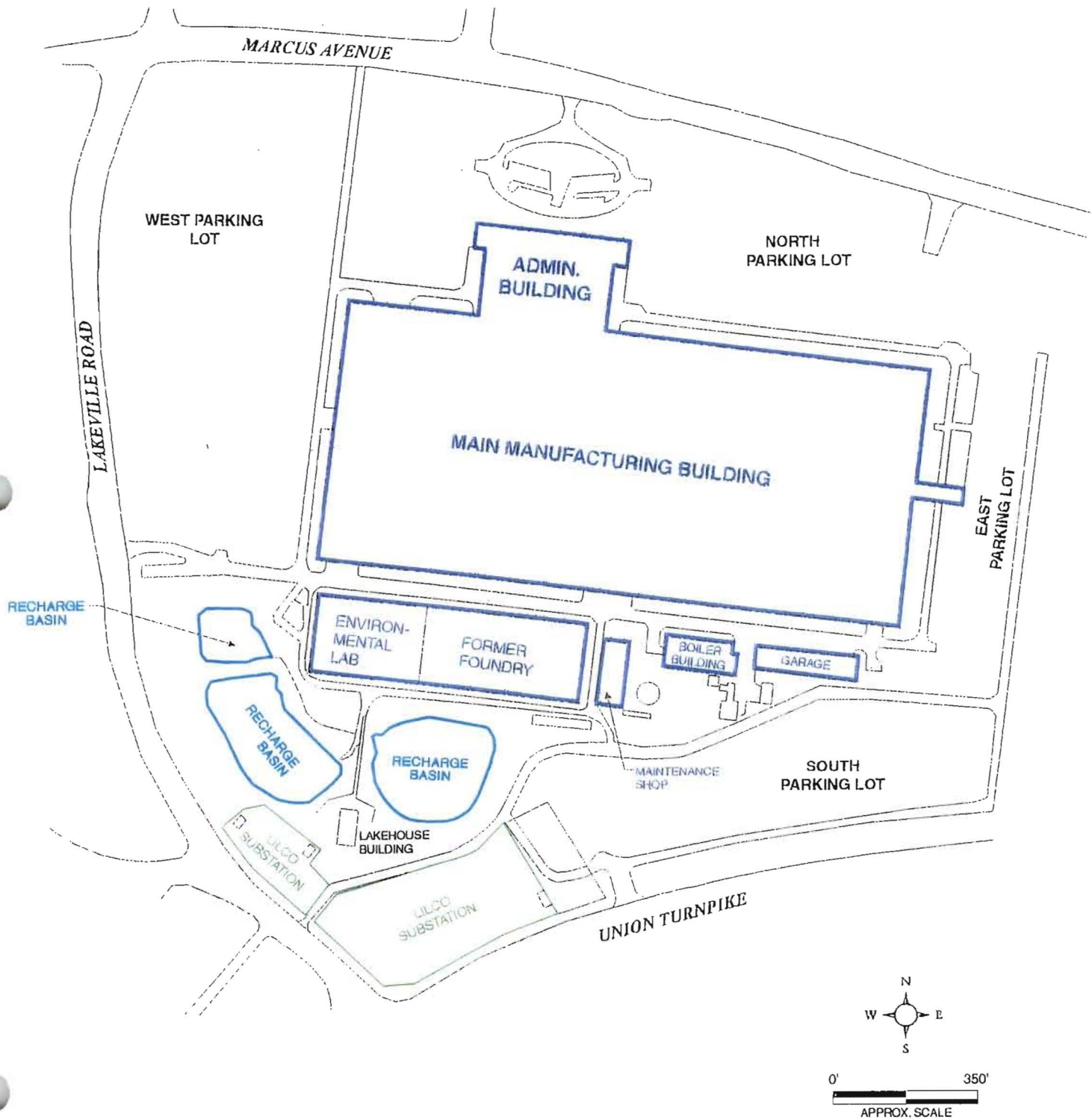
Manufacturing operations have been terminated. Current activity includes program administration and engineering, prototype assembly and electronics integration, testing and development.

Surrounding Population: Industrial/Commercial/Residential

Topography: Generally flat

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

**FIGURE 2
SITE OVERVIEW**



1.2 Goals

MONITORING WELL INSTALLATION

The scope of work for the monitoring well installation project is to install and develop two wells to monitor groundwater quality downgradient of the dry well area located adjacent to the existing soil vapor extraction (SVE) system and downgradient of the site recharge basins. The wells will be constructed to a proposed depth of 95 and 135 feet below ground surface (bgs) using a hollow stem auger drill rig. Soil samples will be collected at 10-foot intervals for lithologic logging.

SVE EVALUATION DRILLING AND SAMPLING

The scope of work for the SVE evaluation drilling and sampling project is to drill and sample four soil borings to determine the vertical and lateral extent of volatile organic compounds (VOCs) in the vicinity of three dry wells located near the southeast corner of the main building. The purpose of verifying the extent of VOCs around the dry wells is to provide updated analytical data for use in evaluation of the soil vapor extraction (SVE) system currently installed and operating at the Lockheed Martin facility. One center boring and three perimeter borings will be conducted to a depth of 70 feet below ground surface (bgs) using a hollow stem auger drill rig. Soil samples will be collected at 10 foot intervals for VOC analysis.

2.0 HAZARD RISK ANALYSIS

2.1 Job Hazard Evaluation

The following is a task-specific evaluation of hazards associated with the well installation and SVE evaluation drilling. 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) Heavy Equipment (Drilling) Operations for Well Installation and SVE Evaluation Drilling

Hazards:

- Trauma-type injuries may occur by mechanical failure of heavy equipment (drill rig), 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 extremely low ambient temperature, such as cold stress, may occur during field operations.
- Loss of equipment control, including “run-away” equipment.
- Exposure to chemicals in soil that is removed during drilling may be caused through contact, ingestion and/or inhalation pathways.
- Hazards associated with vehicular traffic in the parking lots.
- Noise generated from the drilling operations.

Preventive Measures:

- To reduce trauma-type injuries, only trained and properly attired (Level D) personnel will be permitted to operate the drill rig and work in the vicinity of heavy equipment. An exclusion zone encompassing the drill rig will be installed to clearly indicate restricted areas for untrained or nonessential personnel.
- Overhead power lines will be considered live and dangerous. The drill mast will not be raised within 20 feet of an overhead line and will be positioned so that its arm is out of swing range of any overhead lines. Known buried utilities will be identified and marked. The first five feet of each borehole will be hand augered to check for the presence of underground utilities. The boring 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 cold stress, workers will be required to wear cold protective clothing. Alternating work/rest intervals will be employed, based on recommendations by the Site Safety Officer. All workers will be trained to recognize obvious symptoms related to cold stress. A detailed description of medical surveillance and procedures to reduce the risk of cold stress are presented in Section 5.5.
- At the beginning of each shift, the drilling subcontractor shall perform a visual inspection of the drill rig to insure all equipment and safety devices are in safe and operational condition and free of apparent damage to include guarding or enclosure of moving parts, securing of air hoses,

cables, leveling and blocking equipment and emergency stop device. The mast will not be raised until the rig has been blocked, leveled and chalked.

- Preventive measures associated with chemical hazards are presented in Section 2.2.
- 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.
- Noise hazards will be controlled by wearing hearing protection (i.e. ear plugs).

3) Soil Sample Collection / Sample Handling

Hazards:

- Trauma-type injuries may occur by accidents or improper handling of sampling equipment and tools.
- Chemical hazards associated with potentially impacted soil in the samples may occur through contact, ingestion and/or inhalation routes.

Preventive Measures:

- Sampling will be conducted only by staff that are trained and properly attired (Level D) to handle potentially impacted soil.
- 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 eastern portion of the south parking lot.

The following table presents the applicable permissible exposure limits (PELs) as defined by the Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Air Contaminants. These PELs represent time weighted average values based on an 8 hour work day, 40 hour work week to which nearly all workers may be repeatedly exposed without adverse effects. In the absence of an OSHA PEL, the ACGIH TLV was reported. Other exposure limits are expressed as short term exposure limits (STELs) which generally represent limits not to be exceeded for time periods longer than 15 minutes.

<u>COMPOUND</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>	<u>STEL</u>
1,2-DCE	200 ppm	200 ppm	Not Established
PCE	100 ppm	25 ppm	100 ppm
TCE	100 ppm	50 ppm	100 ppm

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit

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

- 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;
- Slip, trip and fall, and
- Noise hazard.

2.3.1 Temperature Stress

HEAT 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.

COLD STRESS

As with excessive heat, cold conditions may also present a health risk to employees during field activities. Two factors influence the risk potential for cold stress: temperature and wind velocity. Bare flesh and areas of the body which have high surface area to volume ratios such as fingers, toes, and ears are most susceptible to wind chill or extremely low ambient temperatures. Procedures that shall be implemented to prevent or reduce the risk of cold stress include:

- Training to familiarize individuals with cold stress syndrome;
- Implementation of work/rest cycles, as appropriate, to reduce the duration of exposure to the cold and allow employees to warm up;
- Availability of warm liquids to provide internal warming;
- Utilization of appropriate cold protective clothing to protect exposed skin surfaces, such as facemasks, hardware, and footwear; and,
- Utilization of extra insulating clothing, if necessary.

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.

2.3.5 Noise Hazard

All personnel will be made aware of noise generated during drilling operations. Noise hazards will be controlled by wearing hearing protection (i.e. ear plugs).

2.4 Hazard Assessment Summary

The principal hazard for this project will be from accidents involving trauma type injuries. Control of these hazards will be accomplished through site reconnaissance, hazard identification, training of site personnel, PPE, and supervision of site activities.

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 SSSH will ensure that all subcontractor employees have received appropriate training and medical clearance.

3.2 SITE SAFETY and HEALTH OFFICER:

The SSSH, 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 SSSH 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. Work area inspections will include both environmental and safety and health (ESH) project requirements as documented in Section IV of the LMC Contractor's ESH Handbook (rev.12/8/97). Inspections will address both SSHP compliance and environmental issues (i.e., waste container labeling, storage, etc.).

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. The employee will be informed of any medical conditions that would result in work restrictions that 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.

5.5 Cold Stress Monitoring

Specific monitoring criteria will not be established for cold stress. However, employees will be familiar with the signs and symptoms of frostbite and hypothermia and adjust work schedules and warm up regimes for temperature and wind conditions. The causes, signs, symptoms, and treatment methods for two primary forms of cold stress (frostbite and hypothermia) are discussed below.

FROSTBITE

Causes and Effects

Frostbite occurs when ice crystals form in body tissue, usually the nose, ears, chin, cheeks, fingers, or toes. Frostbite develops in stages. Early on, pain may be felt in the affected area, but later goes away. The area may then feel numb and very cold. The stages and degrees of frostbite damage are as follows:

Frostnip or Incipient Frostbite - Skin is balanced or whitened and feels hard on the surface. Underlying tissue still feels soft.

Moderate Frostbite - Large blisters may form on the surface and underlying tissue.

Deep Frostbite - Tissues are cold, pale, and hard. Tissue damage may be severe.

Treatment

- Move person to a warm place.
- Immerse the frozen part in warm (100 - 105 F) but not hot water. Handle them gently and do not rub or massage.
- After warming, loosely bandage and seek medical treatment.

HYPOTHERMIA

Causes and Effects

Systemic hypothermia (whole body cooling) is caused by exposure to freezing or rapidly dropping temperature. Several factors increase susceptibility to hypothermia including age (very young or old), smoking, alcoholic beverages, fatigue, and wet clothing.

The signs and symptoms of hypothermia include:

- shivering (uncontrollable or even violent)
- dizziness
- numbness
- weakness
- impaired judgment
- impaired vision
- drowsiness

The signs and symptoms generally follow five stages:

1. Shivering
2. Apathy, listlessness, sleepiness
3. Loss of consciousness
4. Decreased pulse and breathing rate
5. Death

Treatment

- Move a victim of hypothermia to a warm environment as soon as possible.
- Remove any wet clothing and redress with loose, dry clothes.
- Warm, sweet drinks and soups should be provided for internal warming and caloric intake.

PREVENTION OF COLD STRESS

Exposed skin surfaces should be protected by use of appropriate cold protective clothing. These protective items can include facemasks, handware, and footwear. Employees should wear cold protective clothing for the level of cold and physical activity with an objective to protect all parts of the body with emphasis on hands and feet. Provisions for keeping the workers hands warm in addition to use of insulated gloves include use of warm air jets and radiant heaters. Adequate insulating clothing to maintain body core temperatures above 36 C should be used. The use of extra insulating clothing and/or a reduction in the duration of exposure period are special precautions. Wet or damp clothing should be changed as soon as possible. During periods of extreme cold (10 F or less), workers should use the buddy system for constant protective observation.

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 drill rig) 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 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 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-Mask or Full-Face w/ Cartridge

Canister/Cartridge Type: North N7500-83 or equivalent

Protective Clothing:

Suit 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 drill rig will not be placed within 20 feet of overhead electrical wires with the arm in the upright position.

The work zone for this site shall consist of a 10 foot radius surrounding the drill rig. The entry/exit point to and from the delineated work/exclusion zone encompassing the drill rig will take place at the rear of the rig. 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 8.1. In such cases, workers handling soil

samples in the support zone will be required to comply with work zone PPE criteria. Persons handling soil 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
Drilling for Monitoring Well Installation	VOCs (PCE)	PID	Every 30 minutes	Background to 25 ppm > 25 ppm to 100 ppm > 100 ppm	Level D PPE Level C PPE Stop work; implement vapor suppression controls
Drilling for SVE Evaluation	VOCs (PCE)	PID	Every 30 minutes	Background to 25 ppm > 25 ppm to 100 ppm > 100 ppm	Level D PPE Level C PPE Stop work; implement vapor suppression controls

Rationale for upgrade/downgrade matrix:

The decision to upgrade to Level C protection at 25 ppm PID readings is based on 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.

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 field 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 field 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.

<u>Gesture</u>		<u>Message</u>
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

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).
- Lockheed Martin Contractor's ESH Handbook (Attachment E)

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. December 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
 EMERGENCY PHONE: (919) 220-0803
 NUMBER

1. CHEMICAL PRODUCT

PRODUCT NAME: ISOBUTYLENE IN AIR

SYNONYMS: None

2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS#	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
ISOBUTYLENE	C ₄ H ₈	115-11-7	1-1500 PPM	NE	NE	NE	NE
AIR	O ₂	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 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

(page 1 of 3)

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 Great Neck Facility

(TC #) 1768-01/1768-05

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 Great Neck Facility. 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

HOSPITAL ADDRESS _____ PHONE () _____

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

Revision date: 12/08/97

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, visitors, and the public 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 **Contractor 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 documented safety meetings.
 - l. Periodic documented work area safety inspections and corrective actions.
- 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;

GENERAL (cont.)

- 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 Supervisor: 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 (Subcontract Administrator/Buyer) for the project.
- I. Lockheed Martin Safety and Health Supervisor: 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) Supervisor.
- 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 exist. 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.

II. SAFETY & HEALTH (cont.)

- 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 (85 dBA over a 8-hour time-weighted average 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, State, 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 Supervisor 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);

II. SAFETY & HEALTH (cont.)

- 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 Supervisor 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.*

II. SAFETY & HEALTH (cont.)

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

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 Supervisor (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;

II. SAFETY & HEALTH (cont.)

- 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 Supervisor, 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. Fall protection systems and devices shall be inspected prior to each use.

II. SAFETY & HEALTH (cont.)

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 Supervisor and/or Safety & Health Supervisor 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 Supervisor 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 Supervisor, 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 (discontinued) 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 Supervisor 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. CO₂ 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 Supervisor.
6. Contractor shall report all fires extinguished by the Contractor to the Lockheed Martin Project Supervisor.

II. SAFETY & HEALTH (cont.)

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 Sheet (MSDS) and the container is appropriately labeled. MSDS's must be maintained at the job site.
2. Contractor shall notify the Lockheed Martin Project Supervisor prior to bringing onto Lockheed Martin property large quantities of hazardous materials (i.e., >55 gallons liquid, >500 lb solid, >200 ft³ 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 Supervisor 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 Supervisor shall provide the following information:

II. SAFETY & HEALTH (cont.)

- 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 area, 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 Supervisor 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

II. SAFETY & HEALTH (cont.)

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 Supervisor. 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 asbestos abatement 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;

II. SAFETY & HEALTH (cont.)

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 Supervisor before transporting or disposing of any hazardous waste. Lockheed Martin must review all hazardous waste manifests prior to shipment.

II. SAFETY & HEALTH (cont.)

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 and ensure the participation of all employees engaged in asbestos-related work who may reasonably be expected to be exposed to asbestos fibers from asbestos containing construction materials.

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. Periodic work area inspections: Contractor agrees to perform periodic 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.

III. ENVIRONMENTAL (cont.)

- 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 Supervisor 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 Lockheed Martin Project Supervisor 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 Supervisor 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 Supervisor and obtain the approval of Lockheed Martin before discharging any material into storm drains or sewers.

IV. REQUIREMENT TO PERFORM & DOCUMENT SELF-AUDITS

Contractor agrees to perform periodic work area/project field inspections to monitor compliance with project environmental, safety and health (ESH) requirements. These self-audits or inspections provide a mechanism of self-governance whereas the Contractor performs a self-assessment to determine compliance to project ESH requirements. In addition, these inspections provide the opportunity to identify and correct non-compliance conditions or work activities. These inspections shall be documented and available to Lockheed Martin upon request for review.

V. 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.

VI. LOCKHEED MARTIN POINTS OF CONTACT

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

“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