

**HEALTH AND SAFETY PLAN
TUTU SERVICE STATION INVESTIGATION
ST. THOMAS, U.S. VIRGIN ISLANDS**

September, 1991

Prepared for
Tutu Environmental Investigation Committee

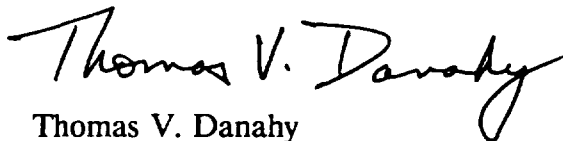
Prepared by
Geraghty & Miller, Inc.
Environmental Services
201 West Passaic Street
Rochelle Park, New Jersey 07662
(201) 909-0700

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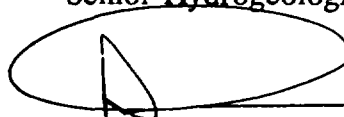
September 24, 1991

Geraghty & Miller, Inc. is submitting this report on behalf of the TUTU Environmental Investigation Committee, Tutu Wells Site, St. Thomas, U.S. Virgin Islands. This Health and Safety Plan was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets the highest standards in terms of the methods used and the information presented. If you have any questions or comments concerning this plan, please contact one of the individuals listed below.

Respectfully submitted,
GERAGHTY & MILLER, INC.



Thomas V. Danahy
Senior Hydrogeologist/Project Manager



Daniel A. Nachman
Vice President/Project Officer

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1. Field Audit Checklist, Tutu Service Station Investigation, Health and Safety Plan, St. Thomas, U.S. Virgin Islands.

**HEALTH AND SAFETY PLAN
TUTU SERVICE STATION INVESTIGATION
ST. THOMAS, U.S. VIRGIN ISLANDS**

INTRODUCTION

This Health and Safety Plan (HASP) has been prepared by Geraghty & Miller, Inc. for the Tutu Service Station Investigation to be conducted by the Tutu Environmental Investigation Committee (TEIC) at Anna's Retreat, St. Thomas, U.S. Virgin Islands (USVI). TEIC is comprised of representatives of Texaco Caribbean Inc. (Texaco) and Esso Virgin Islands, Inc. (Esso). The Tutu Service Station Investigation will be performed in accordance with the scope of work detailed in the Tutu Service Station Investigation Work Plan, St. Thomas, USVI (Geraghty & Miller, Inc. 1991a).

The HASP has been prepared for the purpose of providing protocols that will minimize the potential for exposure to chemical constituents and for accidental injury to workers during investigatory activities. Anyone else, such as responding parties, contractors, subcontractors, clients, and visitors, should review and adhere to this HASP. Copies of the HASP will always be on-site. All workers entering the site must first review the HASP and sign the Health and Safety Review Form (Figure 1).

BACKGROUND

The Tutu site is located in the upper Turpentine Run basin in east-central St. Thomas, U.S.V.I. Various commercial establishments line the major roads in the area. These establishments include the Texaco Tutu service station at the intersection of Highways 38 and 384 and the Esso Tutu service station on Highway 38 (Figure 2). Private homes and multi-family housing, such as the Virgin Islands Housing Authority (VIHA) buildings, generally occupy the less heavily traveled roads. Both the Texaco Tutu service station and the Esso Tutu service station are retail outlets for gasoline and private mechanical servicing of automobiles. Additionally, the Texaco Tutu service station sells diesel fuel.

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A brief reconnaissance of the area, performed by Geraghty & Miller in September 1990, revealed that there are other establishments that represent potential sources of constituents of concern to soil and ground water. These establishments include, but may not be limited to, the following:

- o The LAGA building, which formerly housed a textile processing operation.
- o A Jeep dealership and repair shop.
- o The Ramsay Motor dealership and repair shop.
- o Tillett Garden, where silk screening and pottery manufacturing and glazing are performed.
- o O'Henry dry cleaners.
- o The paint store.
- o The fire station.
- o The Vitelco facility.
- o Other small repair shops located on Highway 38.
- o Septic tanks.
- o The sanitary/storm sewer line(s).

The locations of these establishments, with the exception of the sanitary/storm sewer line(s), are shown on Figure 3.

Sampling and laboratory analysis of residential and commercial wells in the area by the U.S. Environmental Protection Agency (USEPA) Technical Assistance Team (TAT) in 1987 and 1988 indicated the presence of some volatile organic compounds (VOCs) in ground water. In September 1990, February 1991, and June 1991, sampling and analysis of supply wells in the Tutu area were conducted by Geraghty & Miller and Soil Tech in accordance with a USEPA-approved work plan (Geraghty & Miller 1991b; 1991c; 1991d).

BASIS FOR HEALTH AND SAFETY DIRECTIVES

INVESTIGATION TASKS

The objectives of the Tutu Service Station Investigation are to delineate the potential sources, the horizontal and vertical extent, and potential migration pathways of petroleum hydrocarbon products in soil and ground water in the vicinity of Route 38 within the Tutu Wells Site. The USEPA is also concerned about chlorinated hydrocarbon compounds (i.e., tetrachloroethene and its breakdown products) that have been detected in ground water in the Tutu area (Geraghty & Miller 1991b; 1991c; 1991d). To assist the USEPA in evaluating the Tutu area, the TEIC has agreed to install deep monitoring wells (i.e., screened below the water table) and analyze all soil and ground-water samples for target compound list (TCL) VOCs, which include petroleum hydrocarbon constituents and chlorinated hydrocarbons. To achieve this, the following tasks will be performed as a part of the investigation:

- Task 1: Soil Sampling of Borings and Monitoring Wells.
- Task 2: Performance of Borehole Geophysical Surveys.
- Task 3: Well Installation and Development of Monitoring Wells.
- Task 4: Evacuation and Sampling of Monitoring Wells.
- Task 5: Performance of a Pumping Test.
- Task 6: Investigation of Free Product.
- Task 7: Potential Recovery of Free Product.

A detailed discussion of these tasks is presented in the Work Plan (Geraghty & Miller 1991a).

POTENTIAL HAZARDS EVALUATION

Physical hazards which may be encountered during the investigation include those associated with (1) the operation of drilling rigs, (2) the proximity of motor vehicle traffic, and (3) heat stress.

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Potential chemical hazards may occur as a result of contact with site constituents of concern. The following exposure pathways have been identified:

- Dermal contact with ground water, cuttings, and soils, or with equipment which has been in contact with those media.
- Inhalation of vapors associated with constituents of concern.
- Ingestion of ground water or soil that contains constituents of concern.

Constituents of concern that have been detected in site ground water and soil vapor are provided in Table 1. The time-weighted average (TWA) Threshold Limit Values (TLVs) and Permissible Exposure Limits (PELs) for each constituent are shown in Table 2.

AIR MONITORING

Air monitoring will be conducted during each field activity to ensure that the crew is adequately protected from potential chemical hazards. A photoionization detector (PID), such as an HNU will be used to detect VOCs in air in the parts per million (ppm) range. The HNU will be calibrated on a daily basis and all calibration records will be kept on-site. If high humidity interferes with the sensitivity of the PID, a flame-ionization detector (FID)-equipped organic vapor analyzer (OVA) will be used instead. An OVA will be kept on-site as a back-up for the HNU. To confirm the presence of specific compounds, Draeger tubes and a portable gas chromatograph (GC) will be used. An explosimeter will also be available to detect the presence of flammable/explosive gas.

HNU CALIBRATION PROCEDURES

An HNU Systems Model 81-HW101-100 or Model PI-101 photoionization detector with 10.2 electron-volt lamp will be used on a semi-continuous basis to monitor the breathing zone of workers during drilling and sampling activities.

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The instrument will be calibrated every day prior to initiating activities. The calibration gas will consist of a mixture of isobutylene and air. The calibration procedure is as follows:

- o A battery check will be performed to ensure that there is sufficient charge in the battery.
- o The function switch will be turned to the standby position. The zero adjustment knob will then be adjusted so that the instrument reading is 0 ppm.
- o The tip of the HNU 8-inch extension probe will be fitted into the tubing from the calibration gas container.
- o The valve of the calibration gas container will be opened until there is a slight flow of gas.
- o The span on the HNU will be adjusted so that the instrument reading is the same as the calibration gas concentration.
- o If the adjusted span setting is below the manufacturer's recommendations, appropriate maintenance will be performed.

Each time the instrument is calibrated the following information will be recorded: serial number of the instrument, time and date, span setting, instrument response, weather conditions, and the name of the person who performed the calibration.

OVA CALIBRATION PROCEDURES

High humidity may cause reduced sensitivity of the HNU due to condensation of water vapor on the ultraviolet lamp. Exposure of the HNU to abrupt changes in temperature or humidity should be avoided to minimize the effect of condensation. Due to convenient

operational handling, the HNU is the preferred field instrument. However, if reduced sensitivity is suspected (i.e., poor detection of known VOC sources or low span setting required for calibration), then the OVA should be utilized. An OVA unit and calibration gas will be kept on-site at all times as an alternative air monitoring device. The OVA will be calibrated as follows:

- o The H2 tank valve will be opened and the reading on the H2 tank pressure indicator will be checked. Approximately 150 psi of pressure is needed for each hour of operation.
- o The H2 supply valve will be opened approximately one-half to one turn and the reading on the H2 supply pressure indicator will be checked. The reading should be about 10 PSI.
- o Electronic bias adjustments should be made in accordance with the manufacturer's instructions.
- o The calibrate switch will be left on the X10 position and the calibrate adjust (zero) knob will be used to adjust the meter reading to 4 ppm.
- o The calibrate switch will be placed in the X1 position and trimpot R-31 on the circuit board will be used to adjust meter reading to 4 ppm. See Figure 4-1.
- o The calibrate switch will be moved to the X10 position again and the calibrate adjust (zero) knob will be used to adjust meter to a reading of 40 ppm.
- o The calibrate switch will be moved to the X100 position and trimpot R-33 on the circuit board will be used to adjust the meter reading to 40 ppm.

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- o The calibrate switch will be moved to the X10 position and the calibrate adjust (zero) knob will be used to adjust the meter reading to zero.
- o The unit is now balanced from range to range, calibrated to methane, and ready to be placed in normal service.
- o The ignitor button will be pressed and personnel will listen for the "pop" as the hydrogen ignites.
- o A methane sample of known concentration will be introduced and trimpot R-32 on the circuit board will be adjusted so that the meter reads equivalent to the known sample.
- o The OVA is now ready for use.
- o The OVA will be calibrated every day before use.
- o The calibration gas will consist of a mixture of methane and air.
- o The battery power will be checked.
- o The "Instr" switch will be moved to the on position and 5 minutes will be allowed for the OVA warm up.
- o The pump switch will be turned to the on position.
- o The calibrate switch will be moved to 10X.
- o The calibrate adjust knob will be moved so that the instrument meter reading is zero.

- o The instrument will be placed in an upright position and the sample flow rate indicator will be checked. Indication should be approximately 2 units.

ACTION LEVEL

Based on the existing site history and the maximum level of contaminants detected in ground-water samples, the following action level has been established for upgrading the level of protection for the workers. For each individual task, a PID will be available to determine the presence of VOCs. An action level of 1 ppm above background for a sustained period of 5 minutes in the workers' breathing zone has been chosen based on the presence of benzene and vinyl chloride. The workers breathing zone will be sampled and analyzed for benzene and vinyl chloride using Draeger tubes. If the Draeger tubes confirm that the presence of either benzene or vinyl chloride exceeds 1 ppm, work will be temporarily stopped and continued air monitoring will be performed. If the VOCs are vented and the air monitoring readings are below the action level, work will resume. However, if the levels continue to exceed 1 ppm above background, the level of personal protective equipment (PPE) will be upgraded to Level C.

While the workers are in Level C protection, if HNU readings exceed 10 ppm above background, regular monitoring with Draeger tubes for vinyl chloride will be performed. If the level of vinyl chloride in the breathing zone exceeds 10 ppm, work will stop until the VOCs are vented. Work will resume when the levels fall to less than 10 ppm of vinyl chloride. If total volatile readings exceed 50 ppm for a sustained period exceeding 5 minutes, then workers in Level C will stop work and allow the VOCs to vent. Work will resume once total VOCs fall below 50 ppm and vinyl chloride values are below 10 ppm.

An action level for flammable/explosive gases will also be used. If the reading on an explosimeter shows 10 percent lower explosive limit (LEL), the area will be continuously monitored with an explosimeter. If the reading shows 20 percent LEL, work will stop and the work area will be evacuated.

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LEVELS OF PROTECTION

The anticipated level of personnel protection is discussed for each task to be performed. A description of the personal protective equipment is provided in the next section.

Task 1: Soil Sampling of Borings and Monitoring Wells

Level D protection has been selected for this task, based on the current knowledge of contaminant levels. However, if air monitoring results exceed the action level, then the level of protection will be upgraded to Level C.

Task 2: Performance of Borehole Geophysical Surveys

Level D protection has been selected for this task based on current knowledge of contaminant levels and the fact that this task will cause minimal disturbance to the ground water. However, if the air monitoring indicates that the action level has been exceeded, then the level of personal protective equipment (PPE) will be upgraded to Level C.

Task 3: Well Installation and Development of Monitoring Wells

Level D protection has been chosen for this task. If, however, the air monitoring results indicate elevated levels of VOCs above 1 ppm for a sustained period of 5 minutes in the breathing zone, then the level of protection will be upgraded to Level C with chemically resistant suits. If air monitoring indicates a decrease of VOCs below the action level, the level of protection may be downgraded to Level D.

Task 4: Evacuation and Sampling of Monitoring Wells

This task will be done in Level D protection, accompanied by air monitoring using a PID such as an HNU. If the action level is exceeded, the level of protection will be upgraded to Level C.

Task 5: Performance of a Pumping Test

Level D has been chosen for this task, but will be upgraded to Level C whenever the air monitoring indicates that the action level of 1 ppm has been exceeded.

Task 6: Investigation of Free Product

Level D will be primarily used for this task and will be accompanied by semi-continuous air monitoring. If the air monitoring results exceed the set action levels of 1 ppm, the level of protection will be upgraded to Level C with a full-face air-purifying respirator and organic vapor cartridges in combination with a particulate filter.

Task 7: Potential Free Product Recovery

This task will be done in Level D personal protective clothing, but will be upgraded to Level C if the air monitoring shows that the set action level has been exceeded.

PERSONAL PROTECTIVE EQUIPMENT

Level D and Level C protection are described below.

Level D Protection

A basic modified Level D work uniform will be worn by all personnel working in on-site areas. This work uniform will consist of the following clothing:

- o Hard hat.
- o Steel-toed and shanked boots (rubber boots or leather workboots).
- o Work gloves (when handling site media).
- o Disposable coveralls (woven Tyvek) for protection of work clothes are optional.
- o Safety glasses, goggles, or face shield (optional).
- o Disposable ear plugs, noise reduction rating (NRR) of 35 decibels (optional).

If there is potential for dermal contact, personnel will wear the following clothing:

- o Disposable coveralls (woven or chemical-resistant Tyvek suits) taped at the ankles.
- o Inner vinyl gloves and/or outer neoprene or nitrile gloves taped at wrists (when sampling or handling potentially contaminated materials).

Level C Protection

- o Chemically resistant (Saran or PVC-coated) Tyvek suits taped at the ankles.
- o Inner vinyl gloves and outer nitrile gloves taped at the wrists.
- o Hard hat.
- o Steel-toed and shanked chemically resistant boots (rubber boots or rubber boots over leather workboots).
- o Full-face respirator with organic vapor cartridges.
- o Safety glasses, goggles, or face shield (optional).

The following rules apply to respiratory protection:

- o Respiratory protection will be in compliance with OSHA, 29 CFR 1910.134.
- o Only properly cleaned, maintained, National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA)-approved, positive-pressure full-face respirators will be used on-site.
- o Air-purifying cartridges will be replaced daily at a minimum, immediately upon any signs of breakthrough (e.g., odors, physical effects), or at the site safety officer's direction.
- o No employee will be assigned to tasks requiring Level C protection, if based upon the health examination, the physician has determined that the employee will be unable to function normally wearing a respirator or that the safety or health of the employee may be compromised.

RESPONSIBILITIES

Proper implementation of the HASP and the prevention of injury and exposure of site workers depends upon participation of all project workers. Open communication between site workers, supervisors, and managers regarding health and safety issues is essential to the plan.

A definition of the responsibilities of the project team with respect to health and safety issues is provided below.

The project health and safety officer is responsible for the technical coordination of the health and safety program including medical and training program requirements, hazard assessments, air monitoring, personal protective equipment, and field implementation. The

project health and safety officer will interact with the project manager and the site safety officer concerning any changes in the site characterization and HASP requirements.

The site safety officer is responsible for the daily supervision and monitoring of field activities to ensure that all work is performed in accordance with the HASP protocols. The site safety officer reports directly to the project health and safety officer and will refer all safety-related questions to him. The site safety officer will notify the project health and safety officer and the project manager as soon as possible after any exposure incidents, accidents, or emergencies.

The field team members are responsible for implementing the HASP under the supervision of the site safety officer.

The project manager is responsible for ensuring that all project workers abide by the requirements set forth in the HASP. The project manager will discuss any changes in the site characterization and health and safety plan requirements with the project health and safety officer and the site safety officer.

WORK ZONES AND SITE CONTROL

The site access will be controlled using designated work zones. USEPA and DPNR field representatives will be consulted regarding delineation of the exclusion zone area.

EXCLUSION ZONES

Exclusion zones are defined as areas where the potential exists for worker exposure to contaminated materials. Exclusion zones will be designated by the site safety officer based on USEPA and DPNR field decisions and the guidelines in this plan. Movement into and out of these zones will be controlled using a physical barrier of brightly colored plastic tape labeled with the word "caution". Personnel entering or working within these zones will wear the

designated protective equipment and perform environmental monitoring. Personnel and equipment exiting these zones will be decontaminated in accordance with the procedures described in this plan.

All personnel working on-site areas outside of the Support Area will be required to wear a basic modified Level D work uniform. Exclusion Zones within which additional protective clothing and/or environmental monitoring may be required include a minimum of 20 feet around all drilling and sampling activities.

CONTAMINATION REDUCTION ZONES

Contamination reduction zones will be delineated by the site safety officer for personnel and equipment. Decontamination of personnel and equipment will be performed in these zones. Personnel will wear appropriate Level D clothing while decontaminating equipment. Movement into and out of these zones will be controlled.

THE SUPPORT AREA

The support area is considered a clean area where no special protective gear is required. The support area will be delineated in an area considered to be free of contamination.

Access to controlled work areas will be limited to authorized persons. Visitors must present proper identification and certification of training and must comply with all aspects of the HASP when in these areas.

GENERAL WORK PRACTICES

GENERAL WORK RULES

General work rules to be employed on-site are as follows:

- o Field work will be conducted only during daylight hours unless adequate lighting is provided.
- o No eating, drinking, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material, will be allowed in Exclusion or Contamination Reduction Zones. Smoking materials (matches, lighters) and other ignition sources will be forbidden in these zones.
- o Contact lenses will not be worn in Exclusion or Contamination Reduction Zones. All field personnel requiring corrective lenses must provide their own prescription glasses and lenses which may be fitted into the respirator masks.
- o No jewelry which interferes with protective clothing fit or respirator seals will be worn.
- o No beards, sideburns, or mustaches, which interfere with respirator mask seals will be allowed, the site safety officer will determine if facial hair presents an interference. Respirator mask seals will be checked by positive and negative pressure tests by each wearer each time the respirator is used.
- o Frequent and regular inspections of the site, materials, and equipment used during the field investigation will be conducted by the site safety officer. Machinery, tools, material, equipment, and work practices that are judged unsafe, or not in compliance with OSHA or other applicable standards, will be removed or replaced, or the work practices corrected. Equipment and machinery will only be operated by employees qualified by training and/or experience. (See Attachment 1: Field Audit Checklist).
- o Containers will be moved with the proper equipment and will be secured to prevent dripping or loss of control during transport.

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- o Personnel will avoid contact with potentially contaminated substances. Activities such as walking through puddles or mud and kneeling on the ground will be avoided whenever possible.
- o The buddy system, wherein personnel will maintain contact with each other, will be observed at all times in the Exclusion Zones. A uniform hand signal to be used by all personnel in the event of an emergency will be instituted.
- o Field personnel will monitor each other for signs of chemical exposure. Indications of adverse affects include the following:
 - Changes in complexion and skin discoloration.
 - Changes in coordination.
 - Changes in demeanor.
 - Excessive salivation and pupillary response.
 - Changes in speech pattern.
- o Field personnel will be cautioned to inform each other and the site safety officer if adverse effects are felt. These effects may include the following:
 - Headaches
 - Dizziness
 - Nausea
 - Blurred vision
 - Cramps
 - Irritation of eyes, skin, or respiratory tract
- o Health and safety related aspects of the field activities will be documented. The documentation will include any instances of potential chemical exposure, and also the lack thereof.

DRILLING OPERATIONS

Practices to be employed in connection with drilling operations are as follows:

- o Before drilling, the existence of underground utilities must be investigated and the location of any pipelines, electric lines, etc. must be determined. The appropriate utility companies will be contacted. Prior to the start of drilling, the Utilities and Structures Checklist shown on Figure 4, will be completed.
- o Drilling will not be performed in any areas where overhead power lines or telephone lines may present a hazard.
- o No drilling activities will be permitted during periods of thunderstorms and lightning.
- o Ambient air quality in the breathing zone around the drilling rig will be monitored continuously during all drilling activities.
- o Workers will be constantly alert to the potential presence of obstructions during drilling operations. If an obstruction is encountered, work will stop immediately and the project manager and project health and safety officer will be notified.

DECONTAMINATION PROCEDURES

EQUIPMENT

Decontamination of large equipment (drill rigs and associated equipment) will be performed at a specified cleaning station. Cleaning will consist of soap and water wash and potable water rinse using a steam cleaning unit. Any parts of the rig which are encrusted with dirt and mud or are suspected of having been splashed with materials at a sampling station (test

boring) will be washed prior to moving to the next borehole location. Drill rigs will be fully decontaminated prior to and between borings at each new boring location. Drill rigs will be fully decontaminated prior to leaving the site.

All reusable non-dedicated sampling equipment (spatulas, trowels, core barrel sampler, bailers, split spoons) will be decontaminated in accordance with the protocols specified in the work plan, initially, between each use for sampling, and prior to leaving the site.

The required decontamination procedure for all sampling equipment is as follows:

- o Washed and scrubbed with low phosphate detergent.
- o Rinsed with tap water.
- o Rinsed with 10 percent HNO_3 ultrapure.
- o Rinsed with tap water.
- o Rinsed with acetone-only or a methanol followed by hexane (solvents must be pesticide grade or better).
- o Thoroughly rinsed with deionized demonstrated analyte free water.
- o Allowed to air dry.
- o Wrapped in aluminum foil for transport.

PERSONNEL

Personnel decontamination stations will be set up as appropriate at the edge of the Exclusion Zones and/or the Support Area. The procedure is as follows:

- o Equipment and/or samples will be placed in a designated area.
- o Boots will be washed using a detergent solution, followed by a potable water rinse.
- o Outer gloves will be washed and rinsed as described above and removed.
- o Disposable coveralls (if used) will be removed and placed in a proper container.

- o Hard hat and respirator (if used) will be removed and stored in an appropriate place.
- o Disposable inner gloves (if used) will be removed and placed in a proper container.
- o Hands and face will be washed with water and soap.

After use respirators will be washed daily in warm water and mild detergent and sanitized in accordance with manufacturer instructions. They will be inspected regularly for cracks and dents, and stored in a clean plastic bag.

Personnel will shower as soon as possible after leaving the site at the end of the work day.

SAMPLE CONTAINERS

The exterior of the sample containers will be decontaminated by immersing the bottle up to the neck in a detergent solution, followed by a potable or distilled water rinse. Solvents will not be used to wash sample containers.

EMERGENCY RESPONSE PLAN

The site safety officer will inform all field personnel of emergency and evacuation procedures. The route to the hospital and written directions are provided on Figure 5. Prior the start of field activities, the route to the hospital will be driven by the site safety officer.

All personnel will be aware of the location of the nearest accessible telephone before beginning work activities. Local and nationwide emergency numbers are listed on Table 3. The telephone list will be provided to all field personnel and posted, if practicable, next to the telephone.

The site safety officer will designate a safety station where first aid and contingency equipment will be kept and will inform all field personnel of the location of this station. The following first aid and contingency equipment will be available:

- o First aid kit
- o American National Red Cross First Aid Handbook
- o Type A, B, and C fire extinguishers
- o Potable water

Additionally, an eyewash station will be available within 10 feet of each Exclusion Zone and Contamination Reduction Zone.

In the event of an injury requiring treatment, the injured person will be taken to the hospital. In an emergency, first aid will be given and the ambulance company and hospital will be called immediately. Medical and paramedical organizations (i.e., hospital, ambulance service, police and fire departments) will be notified in advance that the project is to begin.

Any injuries or accidents will be thoroughly documented on the appropriate form. A sample injury report and vehicle accident report form are provided on Figures 6 and 7, respectively. The following people will be notified as soon as possible in the event of a personnel exposure incident, accident, or emergency:

Project Health and Safety Officer	Alberto Colberg	(809) 725-6735
Site Safety Officer	Ruben Ponciano	(809) 725-6735
Project Manager	Thomas V. Danahy	(201) 909-0700
Project Coordinator	Jose C. Agrelot	(809) 792-8900
Designated Coordinator	Ana Gloria Ramos	(809) 792-2920
Project Officer	Daniel A. Nachman	(201) 909-0700

HEALTH MONITORING AND FIELD PROTOCOLS

HEALTH MONITORING PROGRAM

Geraghty & Miller and Soil Tech participate in a Health Monitoring Program with occupational health specialists. Geraghty & Miller and Soil Tech employees receive yearly physicals consisting of the following:

- o Personal, family, and environmental history.
- o Hands-on physical examination.
- o Snellen's eye examination.
- o Hearing test.
- o Respirator clearance (EKG and pulmonary function) for those involved in Levels C and B work.

MOTOR VEHICLE HAZARDS

Motor vehicle traffic poses a potential hazard to site workers, particularly at some of the boring and well locations situated in the service station lots and parking lots. At these locations, orange traffic cones will be placed around the work area to mitigate the potential hazard.

HEAT STRESS

Heat stress may be of concern depending upon the ambient temperature and humidity. The task being performed and the level of personal protection in use also influence the degree of heat stress imposed upon workers. Symptoms of heat stress include the following, in order of increasing seriousness:

- o Heat rash.
- o Heat cramps (muscle spasms; pain in the hands, feet, and abdomen).

- o Heat exhaustion (pale, cool, moist skin; heavy sweating; dizziness).
- o Heat stroke (red, hot, dry skin; lack of perspiration; nausea; dizziness and confusion; strong rapid pulse; coma).

Heat stroke can result in serious injury or death; immediate action must be taken cool down a worker exhibiting these symptoms.

The following measures should be implemented to prevent heat stress if conditions warrant:

- o Adequate liquids should be provided to replace lost body fluids and electrolytes lost from perspiration. Replacement fluids can be a 0.1 percent saltwater solution, commercial mixes such as Gatorade or Quick Kick, or a combination of these and fresh water. Encourage workers to drink more than thirst requires.
- o A work regimen should be established that will provide adequate rest and cooling down periods. This may require adjusting work schedules, and/or rotating personnel.
- o Breaks should be taken in an air conditioned (preferably) or a shaded rest area. All impermeable protective garments should be removed during rest periods.
- o All personnel should be informed of the importance of adequate rest, acclimatization, and proper diet.
- o In temperatures above 70°F, personnel using Level C will be monitored via heart rate and oral temperature at rest periods. If the heart rate exceeds 110 beats per minute or oral temperature is above 99.6°F, subsequent work periods should be shortened by one-third. This procedure may be repeated only once, if necessary, and then affected personnel should be removed from the work site for rest and

medical attention. Personnel should not be allowed to work in protective coveralls if oral temperature exceeds 100.6°F.

TRAINING

BASIC TRAINING

Geraghty & Miller and Soil Tech employees attend a 40-hour health and safety training course and refresher training which satisfies the training requirements of OSHA, 29 CFR 1910.120. Subcontractors will be required to provide documentation stating that their employees have been trained in accordance with OSHA requirements.

SITE-SPECIFIC TRAINING

Prior to starting the field activities, all (Geraghty & Miller, Soil Tech, EPA and their representatives, and other subcontractors) personnel will attend an on-site training session by the site safety officer. The topics of this session will include the following:

- o Reading and understanding the HASP.
- o Site history.
- o Constituents of concern.
- o Hazard recognition.
- o Environmental monitoring procedures.
- o Personnel and equipment decontamination.
- o Emergency procedures.
- o Respirator use.
- o First aid.
- o Heat stress.

TAILGATE SAFETY MEETINGS

The site safety officer will hold daily tailgate safety meetings. Attendance by the field team members and subcontractor personnel working on-site each day will be mandatory. Health and safety concerns and procedures specific to that day's tasks will be discussed and questions answered. A Tailgate Safety Meeting record (Figure 8), will be completed daily.

TVD:gv
#PR01301/H&SPLAN

REFERENCES

Geraghty & Miller, Inc. 1991a. Tutu Service Station Investigation Work Plan. Prepared for the Tutu Environmental Investigation Committee, May 29, 1991.

Geraghty & Miller, Inc. 1991b. First Sampling Report, September 1990, Tutu Wells Site Quarterly Sampling, St. Thomas, U.S. Virgin Islands. Prepared for the Tutu Environmental Investigation Committee, January 1991.

Geraghty & Miller, Inc. 1991c. Second Sampling Report, February 1991, Tutu Wells Site Quarterly Sampling, St. Thomas, U.S. Virgin Islands. Prepared for the Tutu Environmental Investigation Committee, May 13, 1991.

Geraghty & Miller, Inc. 1991d. Third Sampling Report, June 1991, Tutu Wells Site Quarterly Sampling, St. Thomas, U.S. Virgin Islands. Prepared for the Tutu Environmental Investigation Committee, September 1991.

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#PR01301/H&SPLAN

TUT 002 0940

Table 1. Maximum Concentrations of Previously Detected Volatile Organic Compounds, Tutu Service Station Investigation, Health and Safety Plan, St. Thomas, U.S. Virgin Islands.*

<u>Ground Water</u>	<u>Concentrations (ppb)</u>
1,2-Dichloroethene	280
Trichloroethene	72
Tetrachloroethene	1500
Benzene	32
Vinyl chloride	17
Toluene	44
Acetone	22
1,1,2-Trichloroethane	5

Air

Total Volatile Organic Compounds (PID reading during evacuation of Tillett Well February 6, 1991)	24 ppm
--	--------

* Based upon Geraghty & Miller, Inc. 1991b; 1991c; and 1991d sampling reports.

ppb Parts per billion.

ppm Parts per million.

PID Photoionization detector.

Table 2. Current Occupational Airborne Contaminants Standards and Guidelines, Tutu Service Station Investigation, Health and Safety Plan, St. Thomas, U.S. Virgin Islands.

	ACGIH		OSHA	
	<u>TLV - TWA</u>	<u>TLV - STEL</u>	<u>PEL</u>	<u>STEL</u>
1,2-Dichloroethene	200	-	200	-
Trichloroethene	50	200	50	200
Tetrachloroethene	50	200	25	-
Benzene _{A2}	10	-	1	-
Vinyl chloride _{A1}	5	-	1	-
Toluene	100	150	100	150
Acetone	750	1,000	750	1,000
1,1,2-Trichloroethane (Skin)	10	-	10	-

ACGIH American Conference of Governmental Industrial Hygienists, 1990-91.
 OSHA Occupational Safety and Health Administration, 1989.
 TLV Threshold Limit Value.
 PEL Permissible Exposure Limit.
 TWA 8-Hour Time Weighted Average.
 STEL 15-Minute Short Term Exposure Limit.
_{A1} Confirmed human carcinogen.
_{A2} Suspected human carcinogen.
 - Level not established.

All values are in parts per million (ppm).

Skin - This notation refers to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or by direct contact with the substance.

Table 3. Emergency Telephone Numbers, Tutu Service Station Investigation, Health and Safety Plan, St. Thomas, U.S. Virgin Islands.

Fire Department	(809) 921
Ambulance	(809) 922
Hospital	(809) 776-8311
Police Department	(809) 915
USEPA Caribbean Field Office	(809) 729-6951
USVI Department of Planning and Natural Resources	(809) 774-3320

#PR01301/TAB7.WK1

TUT 002 0943

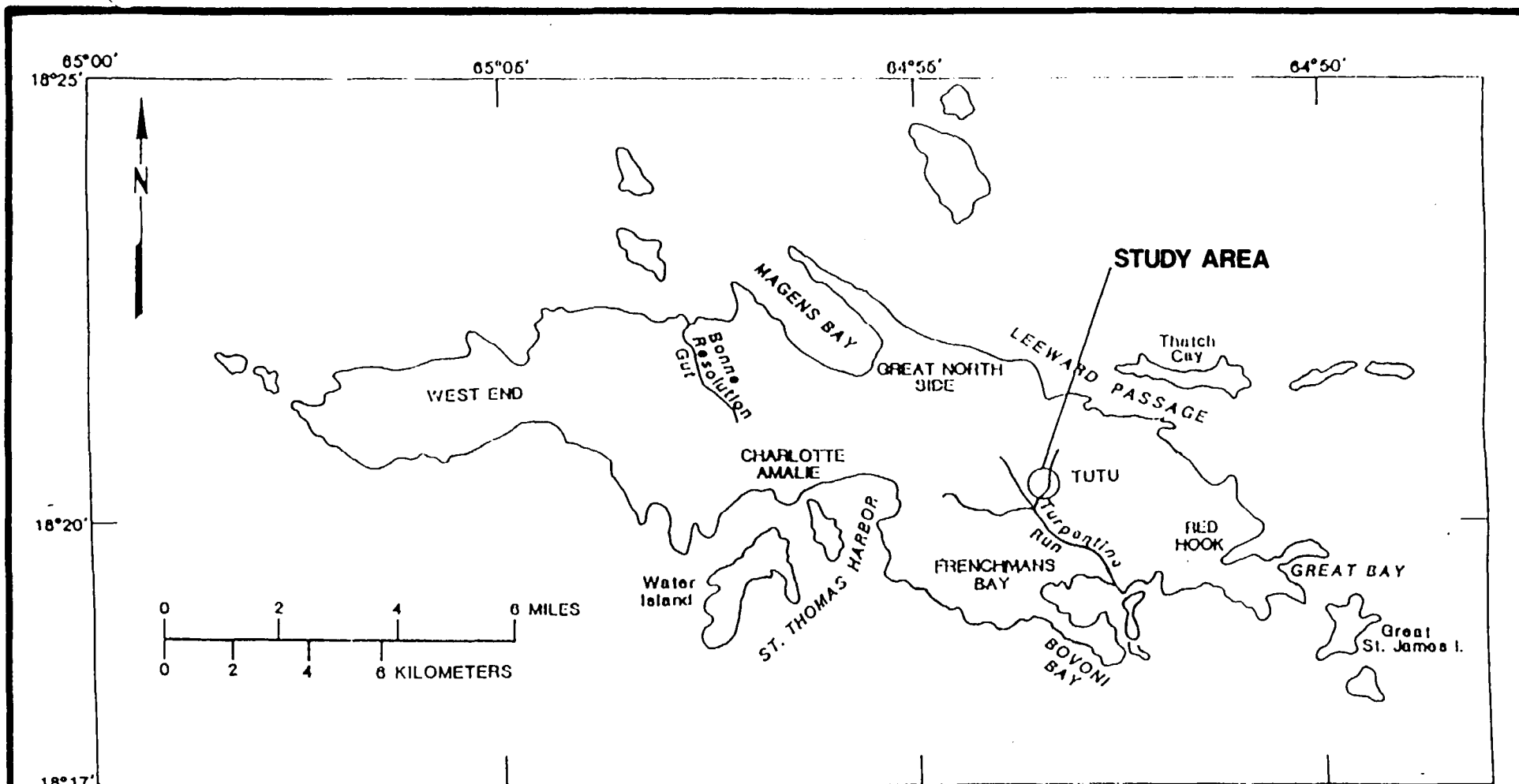


TUTU SERVICE STATION INVESTIGATION
HEALTH AND SAFETY PLAN
ST. THOMAS, U.S. VIRGIN ISLANDS

I acknowledge that I have reviewed the above Health and Safety Plan (HASP). I understand the levels of personal protection that may be required by the HASP and I agree to follow the requirements of the HASP.

[illegible]

TL-448P PRR1301



**TURPENTINE RUN BASIN
TUTU SERVICE STATION INVESTIGATION
HEALTH AND SAFETY PLAN.
ST. THOMAS, U.S. VIRGIN ISLANDS**

PREPARED FOR

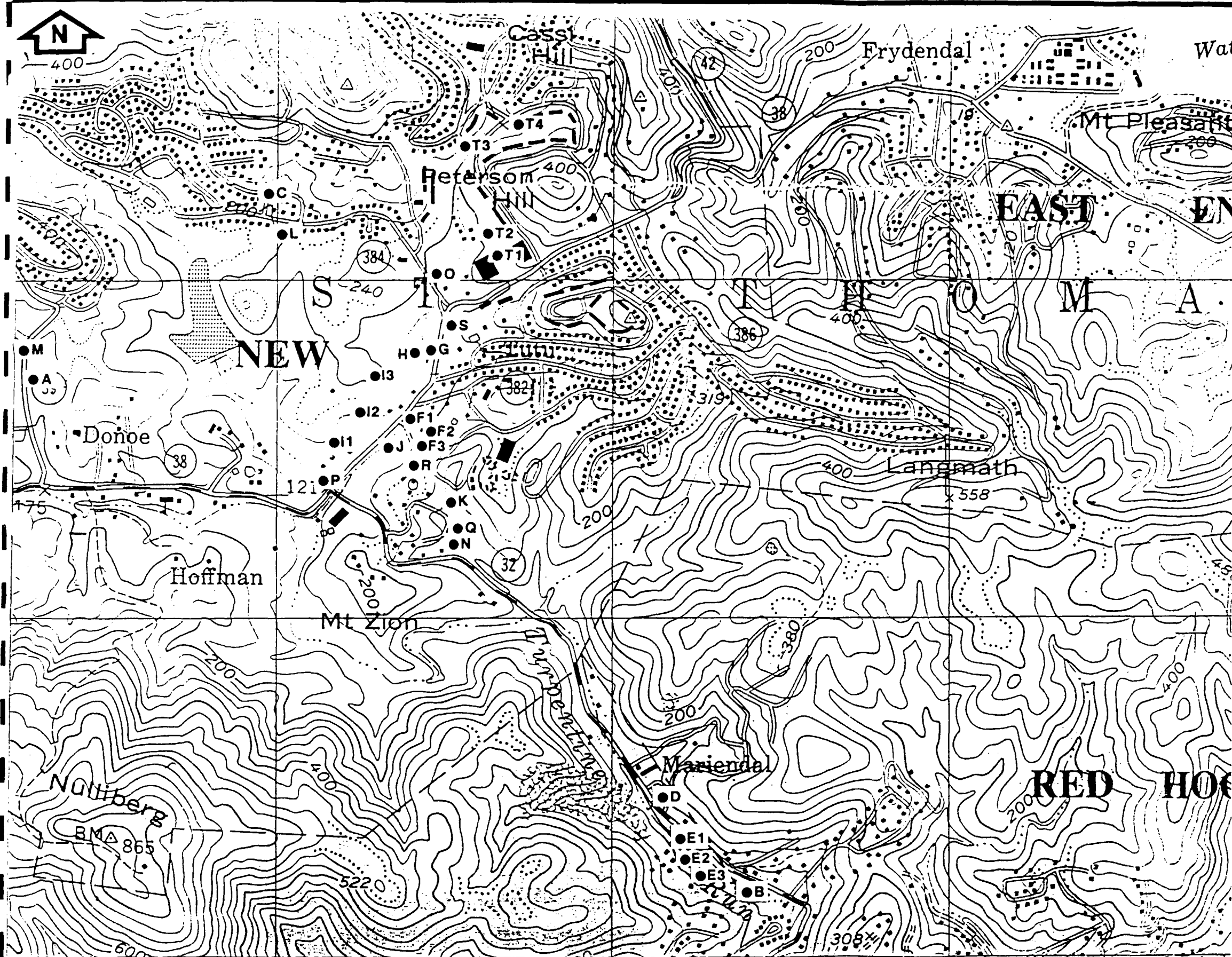
TEIC

Geraghty
& Miller, Inc.

COMPILED BY **NACHMAN**
PREPARED BY **MESSINGER**
PROJECT MGR **FINDLAY**

SCALE
SHOWN
DATE **2/90**

FIGURE
2

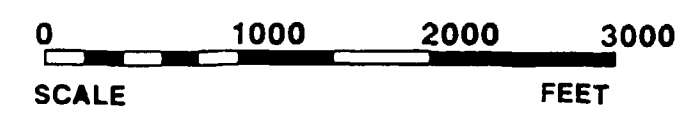


LEGEND

- RESIDENTIAL WELL
- A BRYAN
- B DEDE
- C DEMITRI
- D DENCH
- E1 DEVCON I
- E2 DEVCON II (ALTERNATE)
- E3 DEVCON III
- F1 EGLIN I
- F2 EGLIN II
- F3 EGLIN III
- G FOUR WINDS I
- H FOUR WINDS II
- I1 GASSETT
- I2 HARTMAN II (CRUSHER)
- I3 HARTMAN III (ESTATE)
- J HARVEY
- K LaPLACE
- L LEONARD
- M LOCKHART (ALTERNATE)
- N MATTHIAS
- O RAMSEY
- P RODRIGUES
- Q SMITH
- R STEELE
- S TILLET
- T1 VIHA I
- T2 VIHA II (ALTERNATE)
- T3 VIHA III
- T4 VIHA IV (ALTERNATE)

SUBJECT			
SITE PLAN			
TUTU SERVICE STATION INVESTIGATION			
HEALTH AND SAFETY PLAN,			
ST. THOMAS, U. S. VIRGIN ISLANDS			
PREPARED FOR			
TEIC			
Geraghty & Miller, Inc.	COMPILED BY DAN	SCALE	FIGURE
	PREPARED BY PAD		
	PROJECT MGR DAN	TUT	002 0946

SOURCE: USGS QUADRANGLE EASTERN ST. THOMAS, V.I. (1964)



UTILITIES AND STRUCTURES CHECKLIST

Project: _____ Prepared by: _____

Location: _____ Date: _____

Instructions. This checklist has to be completed by a G&M staff member as a safety measure to insure that all underground utility lines, other underground structures as well as above-ground power lines are clearly marked out in the area selected for boring or excavation. **DRILLING OR EXCAVATION WORK MAY NOT PROCEED UNTIL LINES ARE MARKED AND THIS CHECKLIST HAS BEEN COMPLETED.** Arrangements for underground utility markouts are best made at the time of the preliminary site visit to allow client and/or utility company sufficient time. Keep completed checklist and maps onsite; send copy to Project Manager.

Assignment of Responsibility. Client is responsible for having underground utilities and structures located and marked. Preferably, the utilities themselves should mark out the lines.

Drilling or Excavation Sites. Attach a map of the property showing the proposed drilling or excavation site (or if sites are widely separated, several maps) clearly indicating the area(s) checked for underground utilities or underground structures and the location of above-ground power lines.

Utilities and Structures

Type	Not Present	Present	How Marked? ¹⁾
Petroleum products line			
Natural gas line			
Steam line			
Water line			
Sewer line			
Storm drain			
Telephone cable			
Electric power line			
Product tank			
Septic tank/drain field			
Overhead power line			

1) Flags, paint on pavement, wooden stakes, etc.

Name and affiliation of person who marked out underground lines or structures.

NAME ORGANIZATION PHONE

Emergency Procedures

Persons at site or facility to contact in case of emergency

1. _____ Phone _____

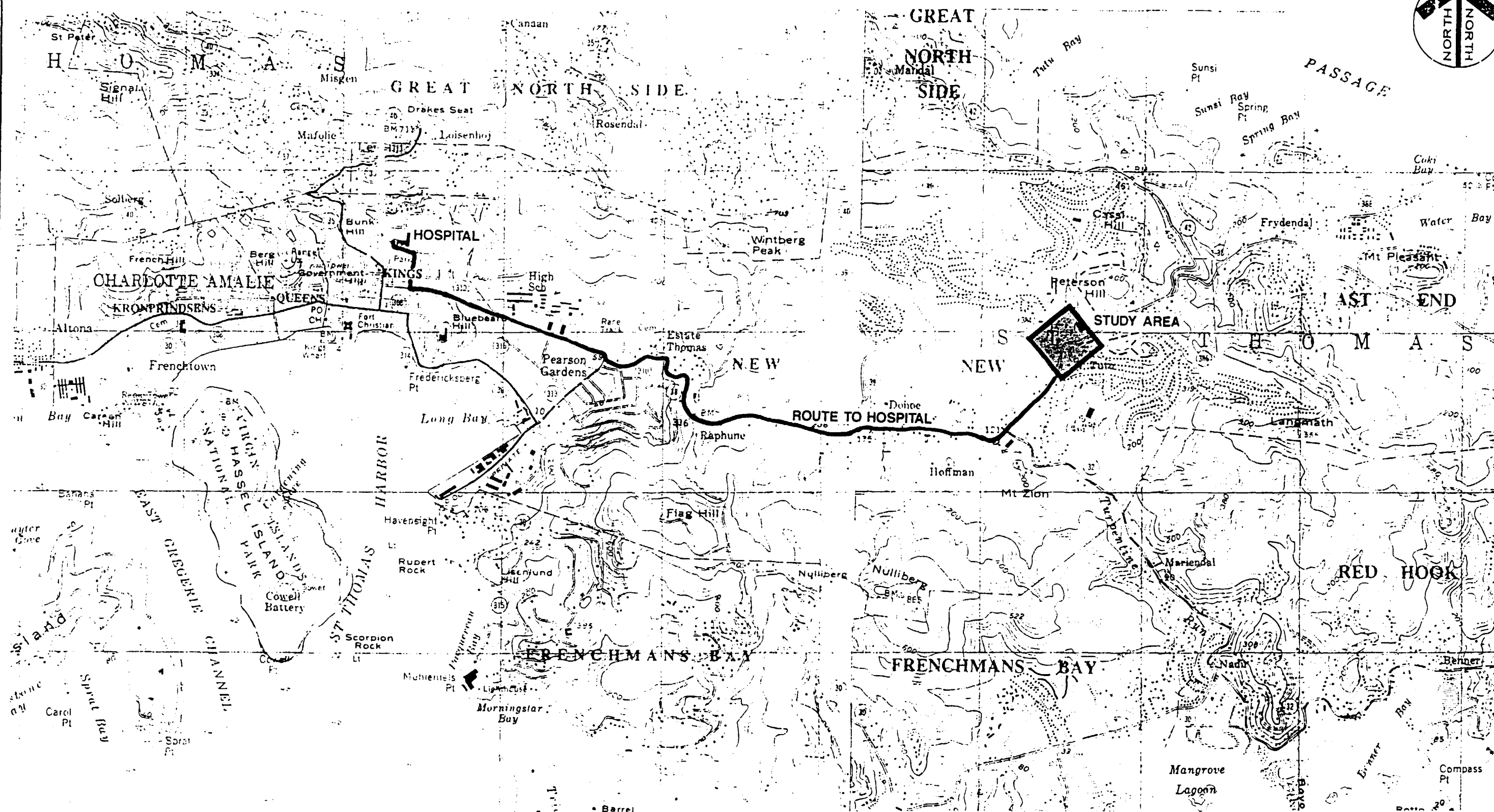
2. _____ Phone _____

Fire Dept.: Phone _____ Ambulance: Phone _____

Utility: Phone _____ Utility: Phone _____

Utility: Phone _____ Utility: Phone _____

Directions to nearest hospital (describe or attach map).



0 SCALE 2000 FEET

GERAGHTY & MILLER, INC.
Environmental Services

**ROUTE TO HOSPITAL
TUTU SERVICE STATION INVESTIGATION HEALTH AND SAFETY PLAN,
ST. THOMAS, U. S. VIRGIN ISLANDS**

PREPARED FOR: TUTU ENVIRONMENTAL INVESTIGATION COMMITTEE

FIGURE

5

TUT 002 0948

Bureau of Labor Statistics
Supplementary Record of
Occupational Injuries and Illnesses

U.S. Department of Labor



This form is required by Public Law 81-896 and must be kept in the establishment for 5 years. Failure to maintain can result in the issuance of citations and assessment of penalties.

Case or File No.

Form Approved
OMB No. 1220-0029

Employer

1. Name

2. Mail address (No. and street, city or town, State, and zip code)

3. Location, if different from mail address

Injured or Ill Employee

4. Name (First, middle, and last)

Social Security No.

5. Home address (No. and street, city or town, State, and zip code)

6. Age

7. Sex (Check one)

Male ☐

Female ☐

8. Occupation (Enter regular job title, not the specific activity he was performing at time of injury.)

9. Department (Enter name of department or division in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)

The Accident or Exposure to Occupational Illness

If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.

10. Place of accident or exposure (No. and street, city or town, State, and zip code)

11. Was place of accident or exposure on employer's premises?

Yes ☐

No ☐

12. What was the employee doing when injured? (Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them.)

13. How did the accident occur? (Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident. Use as many lines as needed for additional space.)

Occupational Injury or Occupational Illness

14. Describe the injury or illness in detail and indicate the part of body affected (E.g., amputation of right index finger at second joint, fracture of ribs; lead poisoning; dermatitis of left hand, etc.)

15. Name the object or substance which directly injured the employee (For example, the machine or thing he struck against, or which struck him, the vapor or poison he inhaled or swallowed, the chemical or radiation which irritated his skin, or in cases of strains, sprains, etc., the thing he was lifting, pulling, etc.)

16. Date of injury or initial diagnosis of occupational illness

17. Did employee die? (Check one)

Yes ☐

No ☐

Other

18. Name and address of physician

19. If hospitalized, name and address of hospital

Date of report

Prepared by

Official position

OSHA No. 101 (Feb. 1981)

TUT 002 0949

FIGURE 6

TAILGATE SAFETY MEETING

Client _____ Prepared by _____
Date _____ Project _____
Work Location _____
Type of Work to be Done _____

SAFETY TOPICS PRESENTED

Chemical Hazards _____
Physical Hazards/Underground Utilities _____
Protective Clothing/Equipment _____
Special Equipment _____
Emergency Procedures _____
Hospital/Clinic _____ Phone () _____
Paramedic Phone () _____
Hospital Address _____
Other _____

ATTENDEES

NAME PRINTED

SIGNATURE

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting Conducted By _____
Name Printed Signature

Note: This tailgate safety form must be completed daily.

VEHICLE ACCIDENT REPORT FORM

TUTU SERVICE STATION INVESTIGATION HEALTH AND SAFETY PLAN,
ST. THOMAS, USVI

Date Claim Submitted _____

Agent _____

VEHICLE OPERATOR _____ Drivers License No. _____
Phone No. _____ S.S. No. _____
Address _____ City _____
Employer _____ Facility _____
DESCRIBE VEHICLE DAMAGE _____

Vehicle No. _____ Year _____ Make _____ Model _____ Plate No. _____
OTHER PARTIES' NAME: _____

Address _____
Phone No. _____ Drivers License No. _____ S.S. No. _____

OWNER'S NAME: (Check if same as driver) _____

Address _____ City _____

Phone No. _____

OWNER'S INSURANCE CARRIER: _____ Policy No. _____

Address _____ City _____

DESCRIBE VEHICLE DAMAGE: _____

Plate No. _____ Year _____ Make _____ Model _____

INSURED PARTIES

(A Supervisor's Injury Report Form must be completed if a G&M employee is involved.)

1. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

2. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

WITNESSES: _____

1. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

2. Name _____

Address _____

Employer's Name & Address _____

DESCRIPTION OF ACCIDENT: _____ Date ____/____/____ Time: _____

(continue on reverse side)

LOCATION OF ACCIDENT: _____

City _____

POLICE OFFICER'S NAME _____ DEPT: _____

Report Prepared By _____ Date ____/____/____

Name Printed

Signature

ATTACHMENT 1

**FIELD AUDIT CHECKLIST
TUTU SERVICE STATION INVESTIGATION
HEALTH AND SAFETY PLAN
ST. THOMAS, U.S. VIRGIN ISLANDS.**

TUT 002 0952

GERAGHTY & MILLER, INC.
HEALTH AND SAFETY
FIELD AUDIT CHECKLIST

<u>YES</u>	<u>NO</u>	DOCUMENTATION
—	—	Has a Health and Safety Plan (HASP) been prepared for this program?
—	—	Is a HASP on-site and readily available?
—	—	Is a Health and Safety Logbook in use?
—	—	Have subcontractors and Geraghty & Miller staff been given a pre-startup safety briefing and have the personnel signed the acknowledgement form in the Logbook?
—	—	Are other job-specific records being maintained, as outlined in the HASP (OSHA 101, training records, etc.)?
—	—	Are monitoring equipment calibrations and readings being properly measured and recorded?
—	—	Have any changes in the HASP been recorded?

REMARKS:

<u>YES</u>	<u>NO</u>	HEALTH AND SAFETY MONITORING - PROTECTION LEVELS
—	—	Is atmospheric monitoring being performed in accordance with the HASP (OVA, TTP, LEL, etc.)?
—	—	Is monitoring being performed at designated time intervals?
—	—	Are monitoring results being properly recorded in the Health and Safety Logbook?
—	—	Are action (upgrade/downgrade) levels being followed by field personnel?
—	—	Are monitoring instruments being properly calibrated at designated time intervals?
—	—	Does the atmospheric monitoring program appear adequate and capable of indicating the presence of contaminants at the site?

REMARKS-ACTION:

<u>YES</u>	<u>NO</u>	PERSONAL PROTECTIVE EQUIPMENT - PPE
—	—	Is the appropriate, designated PPE being worn for each work task by field personnel?
—	—	Is all required safety equipment readily available?
—	—	Does the safety equipment used by subcontractor meet HASP requirements?
—	—	Does the PPE appear appropriate for the contaminant level(s) encountered?
—	—	Are used PPE properly disposed of or adequately decontaminated?
—	—	Are reusable PPE free from contamination once decontamination has been completed? Reusable PPE may not be appropriate in certain highly contaminated situations, or when specific types of contaminants may be encountered. Refer to the site-specific HASP.
—	—	Is stress monitoring being performed in accordance with the HASP and generally accepted practice?

REMARKS-ACTION:

<u>YES</u>	<u>NO</u>	SITE CONTROL
—	—	Have exclusion zones or work areas been established around the work areas, as described in the HASP?
—	—	Are established zones sufficient to prevent the migration of contaminated media beyond these areas?
—	—	Is a clearly defined contamination reduction corridor for decontamination in existence at the work area?
—	—	Are designated decontamination procedures being employed?
—	—	Is decontamination effective in removing contaminants and preventing the spread of contaminated media?

REMARKS-ACTION:

<u>YES</u>	<u>NO</u>	SAFE WORK PRACTICES
—	—	Is the buddy system employed, and is it encouraged by project management?
—	—	An eyewash station, fire extinguisher, and first-aid kit should be present on each site. Are they available?
—	—	Are restrictions on the use of food, tobacco, or beverages in work/exclusion zone(s) being followed?
—	—	Are field personnel washing at lunch and shift changes?
—	—	Is all equipment kept in a safe, operating condition?
—	—	Are safety glasses or goggles in use during all field activities not requiring a respirator?
—	—	Are hard hats being worn, where required?
—	—	Are steel toe and shank and/or chemical protective boots being worn for designated work tasks, as specified in the HASP?
—	—	Are any slip-trip-fall or impalement hazards present, which have not been addressed?
—	—	Are appropriate clearances being maintained between drilling equipment and overhead power lines?
—	—	Are noise monitoring and hearing protection provisions being implemented?
—	—	To the extent possible, are good housekeeping practices being implemented?
—	—	Is a map to the hospital and a list of emergency telephone numbers conspicuously posted or available?

REMARKS-ACTIONS:

<u>YES</u>	<u>NO</u>	ENCLOSED SPACES/TRENCHES/PITS
—	—	Are enclosed spaces, pits, etc. fully characterized for oxygen deficiency, combustible gasses, and toxic gasses?
—	—	Are pits/trenches greater than 5 feet deep properly shored or sloped per OSHA 29 CFR 1910 Subpart P regulations?
—	—	Are PPE requirements for enclosed space entry being properly employed per the HASP?
—	—	Are properly equipped backup personnel on-site during enclosed space activities?

REMARKS-ACTIONS:

<u>YES</u>	<u>NO</u>	OTHER
—	—	If there is potential for spillage of contaminated media, has a spill prevention plan been prepared with the HASP, and are spill prevention/cleanup equipment available?
—	—	If underground storage tanks (USTs) are being removed, have the USTs been properly purged of combustible vapors prior to removal?
—	—	Have the displaced combustible vapors been vented through a stack extending 12 feet above the work area, per API Recommended Practice 1604?
—	—	Are combustible gas measurements being performed during UST venting and removal activities?

March 1991

TUT 002 0956