

Seismic Reflection Survey: Health and Safety Plan

Kansas Geological Survey
Exploration Services Section

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Submitted by:

Kansas Geological Survey

Health and Safety Plan
Spesutie Island and Western Boundary
Geophysical Investigation

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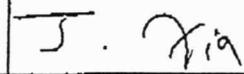
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Statement of Understanding

Project personnel shall read the Project Health and Safety Plan and shall be familiar with its provisions. My signature below certifies that I have read, understood, and will comply with the guidelines set forth in the Project HASP.

Printed Name	Signature	Company	Date
Rick Miller		Ks. Geological Survey	11-28-1994
Joe Anderson		Ks. Geological Survey	11-28-1994
David Laflen		Ks. Geological Survey	11-28-1994
Jianghai Xia		Ks. Geological Survey	11-28-1994
Sara Marcus		Ks. Geological Survey	11-28-1994

Introduction

The following Health and Safety Plan (HASP) specifies safety and occupational health precautions to be employed by all Kansas Geological Survey (KGS) personnel involved in conducting geophysical testing at sites on Spesutie Island, along the Western Boundary, and south of Phillips Army Airfield at Aberdeen Proving Grounds (APG). Requirements for the protection of workers engaged in hazardous waste operations are set forth in U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulation 29CFR1910.120. This hazardous waste operation and emergency response standard is the controlling regulation for the HASP. The HASP includes general safety precautions for KGS personnel working during geophysical testing and support operations. The geophysical investigation will consist chiefly of non-intrusive testing however, several intrusive tests will also be performed. These tests are explained in more detail in this HASP.

Project Description

Project Name:	Evaluation of Feasibility and Determination of Optimum Parameters for the Acquisition of Shallow High Resolution Seismic Reflection Data at Aberdeen Proving Grounds, Maryland
Location:	Aberdeen Proving Grounds, Maryland
Site Safety Officer:	Richard D. Miller
Plan Prepared By:	Richard D. Miller
Estimated Start Date:	1 December 1994
Estimated Duration of Field Work:	7-14 days

Statement of Work

A high resolution seismic reflection geophysical feasibility study is proposed at several test sites at Aberdeen Proving Ground, Maryland (APG). The test sites are located on Spesutie Island, along the Western Boundary, and south of Phillips Air Field as shown in Figure 1. The goals of these surveys are to determine: 1) the feasibility of using the seismic technique at APG, 2) the potential of the technique to resolve the subsurface stratigraphy (both horizontal and vertical), 3) the optimum seismic source for this site, 4) the optimum acquisition geometries, 5) general processing flow, and 6) a basic idea of the acoustic variability across the sites. Proven high resolution techniques will be used to acquire data on this survey.

Applicability

The provisions of the HASP are mandatory for all KGS personnel visiting or working at the site during the course of the investigation. The seismic reflection technique will be the geophysical method used in this investigation.

Plan Amendments and Review

The HASP has been reviewed and approved by the organizations listed on the front of the document. Due to the nature of the work plan revisions may be required as the project progresses. Changes to the HASP may be initiated by the Project Manager, the Health and Safety Officer, or any concurring organization, but all changes are subject to the same review process and concurrence as the original HASP, unless provided for specifically in the HASP.

Project Organization and Responsibilities

Key Project Personnel

Project Manager: Richard D. Miller 913-864-3965

Corporate Health and
Safety Officer: Kathy Sheldon 913-864-3965

Field Operations/On-Site Health and
Safety Officer: Richard D. Miller 913-864-3965

Project Responsibilities

Project Manager

The Project Manager is responsible for defining project objectives, allocating resources, assigning project personnel, and evaluating project outcome and has the authority to direct project activities. The Project Manager assumes control over site activities. Specifically, the Project Manager coordinates all activities with appropriate officials, obtains all necessary permits, ensures work plan is completed on schedule, and briefs project personnel on specific assignments. The Project Manager provides necessary safety and other equipment, provides personnel and time resources to conduct activities safely.

Corporate Health and Safety Officer

The Corporate Health and Safety Officer assures that the safety plan complies with the safety guidelines set forward by OSHA, KGS, and APG, and advises the Project Manager on all aspects of health and safety on site. The Corporate Health and Safety Officer has the authority to stop work if any operation threatens worker or public health or safety. Specifically, the Corporate Health and Safety Officer arranges necessary protective equipment for the project, monitors safety performance of all project personnel in

compliance with the project HASP, corrects unsafe work practices or conditions and documents these corrections, verifies that all project personnel have current medical authorizations and have received appropriate training. Recommends additional monitoring or changes in protective equipment as specified in the contingencies of the HASP, and provides ongoing review of the protective level needs as project work is performed

Field Operations/On-Site Health and Safety Officer

The Field Operations/On-Site Health and Safety Officer is a member of the site field team and is responsible for field team activities and safety. Specifically, the Field Operations/On-Site Health and Safety Officer directs on-site activities, executes the work plan and schedule, enforces safety procedures, determines protection levels, and enforces site control field activities.

Additionally, the Field Operations/On-Site Health and Safety Officer has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. This person is responsible for ensuring that corrective measures have been implemented and appropriate authorities notified.

Safety and Health Risk Analysis

Specific Safety Requirements

Personnel Safety Equipment: All personnel will be equipped with orange vests, safety shoes, hearing protection, and eye protection while working in the field during the seismic data acquisition phase of this project.

Vehicular Safety Equipment: All KGS vehicles will be equipped with a first aid kit and a fire extinguisher. A portable cellular phone will also be required in the KGS vehicle and will be the primary means of communication in the event of an emergency.

Fire/Explosion Prevention: No smoking or open fires are allowed in or around the vehicle carrying the blasting ammunition or container with explosive substances (i.e., gas, diesel, etc.). The blasting vehicle will be equipped with a fire extinguisher. The blasting vehicle will not be left running and unattended. The shotgun ammunition will be kept in ammunition cases which will be stored in a locked steel container permanently attached to the ammunition vehicle.

Time of Work: Attempts will be made to expedite all work during clear daylight hours under unrestricted visibility, in good weather conditions. Work will be suspended during periods of heavy rain or freezing rain, or if there are electrical storms in the area, or if visibility conditions deteriorate to the point where the seismograph and equipment operators cannot see each other.

Health and Safety Plan Participation: All personnel participating on this project will be required to review this plan.

Daily safety briefings will be held prior to the start of field activities. These meetings will be used to discuss any safety hazards or unsafe practices encountered the on the previous work day and to address specific or new safety hazards to the days work.

All personnel will be required to comply with rules outlined with this plan. Failure or inability of any personnel near the work area to comply with the site safety guidelines presented herein will be grounds for suspending all project work until compliance can be assured.

Copies of this HASP will be on the dashboard of the designated project vehicle. Emergency call numbers and evacuation routes are posted on the instrumentation van wall.

The following are the General Health and Safety Rules required by KGS for all staff in all operations.

1. Accidents or injuries must be reported immediately to the site safety officer, no matter how minor they seem.
2. Know how to do your job. Check your work area to determine what problems or hazards may exist. Review the safety requirements of each assigned job with your supervisor. Your activity may endanger other persons or nearby equipment or property. Take necessary steps to safeguard them. Be aware of what others are doing insofar as their actions may affect your safety.
3. Always maintain a safe distance away from any of the explosive seismic materials and devices unless you are specifically authorized or trained to handle these materials. Keep persons not authorized in the use of these materials away from the explosive work area at all times. Those authorized to prepare explosives shall use every reasonable precaution including, but not limited to, visual and audible warning signals, flags, or barricades to ensure safety.
4. Report unsafe equipment, hazardous conditions, and unsafe acts.
5. Use the safety equipment specified for the job.
6. Practice good housekeeping in the work area.
7. For your protection, obey all warning signs such as "Keep Out," "No Smoking," "Eye Protection Required," and "Authorized Personnel Only." Become familiar with site specific emergency response plans.
8. Do not take shortcuts. Use ladders, ramps, stairways, and designated paths.
9. Do not engage in horseplay or roughhousing at any time. To do so may lead to injury and/or be cause for discharge.
10. No KGS staff person is permitted to use intoxicants or to be under the influence of any intoxicant or drug while on the job. This includes any time when operating a company vehicle. Failure to obey this policy may result in immediate termination of employment with KGS.
11. When in doubt about safety equipment or procedures required to do your job, ask your Field Operations/On-Site Health and Safety Officer.

12. Failure to follow practices relating to your safety or that of fellow staff or failure to properly safeguard equipment, tools, or materials may lead to discharge.

Site Descriptions and Historical Background

As previously mentioned geophysical surveys are planned at Spesutie Island, along the Western Boundary, and south of Phillips Airfield at the APG area.

Spesutie Island is located in the northeastern part of APG and is connected to the mainland by a causeway. This area has been used in the past as a testing range. One seismic survey line, line 1, approximately 1.0 miles in length, is planned for this area. The planned survey line is located along the western shoulder of a paved road on the eastern portion of Spesutie Island as shown in Figure 2. The locations of the auger holes to be used for the seismic shot tests are indicated in Figure 2.

Seismic survey lines 3 and 4, are planned to be run along the western boundary of APG west of the 3 mile test track as shown in Figure 3. This site has been used for many years to test various types of military vehicles. The length of survey lines 3 and 4 are approximately 0.3 and 1.7 miles, respectively. The locations of the auger holes to be used for the seismic shot tests for line 4 are indicated in Figure 3.

An additional survey line, designated as line 2, is approximately 0.5 miles in length and is planned along a gravel road south of the Phillips Airfield runway as shown in Figure 3. This area was used in the past as an ordnance test range. The locations of the auger holes to be used for the seismic shot tests for line 2 are indicated in Figure 3.

The principal hazards at the test sites are detonation of unexploded ordnance (UXO) and physical hazards associated with field activities. These hazards are summarized below.

Site Hazard Identification and Assessment

The line locations are outside of any solid waste management units and were chosen specifically to be in areas where no known contamination exists. If, during the course of the project there is any suspicions that contamination has been encountered, operations will be stopped and the APG project office and the APG Safety Office immediately notified.

Unexploded Ordnance

UXO's from historical training and testing activities have often been found at APG and there is always a remote chance that these sites may contain buried UXO's. The exposure hazard associated with UXO items is related to

unexpected disturbance and detonation leading to possible injury or death. The Combat Systems Testing Agency (CSTA) will conduct magnetometer sweeps for UXO's in the areas where auger test holes will be drilled (Appendix B). The magnetometer sweeps have been coordinated through Mr. Pritchard, CSTA.

Physical Hazards

Physical hazards associated with the sites may include traversing wooded areas, adverse weather conditions, hunters, possible wildlife encounters, and the limited use of a sub-surface shotgun source for one of the test.

Since the project will take place over a short period, problems related to the weather (e.g., heat exhaustion, heat stress, frostbite) are not anticipated.

Wildlife hazards common to wooded and grassy areas include snakes, small rodents, and insects. Of particular concern in the spring and early fall are insect bites and stings from bees and ticks. Of particular concern are ticks, some of which are known to transmit a bacterial infection known as "lyme disease."

Hunters in the testing area may constitute another hazard. KGS personnel will notify Range Control prior to testing so that the test sites can be "closed-off" to hunters during the performance of the seismic testing. All personnel working in the test area will be required to wear orange-colored vests to increase their visibility to any potential nearby hunters.

Vehicle traffic near the western boundary sites will probably be intermittent. The proximity to the 3-mile test track and other unpaved test tracks requires yielding of the right-of-way to military vehicles operating in the area. Appropriate signs and signals will be deployed to ensure the presence of the seismic crew is known. KGS will notify CSTA test track operations of their presence in the Western Boundary Area.

Physical hazards associated with the site are of little concern due to their nature and the fact that they are easily controlled or prevented. Precautions include following common sense field practices and adhering to prescribed practices, operating procedures, and protective clothing.

Task Specific Hazards

The purpose of the geophysical investigation is to characterize the subsurface stratigraphy at four test locations at APG. One of the requirements of the geophysical tests is that geophones have to be implanted into the ground at approximately 4-ft intervals along the entire length of each of the survey lines. Geophones are used to detect minute ground vibrations. In order for the geophone to work correctly they must make good contact with the ground and this is accomplished by means of a spike on the bottom of the geophone surface. The geophone spikes are approximately 5 in long have a maximum

diameter of 0.5 in and are pushed into the ground by hand in order to provide the necessary ground-to-geophone contact.

One of the geophysical tests that will be employed may require the use of an auger gun (shotgun type device) to induce energy into the ground. This device consists of a small skid-steer loader with an attached auger/screw (Figure 4). The operation consists of (1) screwing the auger, which acts as a shotgun, approximately 3 ft into the ground, (2) loading and firing the gun, and (3) unscrewing the auger from the ground. The auger gun uses a blank 8 gauge shotgun shell, which is fired directly into the ground. The auger gun is presently planned to be used at three different locations at each of the three test sites. The locations where the auger gun will be used will be marked by means of a wire flags prior to the survey so they can be swept for UXO's by CSTA personnel. The auger gun will not be used prior to obtaining any required excavation permits. The device is built in such a fashion that there is no danger to the person handling the device, and no materials are left in the ground. The shotgun shells will be secured in a specially designed steel, lockable, explosives box in a vehicle at all times. The operation/safety rules and regulations for the auger gun are presented in Appendix A.

Field operations will consist of geophysical investigations to determine the effectiveness of shallow seismic survey methods at this site. The introduction of acoustic energy into the ground in a controlled fashion involves equipment or material with the potential to do harm if not properly handled and operated. Good common sense is the rule for seismic field operations. This can usually be easily accomplished if manufacturers' operating and use instructions are followed. The non-invasive nature of most of these tests will minimize the risk of UXO's.

The field investigations will involve project personnel performing geophysical surveys of the study area utilizing other non-intrusive seismic sources. These sources include a trailer mounted vibrator and air gun. The principle hazards associated with this type testing would consist of handling or moving the equipment.

Activity Hazard Analysis

A. Work Item: Use of Class "C" Shotgun Ammunition

Specific Hazards—The specific hazards involve injuries to persons or property damage arising from normal or accidental detonation or improper handling of the shotgun ammunition.

Control Measures—All project personnel working with or around the shotgun ammunition, seismic guns, and associated equipment will exercise all appropriate and reasonable precautions to prevent or limit accidents arising from use of explosives. All explosive devices will be Class "C," consisting of fully containerized smokeless black powder in the form of shotgun ammunition. Site work will conform with appropriate and reasonable Class "C" explosives handling, storage, communication, and detonation procedures.

All seismic shots will occur in shallow boreholes 2 to 4 feet below ground level.

Rick Miller of the Kansas Geological Society will be responsible for the safe use of the shotgun ammunition to be used. He will review the blasting communications and safety procedures at the initial site safety meeting and again prior to the initiation of the first seismic shots. All project personnel must become familiar with and abide by these protocols.

Specific shotgun ammunition safety measures as follows:

- **Storage:** All shotgun ammunition will be stored in a locked metal container. The storage container will have proper DOT labels for Class "C" shotgun ammunition.
- **Transportation:** The ammunition vehicle will carry proper DOT labels and will be operated by Rick Miller on or near site. The vehicle will contain a fire extinguisher and will be parked far enough off any road to minimize the potential for a collision with other vehicles.
- **Handling:** Only Rick Miller, KGS, will be allowed to access, handle, and load the shotguns. Shotgun loading and firing will be conducted in accordance with the attached "Operations/Safety Rules and Regulations for the Auger Gun".
- **Firing Communication:** Rick Miller shall establish a series of warning signals to be used prior to and following each shot. One short horn blast, whistle blow, or other audio signal will indicate the beginning of a blast. He will review the warning procedures with all project participants at the initial site safety meeting, and will monitor compliance with these procedures.
- **Safe Distances:** All project personnel not authorized to handle the shotgun ammunition and guns must stay a distance of 25 feet away from the guns and shot locations. Non-project personnel will not be allowed in the work area.

Blasting shall not commence if any of these protocols are not met.

Transportation. Transportation of the auger gun and ammunition is on a standard one-ton flat-bed four wheel drive truck. The ammunition is carried in .50-caliber military-style ammo boxes. The ammo boxes are locked in 10-gauge steel boxes that are permanently bolted to the truck bed. The ammunition is classified as "Class C Explosive" by the U.S. Department of Transportation. No more than 2000 rounds of each type of ammunition will be transported to this project, packed in 160 per ammo can.

B. Work Item: Traffic Control

Specific Hazards—The specific hazard involves accidents with vehicular traffic within the survey area.

Control Measures—All personnel will minimize activity along trafficked roadways to the extent possible. Traffic cones will be used to identify and buffer the work area with respect to on-coming traffic. Care will be used while working on or around driveways. If appropriate, signs and/or flagmen will be used to alert and slow traffic through the survey area.

C. Work Item: Bolt LSS-6 Land Air Gun

The Bolt Land Air Gun (BLAG) has been in routine use in oil exploration for more than 20 years. The device consists of a 3-cylinder diesel engine, a four-stage air compressor, and an enclosed water filled chamber (housing the "gun"). The safe operation of the gun is well documented in the operator's manual. The entire device is transported as the bed of an F-350 4-wheel drive truck. The 3-cylinder diesel engine powers not only the air compressor but also a hydraulic system designed to raise and lower the gun chamber to the ground. The gun chamber is hydraulically lowered to the ground with the weight of the truck used to hold the device to the ground. The gun is electrically detonated from the cab of the truck with no moving parts exposed during detonation. The engine and air compressor are enclosed in a protective shroud. The gun generates a thump to the ground surface approximately equivalent to 1/8 of a pound of high explosives buried 3 to 4 ft beneath the ground surface.

Control Measures

- 1) The careful and safe operation of the standard 4 wheel drive truck is well documented in the owners manual.
- 2) It is critical to always be aware of anyone near the device.
- 3) The raising of the gun for transport and lowering of the gun just prior to detonation is done with only part of the gun visible to the operator. It is critical that no one comes within 50 ft of the gun while in operation.
- 4) Hearing protection (down 30 dB) is required by anyone within 50 ft of the truck.

D. Work Item: MiniVib

The MiniVib is a hydraulically powered vibrator designed to shake the ground in a very controlled fashion over about a 4 to 8 second time duration. The device is hydraulically powered with no moving parts that possess an entanglement potential. Energy is delivered to the ground by this device through a hydraulically powered pad approximately 3 ft in diameter mounted on the belly of the vehicle. The pad is lowered from beneath the vehicle using the vehicle's weight as hold-down pressure. The pad is vibrated by a hydraulic servo delivering frequency-varying energy to the plate over a preset time duration. No moving parts are exposed with the maximum movement of the pad relative to the vehicle less than 2 in.

Control Measures

- 1) This vehicle is center articulating and requires care when turning that no one is within 20 ft of the vehicle.
- 2) Safe operation of the vehicle is documented in the operator's manual provided by the manufacturer.
- 3) Hearing protection is required within 50 ft of the vehicle.
- 4) All shields are to remain in place while the vehicle is in operation
- 5) Hydraulic pressures of more than 1500 psi are routine during operation. No maintenance or service will take place while vehicle engine is running.
- 6) Quick inspection is necessary prior to lowering the pad.

E. Work Item: Accelerated Weight Drop

The accelerated weight drop (AWD) generates acoustic energy by accelerating a 50 to 100 lb weight through a 2 ft stroke impacting an 18 in diameter steel plate held to the ground surface by the weight of a skid-steer style loader. The weight is accelerated within an enclosed steel guide. The drive mechanism consists of a hydraulic motor turning a set of sprockets that deliver power to a cycling lift arm that pulls the weight against the resisting force of an industrial rubber band. Simply envisioned, this device is analogous to a sling-shot. All moving parts are shielded, with the contact area between the weight and plate sufficiently enclosed to avoid a possibility of debris becoming air born and representing a risk to the operator or bystanders.

Control Measures

- 1) The operator wears hearing protection (30 dB down) while the loader is running.
- 2) No bystanders can be within 30 ft of the device while it is in operation and within 50 ft without hearing protection.
- 3) All shields are to remain in place while in operation. Routine maintenance, requiring removing shields, can take place only when the loader engine is off.
- 4) The operator can exit the vehicle only when the weight drop is in the full down position and solid contact is made with the ground surface.
- 5) Operation of the loader will be consistent with those published in the owner manual of the Case 1225 Uni-Loader.

F. Work Item: All Terrain Vehicles (ATVs)

ATVs that could be on site include the Yamaha Terra Pro, Kawasaki Mule, and Polaris 4x6. These ATVs all serve a very specific purpose and are critical to smooth and efficient operations. The ATVs never obtain speeds in excess of 15 mph and therefore do not represent risk of injury due to excessive speeds. The tip-over potential is minimized by the 4-wheel design of the vehicles, but tip-over potential does exist. Care is always taken to properly load the vehicles and only traverse grades within the acceptable limits of the vehicle as defined by the manufacturer.

1) The Yamaha has a specially design cable winding device. The Yamaha has a Power Take-Off that is used to power a winding device mounted on the front of the vehicle and is used for the rolling of seismic cable. Operation of the PTO requires the operator to be on the seat and travelling in the lowest speed range (this is controlled by safety overrides that "kills" the engine when these conditions are not met).

2) The Mule is designed to carry the seismograph and 12-volt batteries. This vehicle never travels more than 5 mph and spends over 99% of its time parked along the survey line.

3) The Polaris is the primary work horse of the ATVs. It transports cables and geophones in a 3x3 steel box mounted behind the seat. The vehicle has 6 wheels with 4 drive wheels. The 6-wheel design makes the vehicle very stable with a large safe payload capacity (> 700 lbs). This vehicle never travels more than 15 mph and is therefore at low risk of injury from excessive speed.

All ATVs have blinking yellow lights for increased visibility by other traffic.

Training

All KGS personnel working at the site in connection with the project shall have received hazardous waste worker training in accordance with 29CFR1910.120(e). This includes 40 hour initial training and 8 hour refresher training for all site workers. The Field Operations/On-Site Health and Safety Officer has complete knowledge of KGS's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health and hazard monitoring procedures and techniques and has the equivalent 8-hour supervisory training. The Training records will be available on-site for review by APG personnel. The Field Operations/On-Site Health and Safety Officer is responsible for ensuring that all KGS personnel have received their annual training and qualify to work on the project. All field personnel have been briefed on the safe and proper use of all field equipment.

The field crew will have at least one person that is properly trained in CPR and first aid procedures.

Personal Protective Equipment

Personal protective equipment (PPE) protects employees from the hazards and potential hazards they are likely to encounter as identified during previous site characterization activities. PPE consists of a combination of protective clothing and respiratory protection equipment. Selection of PPE is based on an evaluation of the performance characteristics of the PPE relative to the requirements of the site and the task specific conditions and duration. The level of protection is upgraded when site monitoring or conditions indicate that increased protection is necessary to reduce employee potential for exposure.

Based on the available information assessing the current condition of the sites, minimal skin protection is required for general site access. The prescribed working uniform for all personnel engaged in activities related to the project at the site is a modified EPA level D and shall consist of:

- Long-sleeved shirts and full-length pants
- Leather steel toed safety boots
- Optional hard hat
- Eye protection
- Hearing protection as required by procedures in the HASP
- Orange vests

No respiratory protection equipment is required. At the present time based on all available information, the atmosphere contains no known hazards. There is no expected potential for inhalation or contact with hazardous levels of any chemical.

Site Control

General

The sites are located on APG and are subject to various physical security safety measures. The primary means of external communication during field activities will be the mobile telephone. Internal communications will include oral communication and a low power walkie-talkie system, with a car horn as the emergency backup system.

In the event of a fire or explosion, the emergency operations center shall be notified immediately by dialing 911 on a Government phone or 410-272-0960 on a commercial phone. Dial 911 from a cellular/commercial phone if 410-272-0960 does not respond.

The purpose of a buddy system is to provide quick assistance to other employees in the event of an emergency. Site activities shall be conducted with a buddy who is able to provide his or her partner with assistance, observe his or her partner for signs of chemical or heat exposure, periodically check the integrity of his or her partner's protective clothing, and notify others if emergency help is needed.

Work Zones

Anytime energy producing sources, as previously described under Activity Hazard Analysis, are used, a work zone will be set up around such sources. The work zone will consist of a 50 ft radius from the device from which all non-essential personnel will be excluded during the operation of the device. This requirement is in addition to any requirements described under the Activity Hazard Analysis.

Emergency Response Plan

The nature of the investigation and the known condition of the work site makes emergencies a continual possibility. Emergencies, by nature, occur quickly and unexpectedly and require immediate response. During activities at a hazardous site an emergency may be as limited as a worker experiencing protective equipment failure or as vast as an explosion involving hazardous materials. The complexity of these potential emergencies means that advanced planning and thorough preparation is essential to protect worker health and safety. This section of the HASP addresses the planning and response to potential emergencies that could occur during the investigation at the Site.

Emergency Personnel and Telephone Numbers

During the investigation, the Field Operations/On-Site Health and Safety Officer shall serve as the onsite emergency coordinator; he will be responsible for responding to and correcting emergency situations. Off-site personnel shall provide assistance during a site emergency. The primary emergency numbers are 911 from a Government phone and 410-272-0960 on a commercial phone. Dial 911 from a cellular/commercial phone if 410-272-0960 does not respond. Off-site personnel include:

<u>Location</u>	<u>Phone Number</u>
Kirk U.S. Army Health Clinic	Dial 911 on a Government phone or 410-272-0960 on a commercial phone.
APG EMD	278-5622/5773
Fire, Police, Ambulance	Dial 911 on a Government phone or 410-272-0960 on a commercial phone.
Installation Safety Division	Initially notify Aberdeen Area Safety Office (278-4756/4757) and follow-up with a call to the Edgewood Area Safety Office (671-3660/3157).

Emergency Recognition and Prevention

All personnel involved in the investigation will read the HASP prior to commencing work. Since the investigation team is small, emergency response procedures must be fully understood by all project personnel. Personnel will be familiar with potential hazards and their recognition, communication procedures and signals, evacuation routes, and routes to the nearest medical facility. A daily meeting, informing project personnel of specific field operations and potential problems will be conducted at the start of each work day by the Field Operations/On-Site Health and Safety Officer. All visitors to the site will be briefed by the Field Operations/On-site Health and Safety Officer concerning emergency procedures, prior to entering the site.

Emergency Equipment

Large pieces of emergency equipment (e.g., fire engines, rescue equipment, etc.) are maintained at various locations around APG and may be summoned through the numbers listed in the previous section. Smaller pieces of equipment to control fires and other emergencies will be conspicuously maintained on site. This equipment will include one adequately stocked first-aid kit, one emergency eye wash kit, and one B/C type dry chemical fire extinguisher (minimum rating 2A-10).

Emergency Communications

The primary means of off-site communications during field activities will be by mobile telephone. A mobile phone will be kept on-site as the primary means of off-site communications. In addition, the closest accessible telephone during all working hours will be identified by the Field Operations/On-Site Health and Safety Officer prior to commencing field activities. Emergency telephone numbers will be posted in the KGS field vehicle and will be available from the KGS Field Operations/On-Site Health and Safety Officer present at all site activities.

Internal communications will include verbal communication, a low power walkie-talkie system, and a car horn to be used in case of an emergency. Notification to field personnel that an emergency is in progress will be given by three blasts on a car horn. Upon hearing the emergency notification, personnel will proceed to a designated assembly point. The assembly point for the Spesutie Island site will be designated as the security check-point at the entrance to the site (Figure 2). The designated emergency assembly point for the Western Boundary sites, Lines 3 and 4, is the water treatment plant whereas, the designated emergency assembly point for the site south of Phillips Airfield, Line 2, is at the intersection of the gravel and paved roads south of the airfield runway (Figure 3).

Emergency Medical Facilities

The primary emergency medical facility to be used for this work is:

Harford Memorial Hospital
Corner of Revolution St. and Union Ave.
Harve de Grace, MD
Phone: 410-939-2400

Harford Memorial hospital is a full service hospital which has an emergency ward.

The secondary medical facility to be used for this work is:

Kirk Army Health Clinic
Building 2501
Phone: 410-278-3332
on post dial 911 on government phones or
410-272-0960 on a commercial phone. Dial 911 on a
cellular/commercial phone if 410-272-0960 does not respond.

Kirk Army Health Clinic will only be use in conjunction with medical emergencies coordinated through APG's emergency response network.

The route from APG to the primary medical facility, Harford Memorial Hospital, is shown in Figure 5. The route from the Spesutie Island site to Kirk Army Health Clinic is presented in Figure 6 whereas, the routes from the Western Boundary sites and the site south of Phillips Airfield to Kirk Army Health Clinic are shown in Figure 7.

Emergency Procedures

For life-threatening medical emergencies notify response personnel immediately by dialing 911 on a post phone or 410-272-0960 from a commercial phone and identify your location at APG. Dial 911 from a cellular/commercial phone if 410-272-0960 does not respond. Clearly communicate to response personnel the nature of any injuries. Other emergency telephone numbers are included in Table 1. An emergency action checklist has been developed and will be maintained and kept readily available. This checklist appears as Table 2. The checklist will be revised and updated to reflect any and all new emergency procedures and requirements.

Upon an injury at the site, signal other workers in the area for evacuation (three blasts). Notify emergency response personnel as needed and initiate first aid procedures. No personnel will re-enter the site until the cause of the injury has been determined and the hazard removed if appropriate. The Field Operations/On-Site Health and Safety Officer will notify personnel when re-entry is allowed.

Upon notification of a fire or explosion, sound the evacuation signal; all personnel will gather at the designated emergency assembly point. Notify APG fire department (dial 911 on a post phone or 410-272-0960 on a commercial phone). If the fire is small and does not involve known hazards (e.g., toxic chemicals), extinguish the fire using the portable fire extinguisher. If the fire is large, evacuate the site.

All emergencies will be logged by the Field Operations/On-Site Health and Safety Officer in the project field logbook. Additionally, all injuries and illnesses will be immediately reported to the Installation Safety Division at 272-4756/4757 (Aberdeen Area Office) and with a follow-up call to 671-3660/3157 (Edgewood Area Office). Injuries will also be reported to the KGS Safety Officer.

TABLE 1 EMERGENCY CONTACTS

	Primary Phone Numbers		Secondary Phone Numbers
	on post government phone	on or off post commercial phone	on or off post commercial phone
Fire/rescue	911	410-272-0960	911
Ambulance	911	410-272-0960	911
Police	911	410-272-0960	911
Poison Control Center:	1-800-492-2414		
Primary Medical Facility:	Harford Memorial Hospital Corner of Revolution St and Union Ave Harve de Grace, MD Phone: 410-939-2400		
Directions to Hospital:	<p><u>FROM SPESUTIE ISLANDS SITE:</u> Exit post via Route 22 (Harford Gate on Harford Blvd).</p> <p><u>FROM WESTERN BOUNDARY AND PHILLIPS AIRFIELD SITES:</u> Exit post via Maryland Blvd.</p> <p>Proceed north on Route 40. Follow Route 40 to Route 7. Turn right on Revolution St. Follow Revolution St. to Union Ave. Harford Memorial Hospital is located on the corner of Revolution St. and Union Ave.</p>		
Secondary Medical Facility:	Kirk Army Health Clinic Building 2501 Aberdeen Proving Ground, MD 410-278-3332		
Directions to Clinic:	<p><u>FROM SPESUTIE ISLAND SITE:</u> Exit the secure area on Spesutie Island Rd. going northwest. Turn left on Plumb Point Loop East going southwest. Continue straight to Longs Corner Rd. Turn right on Aberdeen Rd. going northwest. Turn right at the light on Maryland Blvd. Follow Maryland Blvd. past Harford Blvd. The clinic is at the end of Maryland Blvd.</p> <p><u>FROM WESTERN BOUNDARY AND PHILLIPS AIRFIELD SITES:</u> Exit the secure area on Bush River Rd. going east. Turn right at light on Maryland Blvd. Follow Maryland Blvd. past Aberdeen and Harford Blvds. The clinic is at the end of Maryland Blvd.</p>		

TABLE 2 EMERGENCY ACTION CHECKLIST

	Primary Phone Numbers		Secondary Phone Numbers
	on post government phone	on or off post commercial phone	on or off post commercial phone
Fire/Explosion	911	410-272-0960	911
Physical Injury/Medical Emergency	911	410-272-0960	911
Security (assault, robbery, theft, trespass etc.)	911	410-272-0960	911
Weather Related Emergencies	911	410-272-0960	911
Vehicle Accidents	911	410-272-0960	911
Spills	911	410-272-0960	911

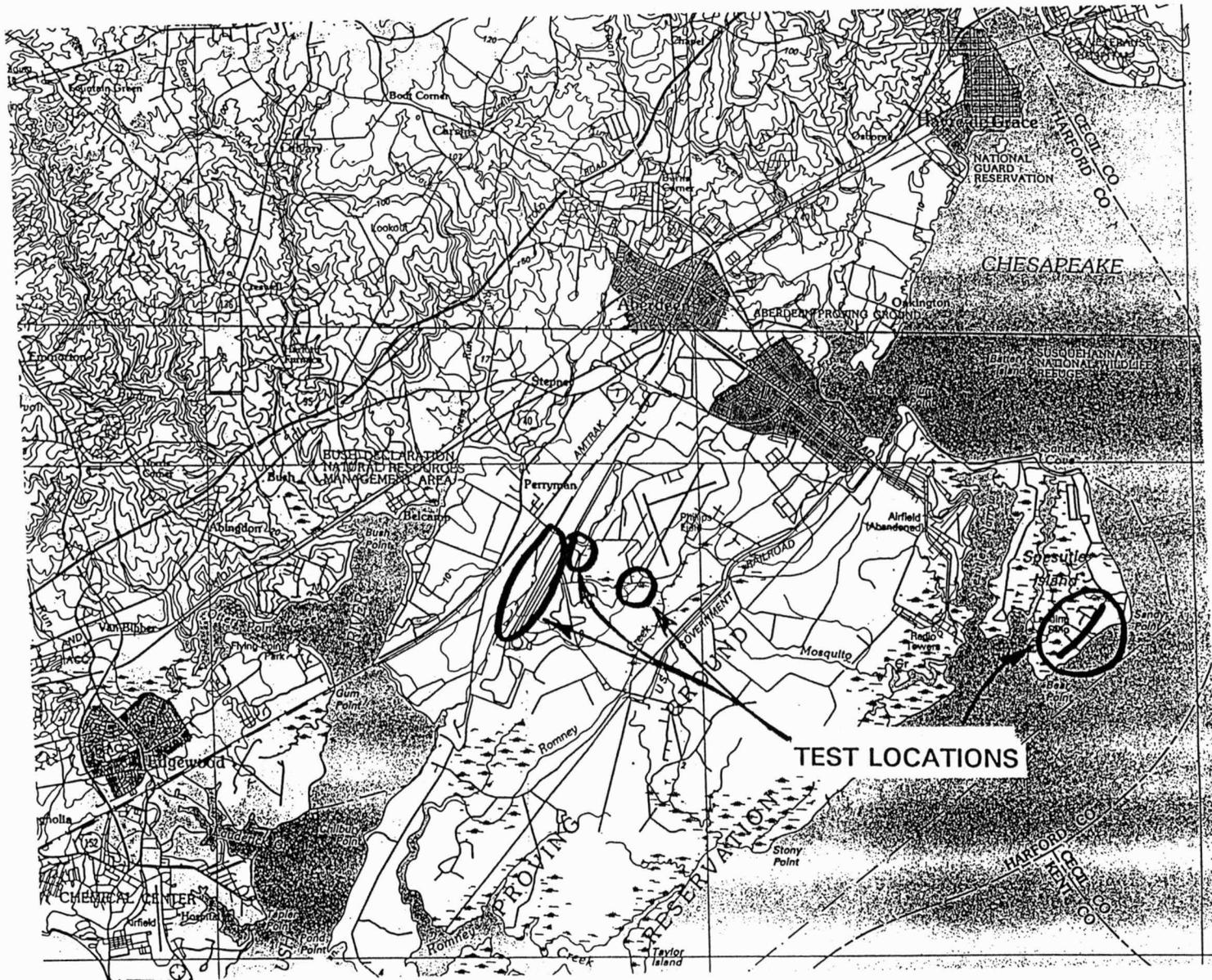


Figure 1. General location and layout of geophysical test lines

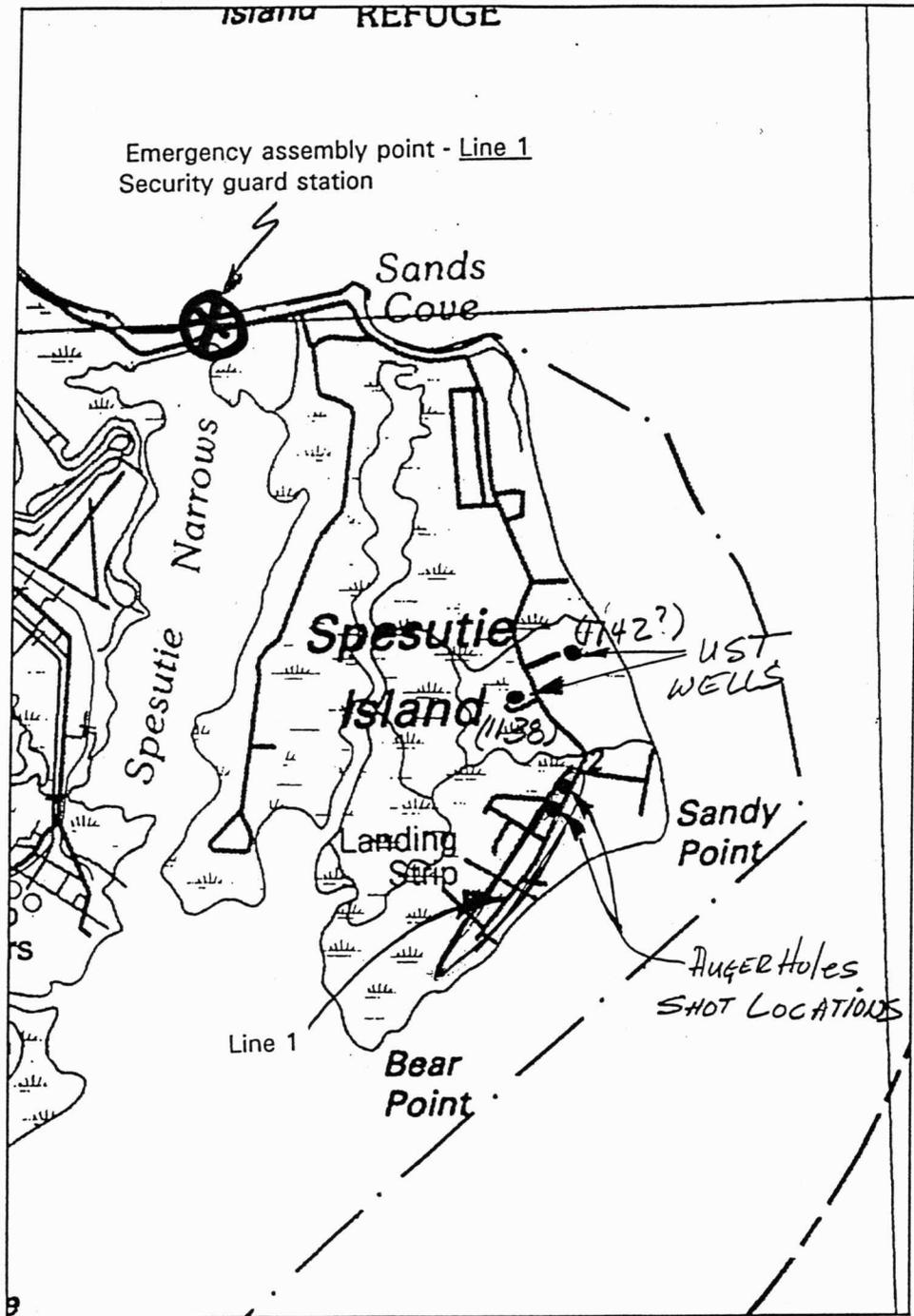


Figure 2. Location and layout of geophysical lines on Spesutie Island

Emergency assembly point - Lines 3 and 4
Water treatment plant

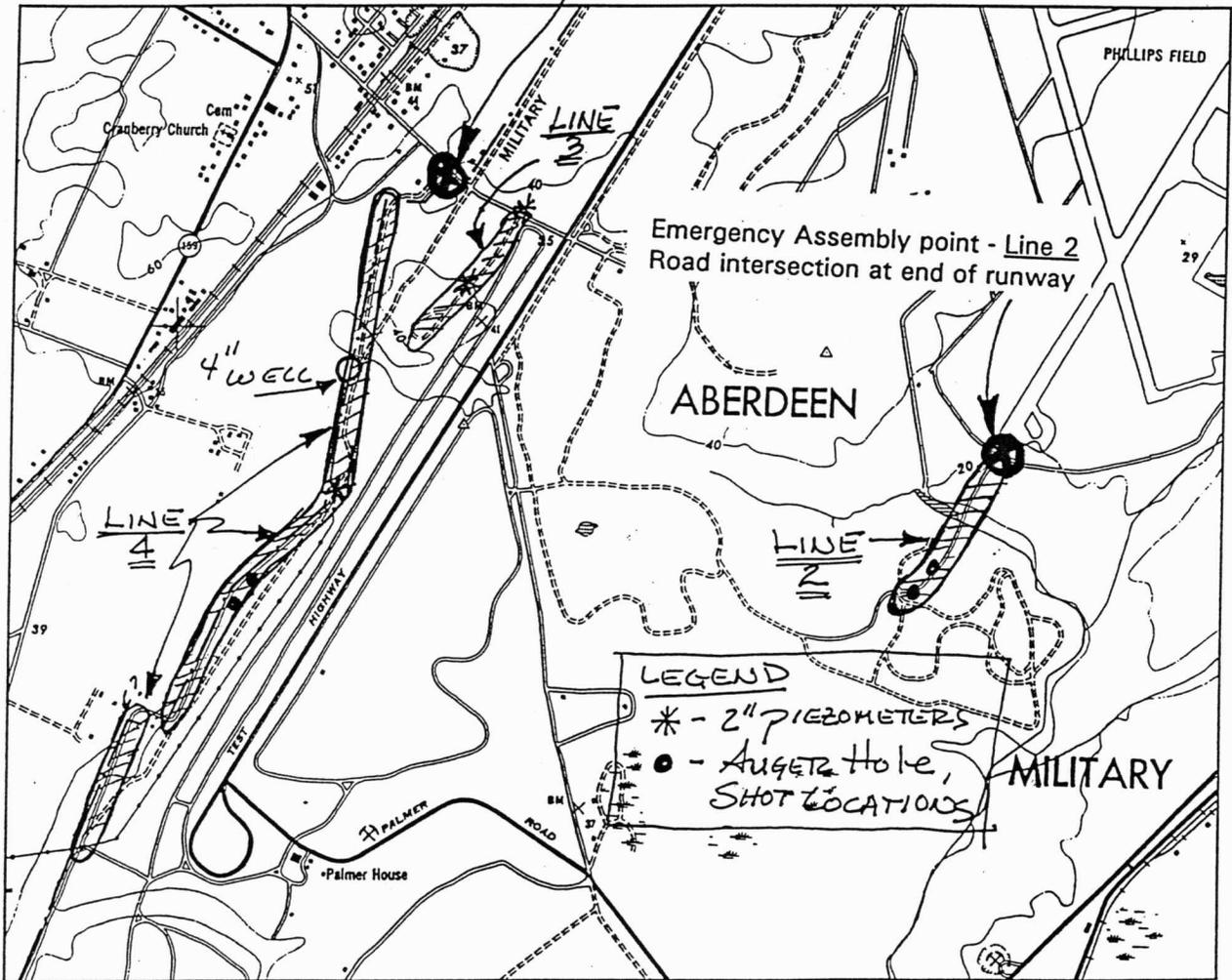


Figure 3. Location and layout of geophysical lines at the Western Boundary and south of Phillips Airfield

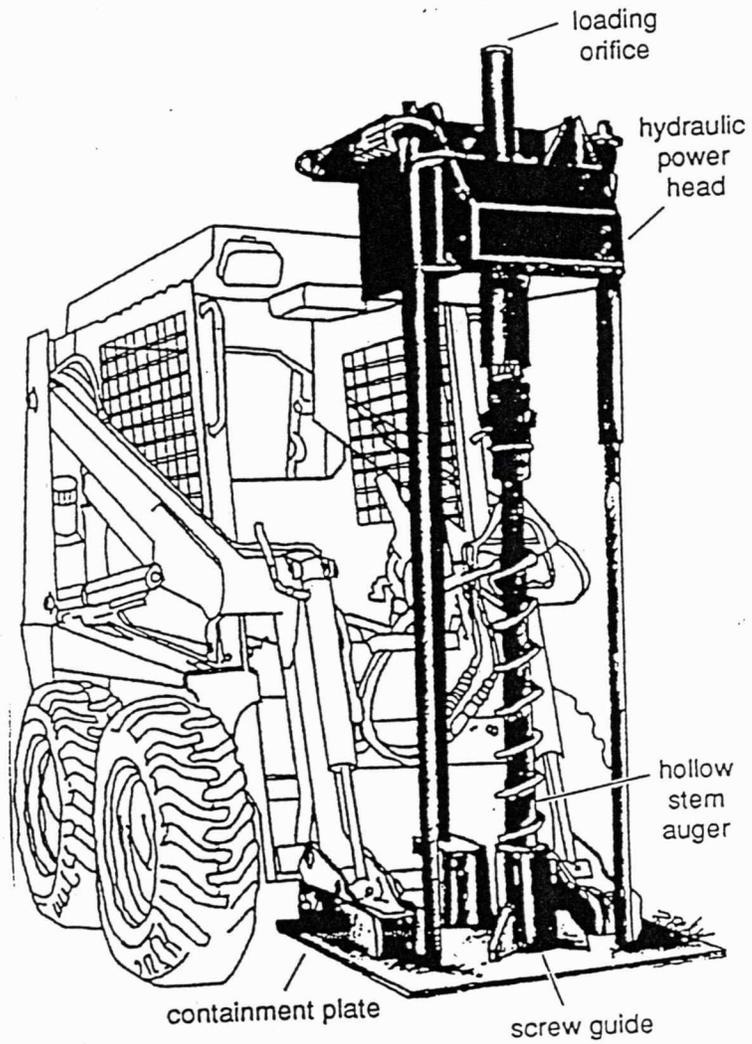
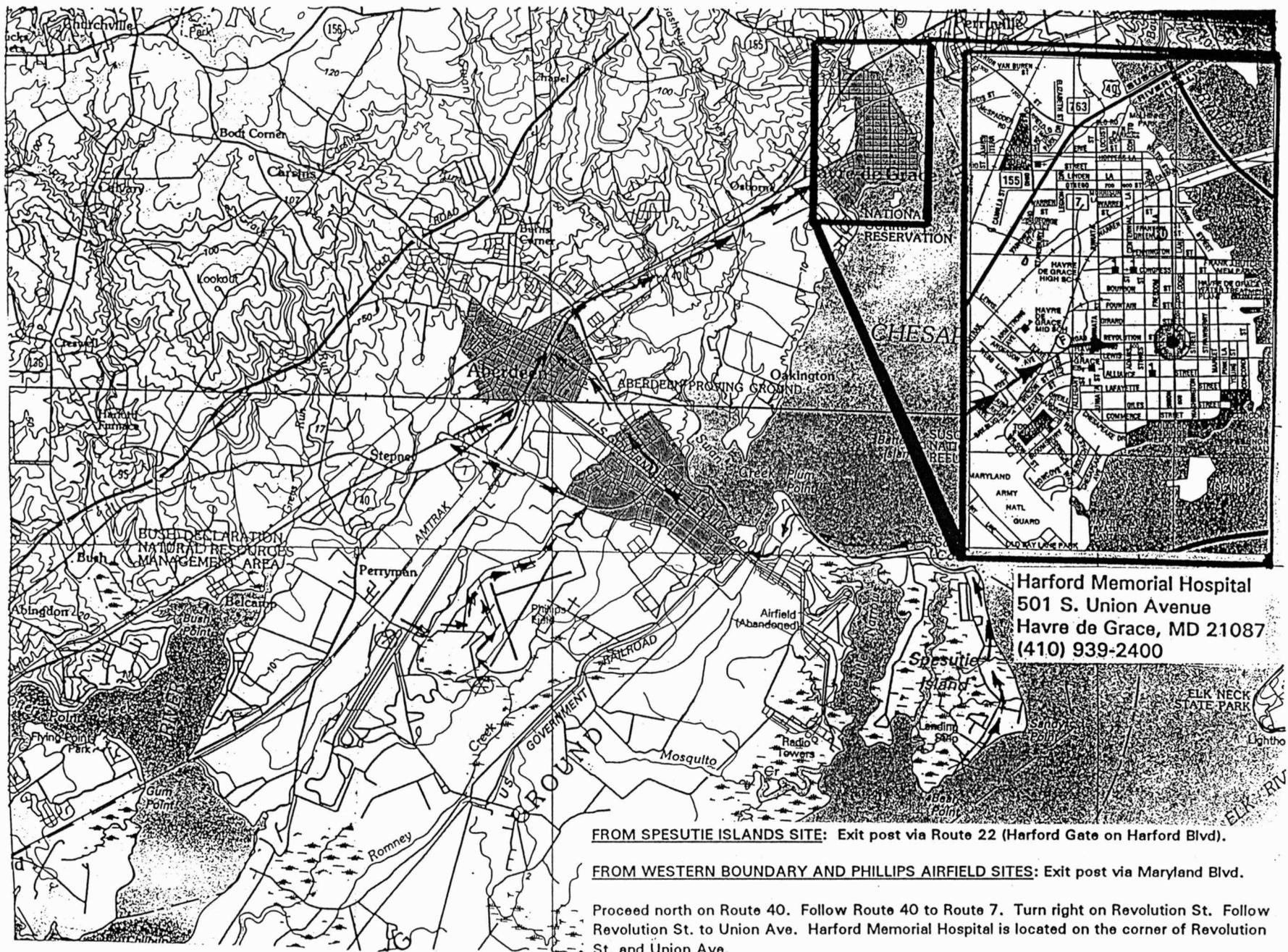


Figure 4. Illustration of auger gun



Harford Memorial Hospital
 501 S. Union Avenue
 Havre de Grace, MD 21087
 (410) 939-2400

FROM SPESUTIE ISLANDS SITE: Exit post via Route 22 (Harford Gate on Harford Blvd).

FROM WESTERN BOUNDARY AND PHILLIPS AIRFIELD SITES: Exit post via Maryland Blvd.

Proceed north on Route 40. Follow Route 40 to Route 7. Turn right on Revolution St. Follow Revolution St. to Union Ave. Harford Memorial Hospital is located on the corner of Revolution St. and Union Ave.

Figure 5. Route to Harford Memorial Hospital

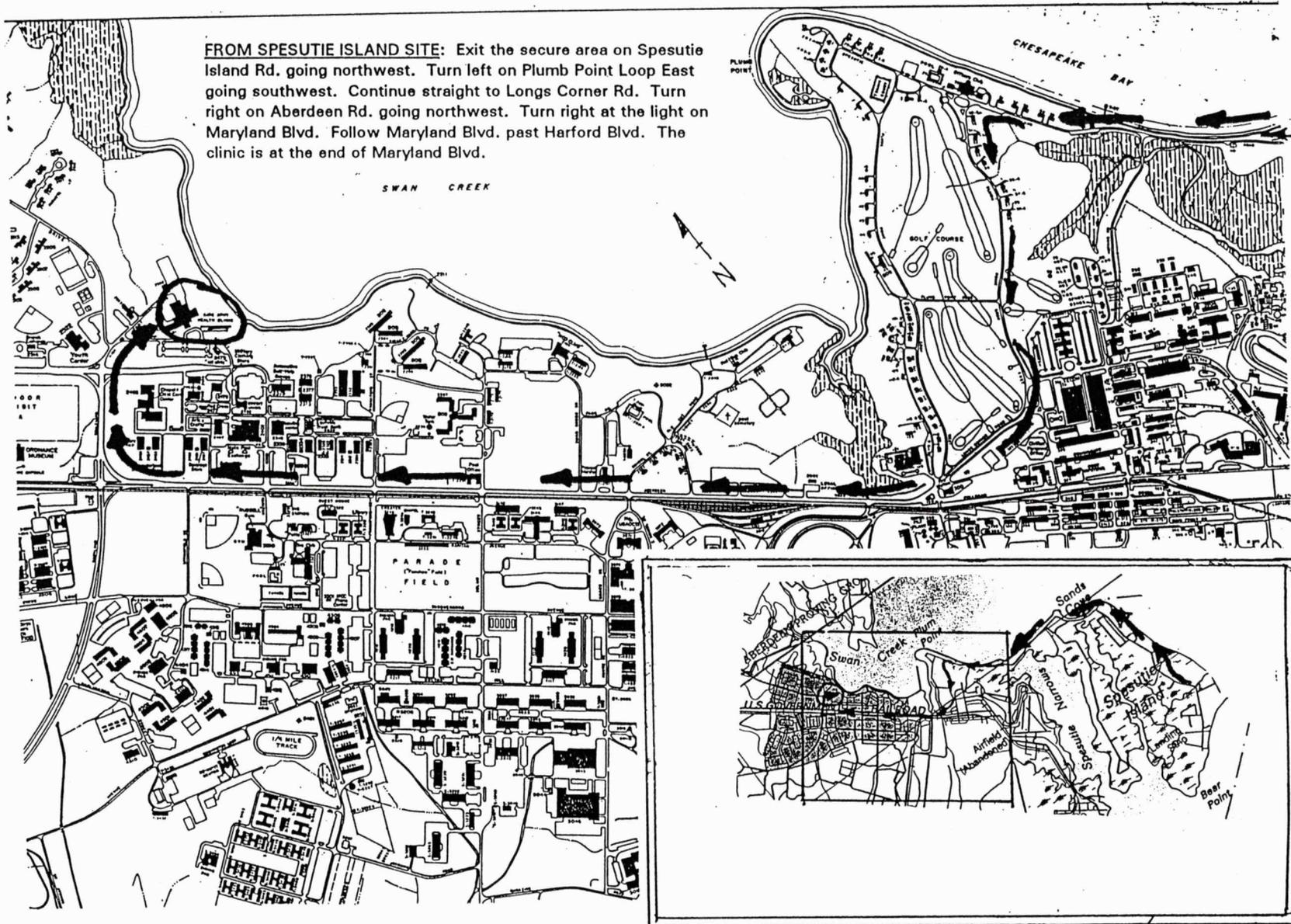


Figure 6. Route to Kirk Army Health Clinic from Spesutie Island - Line 1

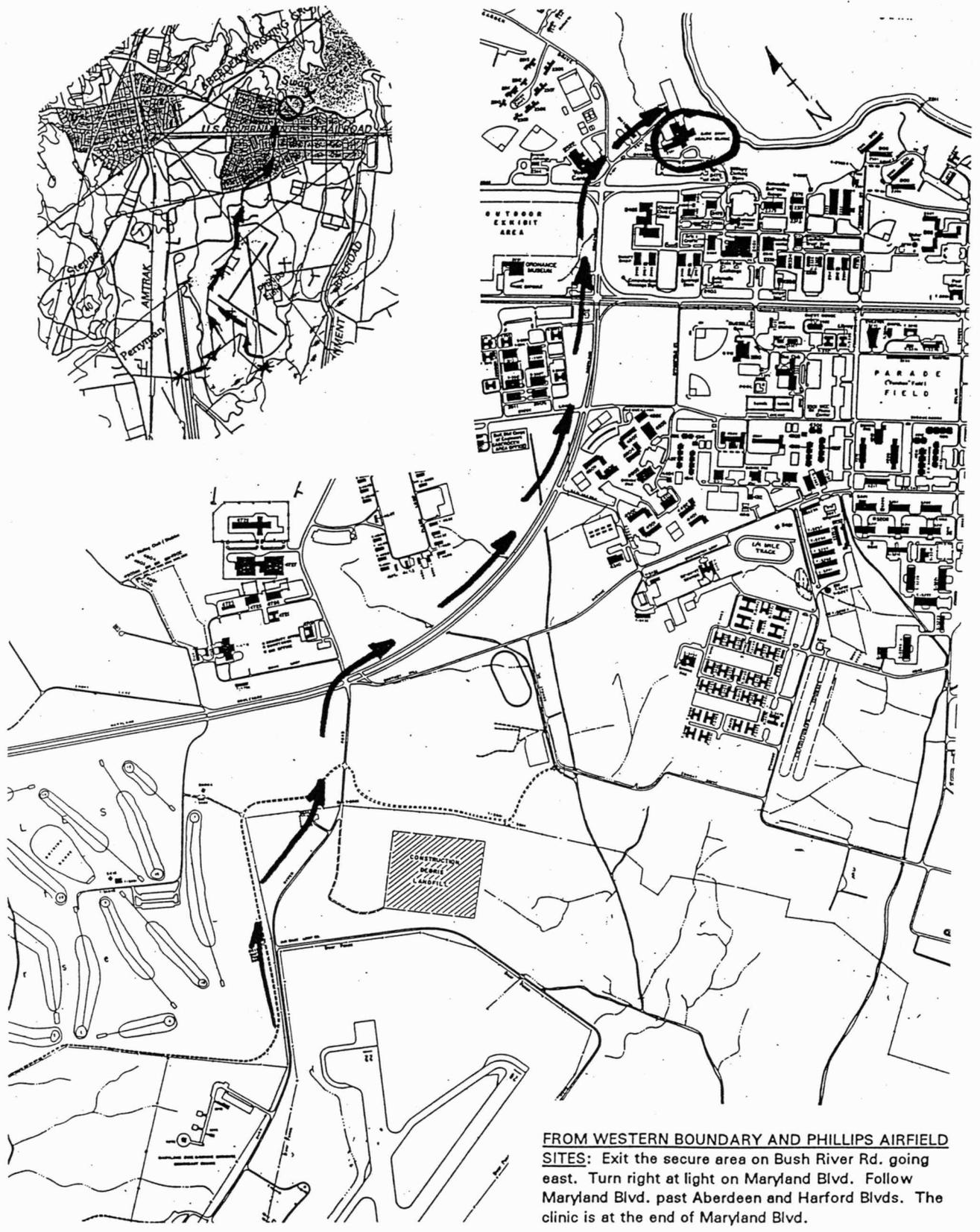


Figure 7. Route to Kirk Army Health Clinic from Western Boundary and Phillips Airfield sites - Lines 2, 3 and 4

Appendix A

Operation/Safety Rules and Regulations for the Auger Gun

The auger gun is a multi-component shallow seismic source which is designed for safe operation. The auger gun can detonate up to a 400 grain black powder load (approximately equivalent to one-twelfth of a pound of high explosive). Improper handling or operation of the auger gun or any of its components can potentially result in serious injury. Proper use of the auger gun includes not only safe operation and handling of the gun mechanism (firing rod) itself but also the skid-steer loader that transports and powers the device. The auger gun is not intended to fire projectiles but it has been designed to do so safely with no damage to the gun or operators. Proper maintenance is critical to the longevity and smooth operation of the auger gun. As with operating any firearm or explosive device, maintenance, transportation, and storage handlers must always assume the firing rod is loaded and the safety is off.

Operation and Safety Regulations

1. Each day the Field Operations/On-Site Safety Officer must brief all members of the seismic crew on the proper operation and maintenance of the auger gun.
2. Prior to set-up on any location the site must be cleared of all potential underground hazards and utilities. The "tip-over" potential of a site (directly related to topography) must also be considered prior to access with the loader.
3. The firing rod is never transported or stored loaded or in firing mode (locked into the auger) prior to downhole placement of the auger.
4. The firing rod is stored unloaded (no sleeve snapped onto the bottom) in the left side storage holster during downhole placement and in-field movement.
5. Only after the auger has been screwed into the ground and the center bit extracted and placed in the right side storage holster will the firing rod be removed from the left side storage holster. The shells should be pre-loaded

into metal sleeves and ready for loading prior to removing the firing rod from the storage holster. Once the firing rod has been removed from the holster, the firing rod should be pointed toward the ground and the loaded sleeve snapped into place making certain that nothing (hand, finger, etc.) is covering the powder end of the sleeve. The firing rod should then be immediately lowered downhole and locked into place.

6. Firing the device should only take place after the hole has been water flooded and the firing rod handles securely locked in the "J" notches. If after a sharp blow with a hammer the shell does not detonate wait for at least 5 min. prior to removing the firing rod from its locked position. Once the firing rod is removed from the auger, the un-fired round should be released from the firing rod and dropped into the empty shell casing can on the right side of the device making certain not to touch the metal sleeve for at least 20 min. after placement in the empty shell casing can.

7. The skid-steer loader should be operated with good common sense taking no chances that would compromise the safety of either the operator or any other crew member. No one should be allowed to operate the loader without proper training.

8. The firing rod should always be handled as if it is loaded. The firing rod has an automatic safety that will only allow the firing pin to travel through the rod if the gun is locked into place.

28 November 1994

TO: APGSA, Chief
Installation Safety Office
Directorate of Safety, Health, and Environment

Mr. Richard Miller, Kansas Geological Survey (KGS), has been Project Director and Health Safety Officer for the following site studies: (* = 40-hour OSHA required)

U.S. Geological Survey, High resolution seismic reflection survey to delineate buried river channel under Marine Corps Air Station, Cherry Point, North Carolina*

U.S. Geological Survey, High resolution seismic reflection survey to delineate near-surface hydrogeology at the Ft. Bragg Military Reservation, North Carolina*

Tetra-Tech, Inc., A high resolution seismic reflection survey in the Joplin, Missouri, area* (superfund site, International Paper)

Sandia National Laboratory, Seismic reflection survey at SPR surface collapse location (Weeks Island, Louisiana)

U.S. Army Corps of Engineers, Waterways Experiment Station, High resolution seismic survey to image the top and bottom of a shallow clay layer at the Memphis Defense Depot, Memphis, Tennessee

Louis Berger and Associates, High resolution seismic reflection survey near the present and former dry cleaning facilities on the Fort Riley Army Post near Junction City, Kansas*

Oak Ridge National Laboratory, Shallow seismic reflection feasibility study at the Drop Test Facility, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*

Oak Ridge National Laboratory, Non-invasive seismic source test at Waste Area Grouping 10*

Harding Lawson Associates, Seismic reflection survey at Fort Ord, California* (superfund site)

NorCal, Hawthorne Ammunition Depot, Seismic reflection survey near Mustard gas deposit pits*

NorCal, March Air Force Base seismic reflection survey*

Southern Clean Fuels, Seismic reflection to delineate shallow geologic structures at Southern Clean Fuels Coal Liquefaction Facility, Wilsonville, Alabama

Martin-Marietta Energy Systems, Inc., Seismic reflection data acquisition at the Y-12 Bear Creek Burial Ground

These activities were completed in the last two years, are similar in scope to the proposed APG Geophysical Evaluation Study, and were conducted at known contaminated sites. Mr. Miller's experience and highly successful execution of this large number of projects is equivalent to the 8-hour supervisory training.

Mr. Miller has complete knowledge of KGS's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health and hazard monitoring procedures and techniques.

Appendix B

Combat Systems Testing

Agency (CSTA) Magnetometer

Sweep Procedures

A Forrester magnetometer, or a magnetometer with equivalent capabilities, will be used to sweep the surface for buried ferrous objects in areas where holes are planned to be augered. If during the initial surface magnetometer sweep anything is detected the auger hole location will be moved a minimum of 5 ft away from the original location. If nothing is detected with the surface magnetometer sweep, the hole will be augered to a depth of 1 ft and the magnetometer lowered to the bottom of the auger hole. If nothing is detected by the magnetometer at a depth of 1 ft the hole will be augered an additional 1 ft to a total depth of 2 ft. The magnetometer will then be lowered to the bottom of the auger hole and if nothing is detected by the magnetometer at a depth of 2 ft the hole will be augered an additional 1 ft to a total depth of 3 ft. The magnetometer will then be lowered to the bottom of the auger hole and if nothing is detected by the magnetometer the hole will be used for testing. However, if the magnetometer does happen to detect something at any of the depths tested, the hole will be backfilled and a new boring location will be located a minimum of 5 ft away and the above testing procedure repeated.

CSTA operations will also follow appropriate CSTA Standard Operating Procedures.

Certificate Of Training

*Epic Training
Environmental Service
Hereby Certifies*

RICHARD D. MILLER

**Has Completed
OSHA ANNUAL REFRESHER**

2/14/94
Date Completed

Jack Hunsfeld
Director of Training

ate Of Training

**Environmental Protection
Instruction/Consulting**

Hereby Certifies that

Richard D. Miller

has successfully completed

OSHA's HAZARDOUS WASTE OPERATIONS

work practices standard 1910.120

OSHA Compliance Training 40 hour

in witness whereof this certificate is awarded

on the **17th** day of **Jan., 1992**

[Signature]
Director of Training
[Signature]
Educational Administrator

[Signature]
Instructor



Certificate Of Training

EPIC Training
Environmental Service

Hereby Certifies that
Joe M. Anderson

has successfully completed
OSHA's HAZARDOUS WASTE OPERATIONS
work practices standard 1910.120
40 Hour Hazardous Waste Operations
in witness whereof this certificate is awarded

on the **18th** day of **February 1994**

Jack Hunsfeld
Director of Training
J. A. Farley
Educational Administrator

Jack Hunsfeld III
Instructor

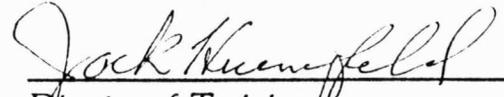
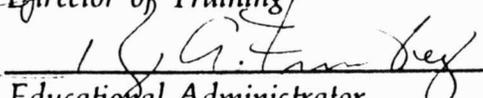


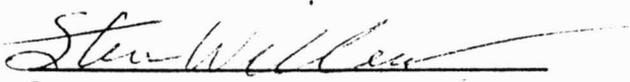
Certificate Of Training

EPIC Training
Environmental Services

Hereby Certifies that
David Laflen
has successfully completed
OSHA's HAZARDOUS WASTE OPERATIONS
work practices standard 1910.120
40 Hour Hazardous Waste Operations
in witness whereof this certificate is awarded

on the **8th** day of **April 1994**


Director of Training

Educational Administrator

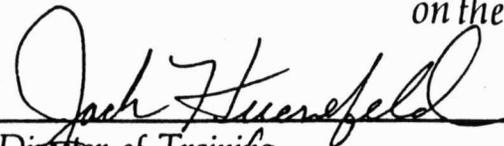
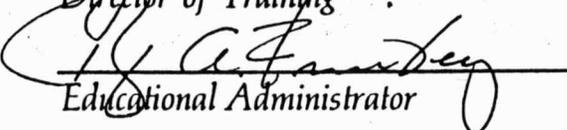

Instructor

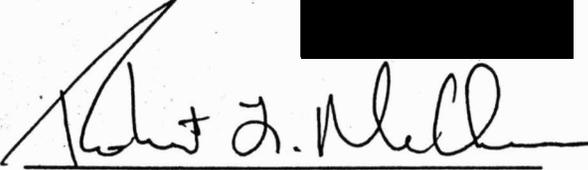


Certificate Of Training

EPIC Training
Environmental Services

Hereby Certifies that
Jianghai Xia
has successfully completed
OSHA's HAZARDOUS WASTE OPERATIONS
work practices standard 1910.120
40 Hour Hazardous Waste Operations
in witness whereof this certificate is awarded

on the 23th day of November 1994

Director of Training

Educational Administrator



Instructor



Certificate Of Training

EPIC Training
Environmental Services

Hereby Certifies that

Sara Marcus

has successfully completed

OSHA's HAZARDOUS WASTE OPERATIONS

work practices standard 1910.120

40 Hour Hazardous Waste Operations

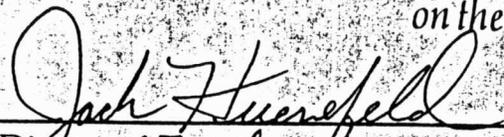
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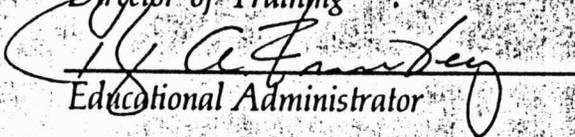
23th

day of

November 1994



Director of Training



Educational Administrator



Instructor



MEDICAL EVALUATION FORM

Employee Name: Richard Dymuller Corporation: _____
Date of Exam: 11/17/94

I have reviewed the results of the medical health history, physical examination, and laboratory tests prescribed for an (initial/annual/exit) exam and certify that the record (is/is not) complete.

Respirator Certification

Based upon the examination as per the OSHA Respirator Standard (29 CFR 1910.134), I certify that this individual (is/is not) medically qualified to use a respirator.

Comments: _____

Opinion of Increased Risk - Asbestos

This individual has been examined per the OSHA Asbestos Standard (29 CFR 1910.1001 and 29 CFR 1926/58) and in my opinion (has a/has no) medical condition that places the individual at an increased risk of material health impairment from exposure to asbestos, tremolite, anthophyllite, or actinolite.

Comments: _____

Clearance for Hazardous Waste Site Work

As per OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120), This individual was examined for medical conditions that would place him/her at an increased risk of material impairment of health from hazardous waste site work. Based on this examination I certify that this individual:

X has no medical contraindications to full participation in hazardous waste site work, when conducted under the conditions of adequate training and a health and safety plan.

_____ has medical limitations that restrict full participation in hazardous waste site work. (Describe work function limitations, i.e., lifting, temporary limitation, pending medical follow-up work, etc.)

_____ is medically restricted from any direct work with hazardous waste or hazardous waste sites. (Describe work limitations.)

Comments: Healthy male

I have also informed the employee about medical conditions discovered that require further examination or treatment.

Name of physician: MARY UERON
Please Print

Mary Ueron
Signature of Physician

Address: 500 Rockledge Rd
Lawrence, KS 66049

11/17/94
Date