

ENVIRONMENTAL RESTORATION PROGRAM

**LIMITED FIELD INVESTIGATION
OPERABLE UNIT 3, MISCELLANEOUS SITES
HEALTH AND SAFETY PLAN**

**MOUND PLANT
MIAMISBURG, OHIO**

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**DEPARTMENT OF ENERGY
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**ENVIRONMENTAL AND HEALTH DIVISION
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LOS ALAMOS NATIONAL LABORATORY**

FINAL

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ACRONYMS

ACGIH	American Conference of Government Industrial Hygenists
ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
CGI	combustible gas indicator
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration (Program)
FIDLER	Field Instrument for the Detection of Low-Energy Radiation
LEL	lower exposure limit
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PID	photoionization detector
SOP	Standard Operating Procedure
TSO	Technical Support Office
VOC	volatile organic compound

1. INTRODUCTION

This plan is one component of the Work Plan for a limited field investigation for Mound Plant Miscellaneous Sites, Operable Unit 3. It is applicable to work performed by Roy F. Weston, Inc., and subcontractors and includes an assessment of potential hazards, a justification for personnel protection requirements, and site-specific emergency response procedures for surface and subsurface soil and groundwater sampling at the following sites:

- farm trash area (previous owner);
- underground sewage lines;
- paint shop area;
- powerhouse area;
- Area C waste storage area;
- Building 61, former heavy equipment area;
- oil burn structure;
- fire-fighting training facility pit;
- Area I, Buildings 1 and 27 leach pits;
- Building 27 sump;
- Building 27 concrete flume;
- Building 27 solvent storage area;
- glass melter room sump;
- WD Building drum staging area;
- Area H, pyrotechnic waste disposal area;
- pyrotechnic waste shed;
- thermal treatment unit area;
- trash burner area;
- waste oil drum field;
- old firing range drum storage site;
- Building 34 aviation fuel tank; and
- Building 51 waste solvent storage tank.

The Miscellaneous Sites operable unit incorporates those sites that require limited field investigations because little or no data are currently available. The limited sampling efforts are designed to reduce the uncertainty concerning these sites and provide data to either eliminate them from further consideration or to plan a more detailed investigation.

2. POLICY AND STANDARDS

The U.S. Department of Energy (DOE) is responsible for health, safety, and environmental protection programs at DOE-owned, contractor-operated facilities. DOE is mandated to conduct the Environmental Restoration (ER) Program in a manner that will limit risks to the health and safety of employees and the general public and to provide adequate protection for property and the environment. Specific procedures may include engineering controls, administrative controls, and the use of equipment for personal protection.

Maintaining toxic material and radiation exposures to workers at levels as low as reasonably achievable (ALARA) is one of the main tenets of this safety plan. To accomplish this, health physicists and industrial hygienists have been involved in the planning of tasks and have provided an ALARA review for all project work plans. The ALARA review will demonstrate that all reasonable efforts have been made to minimize exposures of workers and the general public.

The environmental, health, and safety protection requirements applicable to remedial investigations under the ER Program are described in DOE and DOE Albuquerque Operations Office orders. This site-specific health and safety plan is based on these orders and follows applicable federal, state (Ohio), and local standards.

3. HEALTH AND SAFETY RESPONSIBILITIES

The ER Program Technical Support Office (TSO) subcontractor project director is responsible for ensuring the health and safety of field team members at ER Program sites. At Mound Plant, the ER Program TSO subcontractor installation manager and site manager are responsible for site worker safety. The ER Program TSO subcontractor site health and safety officer provides guidance to the site manager regarding potential health hazards during characterization activities. As with all field activities, field personnel must be aware of potential hazards at all times.

3.1. INSTALLATION RESPONSIBILITIES

The Mound Plant Safety and Loss Prevention Department has the primary responsibility for implementing health and safety requirements according to installation procedures. The managers of this department will provide guidance to the site manager for establishing health and safety requirements in conjunction with current Mound Plant policy and standards.

3.2. INTERNAL AUDITS

Internal health and safety audits are conducted to ensure adequate implementation of the requirements of this plan, along with the Quality Assurance Project Plan and the regulations and responsibilities it describes. Internal audits will be conducted by the ER Program TSO subcontractor health and safety manager and documented in health and safety audit reports. Individuals responsible for health and safety deficiencies noted in the audit findings will provide written responses describing corrective actions that have been implemented to resolve the findings.

3.3. VARIANCES FROM HEALTH AND SAFETY REQUIREMENTS

Where special conditions exist that may warrant a variance from a safety requirement or procedure, a written request may be submitted by the ER Program TSO subcontractor site health and safety officer to the corporate health and safety manager. The request will be reviewed by the project manager; the conditions will be evaluated; and, if appropriate, a written statement specifying the conditions under which the variance is granted will be provided. A copy of the variance will be retained in the field during work activities where it is invoked.

4. IDENTIFICATION AND ASSESSMENT OF POTENTIAL HAZARDS

It is not known if spills or leaks that have resulted in environmental contamination have occurred at any of the Miscellaneous Sites. However, potential contaminants have been identified based on site histories and general knowledge of past Mound Plant activities. These are discussed in subsections 4.2 (Chemical Hazards) and 4.3 (Radiological Hazards). Subsection 4.1 addresses potential physical hazards, particularly those associated with excavation activities.

The ER Program TSO subcontractor site health and safety officer or his approved designee will monitor field personnel exposure to the physical, chemical, and radiological hazards described in the following sections. Measurement data will be recorded on appropriate ER Program Standard Operating Procedure

**Table IV.1. ER Program Standard Operating Procedures for
Health and Safety Monitoring**

<u>SOP No.</u>	<u>Title</u>
1.1	General Instructions for Field Personnel (revision 2)
1.6	General Equipment Decontamination (revision 2)
1.7	Sampling for Removable Alpha Contamination (revision 2)
1.8	Personnel Decontamination - Level D Protection (revision 2)
1.9	Personnel Decontamination - Level C Protection (revision 2)
1.12	Air Particulate Sampling with a Real Time Aerosol Monitor (revision 2)
6.1	Health and Safety Monitoring of Combustible Gas Levels (revision 2)
6.2	Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (revision 2)
6.4	Total Alpha Surface Contamination Measurements (revision 2)
6.7	Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (revision 2)
6.16	Heat Stress Monitoring (revision 2)

Reference: DOE 1988

(SOP) forms (DOE 1988). Applicable SOPs are listed in Table IV.1. Safety precautions are described in section 5.

4.1. PHYSICAL HAZARDS

Physical hazards of Miscellaneous Sites, Operable Unit 3, limited field sampling include heat stress, equipment and terrain hazards, detonation, and noise. Test pit excavations at Area C present field personnel with a number of hazards. The hazards of most concern are the crushing hazards associated with cave-ins of the excavation of buried drums and utilities. Regulations (Occupational Safety and Health Administration [OSHA] 29 CFR 1926.650, 651, and 652) have been established to protect the worker during excavation activities. These regulations are detailed in nature and set forth criteria for characterizing soils, benching, sloping, and shoring. However, for excavations less than five feet in depth there are no requirements for stabilization of soils. See Appendix A for additional requirements for excavations.

High explosives residues may be found at the pyrotechnic waste shed; thermal treatment unit; and Building 27 sump area, solvent storage area, and concrete flume. During drilling and sampling, a remote possibility exists that a detonation may occur. Therefore, extreme caution should be used in these areas. If chunks of yellow, blue, or white material are noted in the cuttings, drilling will cease until it is determined if the substance is explosives residue. If it is determined to be high explosive residue, the drilling operation in that area will be abandoned.

An addendum will be made to the training outline (Appendix B) for the Area C activities when a determination has been made of the type of equipment needed.

4.2. CHEMICAL HAZARDS

Volatile organic compounds (VOCs), as well as a variety of other chemical contaminants, may be present in the soils and water to be sampled during this limited field investigation. Many of the contaminants suspected at the Miscellaneous Sites, if identified, are expected to be present in minor concentrations. See section 5 of Appendix C, page C-5, for a list of these chemicals or group of chemicals. Specific chemical information is not known on some of the compounds; therefore, listed below are the areas to be investigated and a list of the suspected chemicals.

Potential contaminants:

- WD Building Drum Staging Area - unknown contaminants;
- Pyrotechnic Waste Shed - pyrotechnic wastes;

- Thermal Treatment Unit - high explosives powder (PETN, PBX, RDX, HMX, and tetryl), detonating cord and fuses, pyrotechnic powders, contaminated trash, hexanitrostilbene wastes, 2-[5-cyanotetrazolato] pentramine cobalt (111) perchlorate wastes, thermite powder wastes, and solid primary wastes;
- Building 51 Waste Solvent Tank - organic waste solvents; and
- Building 34 Aviation Fuel Tank - aviation fuel components include benzene, toluene, ethylbenzene, and xylenes.

Potential contaminants at new sites in Operable Unit 3:

- Underground Sewer Lines - small amounts of solvents, photographic solutions, acids, and bases;
- Oil Burn Structure - aviation fuel components include benzene, toluene, ethylbenzene, and xylenes;
- Fire Fighting Training Facility - diesel fuel, benzene, and toluene;
- Glass Melter Room Sump - unknown contaminants;
- Building 27 Sump Area - acetone, ethanol, and dissolved explosives;
- Building 27 Solvent Storage Area - acetone, ethanol, and dissolved explosives;
- Building 27 Concrete Flume - unknown quantities of acetone, ethanol, and dissolved explosives

The following monitoring will be performed by the designated site health and safety officer during the Miscellaneous Sites, Operable Unit 3, field investigation:

- A photoionization detector (PID) with a 10.2-eV probe will be used to detect VOC vapors during augering and excavation. Readings will be taken in the breathing zone, downhole, and in the head space at every drilling increment, which is usually 5 to 10 ft, and at every lift during excavation.
- A combustible gas indicator (CGI) will be used to detect flammable vapors downhole at every drilling increment, usually 5 to 10 ft, and at every lift during excavation.
- A real-time aerosol monitor will be used to detect airborne dust and particulates during all activities that may potentially produce dust (drilling and excavation). This monitoring will be performed on a continuous basis.

4.3. RADIOLOGICAL HAZARDS

Radioactive contamination is not anticipated at any of the Miscellaneous Sites areas. However, plutonium-238 and thorium-232 were used and handled extensively at Mound Plant. Therefore, the following precautions will be followed. Appendix C, section 6, provides information about these radionuclides.

- While working in the Miscellaneous Sites areas, thermoluminescent dosimeters will be worn at all times.
- A Field Instrument for the Detection of Low-Energy Radiation (FIDLER) will be used to screen samples and work areas. The FIDLER will be calibrated to detect the 17-KeV x-ray emitted when plutonium-238 decays to uranium-234 and the low-energy x-rays emitted by thorium. If gamma radiation levels greater than three-times background are detected during FIDLER screening, the work area will be evacuated and a health physicist contacted in order to reassess the situation.
- Samples will be screened by Mound Plant personnel before shipment off the site for analysis. Samples with greater than 2000 pCi/g activity will be shipped as radioactive samples according to the U.S. Department of Transportation regulations in 49 CFR 172 and 173. These screening results will be included with samples to be shipped offsite.
- An alpha scintillometer will be used to screen all equipment and persons exiting the site for breaks or at the end of the day. The screening will be performed according to SOPs 1.7, Sampling for Removable Alpha Contamination (revision 2); and 6.4, Total Alpha Surface Contamination Measurements (revision 2) (DOE 1988). Release criteria will follow DOE Order 5480.11 (Appendix D).
- All personnel working at Mound Plant, where radioactive hazards are suspected, will have two whole-body counts performed at Mound Plant in the medical facility, a baseline count before work begins, and a count when the reconnaissance sampling work is completed. These whole-body counts will be performed by Mound personnel at Mound Plant.

4.4. BIOLOGICAL HAZARDS

Biological hazards associated with the limited field investigation include insects, poisonous plants, and nonpoisonous snakes. Appropriate safety measures will be taken to avoid exposure to biological hazards. In the event of an exposure, the site health and safety officer will be notified and first aid or medical attention will be obtained, if necessary.

5. PERSONNEL PROTECTION REQUIREMENTS

The U.S. Environmental Protection Agency (EPA) has established four levels of protection for initial site personnel protection based on the total vapor readings for unidentified atmospheric contaminants (EPA 1984).

The levels of protection used during field activities at the Miscellaneous Sites areas have been modified from EPA protocol and are based on the following total organic concentration levels for a 1-minute sustained reading in the breathing zone using a PID or CGI.

Protection Level

Concentration Range

Level D

Background - 12.5 units above background PID
Background - 20% lower explosive limit (LEL)
on the CGI (ACGIH 1987)

Exit site; reevaluate condition with the
site health and safety coordinator.

> 12.5 units above background PID
> 20% LEL on the CGI

Level D protective equipment will include the following items:

- cloth coveralls, Tyvek coveralls, or work outfit (long pants);
- latex or cloth work gloves;
- steel-toed safety boots and optional disposable boot covers; and
- hard hats and a face shield or safety glasses.

Level C protection will be used during sampling activities if the real-time aerosol monitor registers 5 mg/m³ or greater, if any visible airborne dust is present, or if VOC concentrations exceed 12.5 units (measured using the PID). The PID action level is based on one-half of the exposure limit for trichloroethene, which is the most restrictive limit for the potential VOCs.

If needed, Level C protective equipment will include the following items:

- full-face, air-purifying, canister/cartridge-equipped respirator;
- Tyvek, polyvinyl chloride, or Saran-coated Tyvek chemical resistant clothing;
- latex inner gloves;
- nitrile outer gloves;
- steel-toed safety boots with disposable latex or polyvinyl chloride boot covers; and
- hard hats, safety glasses, and hearing protection, as needed.

If necessary, the work area will be sprayed with water to eliminate airborne dust. This practice will protect Mound Plant employees in nearby areas and prevent offsite contamination.

5.1. JUSTIFICATION FOR PROPOSED LEVELS OF PROTECTION

The action levels for Levels D and C protection prescribed in this document are applicable to the Miscellaneous Sites, Operable Unit 3, reconnaissance sampling and are supported by the following information:

- Auger drilling, hand augering, water sampling, and surface soil sampling produce little dust.

- If airborne dust levels exceed 5 mg/m^3 , Level C protection will effectively filter airborne particles.
- All known organic chemicals can be detected with a PID (10.2-eV probe).
- The most restrictive exposure limit is 25 ppm for trichloroethene (NIOSH 1985).
- The detection limit of a PID is on the order of 1 unit.

An initial survey before sampling begins and surveys during sampling will be conducted at each site using a PID with a 10.2-eV lamp; these surveys will confirm the absence of VOCs. Measurements will be performed according to SOP 6.2, Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (revision 2) (DOE 1988), and the results will be recorded on the appropriate SOP form. If the PID gives a sustained 1-minute reading of 1.0 unit above background, personnel will exit the site and reevaluate the situation with the site health and safety officer.

5.2. PROTECTIVE EQUIPMENT

Emergency equipment, such as first-aid kits, blankets, and eye-wash kits, will be available for immediate response and treatment. The locations of clearly marked emergency equipment will be pointed out during the health and safety training described in subsection 5.5.

5.3. DECONTAMINATION

Decontamination will be required for personnel and equipment. The appropriate SOP (1.6, 1.8, or 1.9) must be used for all decontamination (DOE 1988). Equipment must be decontaminated before each borehole and before leaving the site. ER Program SOP 1.6, General Equipment Decontamination (revision 2) (DOE 1988), will be implemented for all onsite equipment.

5.4. GENERAL SAFETY PRACTICES AND MITIGATION MEASURES

Some hazards can be minimized by implementing specific safety procedures, work practices, special equipment, training of personnel, and emergency response equipment in case of an accident. These specific measures are as follows:

- Daily planning and preactivity meetings will be held for all personnel involved in field activities. These meetings will discuss health and safety concerns and refresh personnel on the emergency response plans.
- Eating, drinking, smoking, and chewing gum or tobacco are prohibited in any area designated as contaminated. Workers will wash their hands, face, and boots with soap and with a hand-pumped, pressurized sprayer upon leaving a contaminated work area and before eating, drinking, smoking, or chewing.

- Workers will shower with soap as soon as possible after field work at the end of each day.
- Regulated areas will be established for all field activities. This control zone will be at least 25 ft in diameter and will be established for safety considerations as well as to control exposures to airborne contamination. The actual dimensions of the control zone should include the space required for any Mound Plant security requirements.
- If dust persists during augering or drilling activities, water will be used for dust suppression. This action is for the protection of subcontractors and Mound Plant personnel.

5.5. FIELD PERSONNEL REQUIREMENTS

As in all field activities, site personnel must meet certain criteria before entering a potentially hazardous area. The criteria outlined in OSHA regulations (29 CFR 1910.120) are:

- 40 hours' health and safety indoctrination training,
- 24 hours' supervised on-the-job training,
- participation in a medical monitoring program,
- 8 hours' additional training for managers,
- participation in annual fit testing program, and
- 8 hours' annual refresher training.

In addition, site-specific health and safety training will be conducted and documented for all members of the field team. Information contained in this plan will be presented during a site-specific health and safety training session before the limited field investigation begins. An outline of the site-specific training is provided in Appendix B.

During limited field sampling activities, at least two onsite members of the field team will have a current certification in first aid and cardiopulmonary resuscitation.

6. EMERGENCY RESPONSE AND NOTIFICATION

6.1. EMERGENCY CONTACTS

Persons and services to contact in case of emergencies are given in section G of Appendix C. This emergency contact form will be posted in prominent locations at the work site.

6.2. CONTINGENCY PLANS

Emergency response contingency plans in section H of Appendix C will be followed during field investigations. A copy of this plan will be available at the work site at all times, and all personnel working on the site will be familiar with the plan. Evacuation plans and routes will be determined on a job-specific basis and discussed with field personnel before field activities begin. The route to Sycamore Hospital, shown in Figure 1.1 of Appendix C, will also be posted at the work location.

In case of minor injuries to personnel, first aid treatment will be initiated by trained personnel in the field. In case of a serious injury, the victim will be transported to the Sycamore Hospital in Miamisburg (Figure 1.1, Appendix C).

6.3. NOTIFICATION REQUIREMENTS

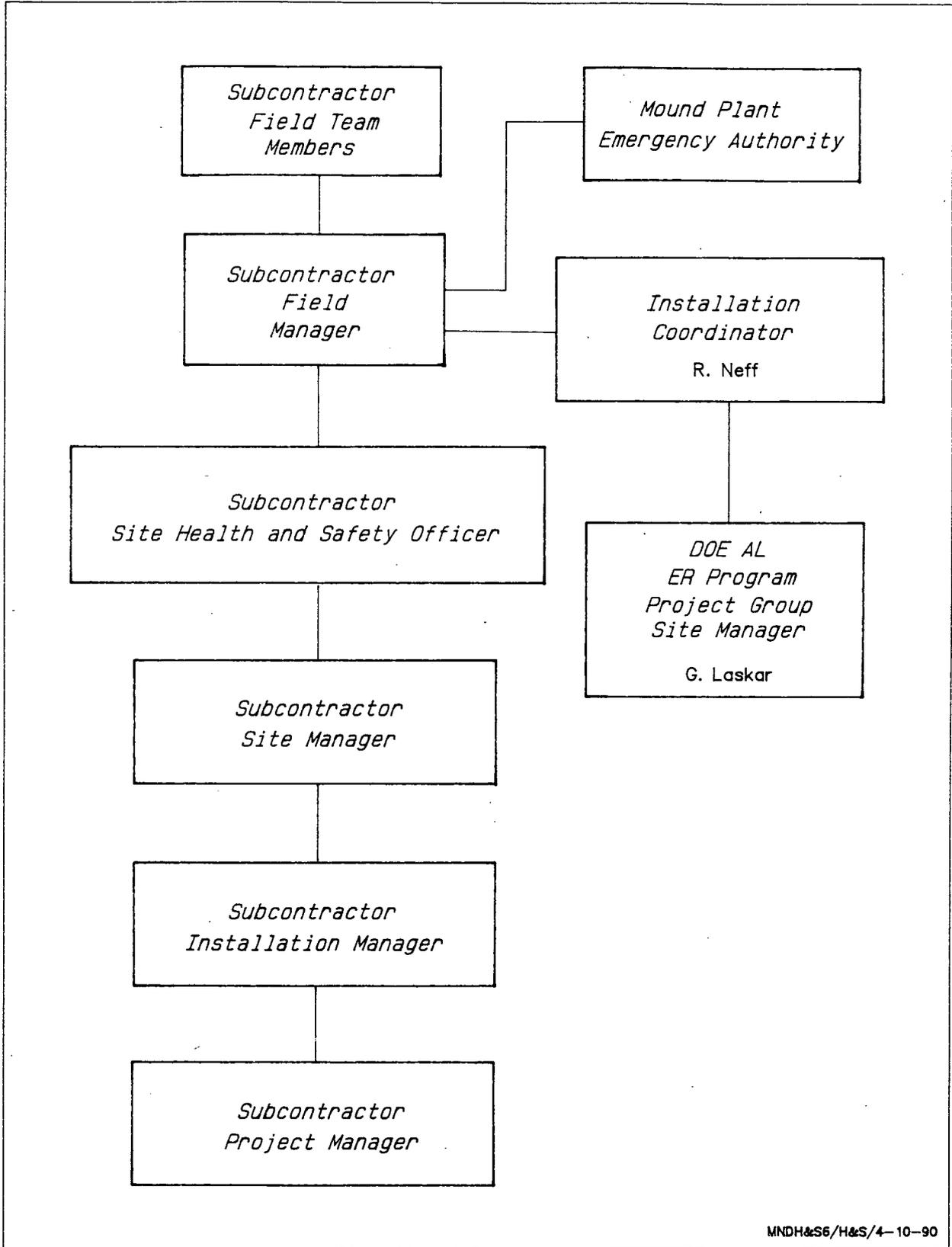
Reporting and notification of emergency situations will follow the flow chart provided in Figure 1.

7. PERMITS

Mound permits required for the Miscellaneous Sites limited field investigation are:

- Excavation/Digging Permit (MRC-ML-7844)
- Radiation Control Area Maintenance Permit (MRC-ML-812)
- Health Physics Dumping Permit (MRC-ML-7845)

All permits must be approved by the Mound Plant health physics manager. These forms will be provided by Mound Plant and completed before field investigations begin. In addition, all personnel will follow the procedures given by Mound Plant in Policy-Procedure 8019 for the orientation of contractors (Appendix E).



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Figure 1. Emergency notification flow chart.

REFERENCES

- ACGIH 1987. "Threshold Limit Values and Biological Exposure Indices for 1987-88." American Conference of Governmental Industrial Hygienists.
- DOE. 1988. "Standard Operating Procedures." Environmental Restoration Program. U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM. May 1988.
- EPA. 1984. "Standard Operation Safety Guides." U.S. Environmental Protection Agency unnumbered report.
- NIOSH 1985. "Pocket Guide to Chemical Hazards." National Institute for Occupational Safety and Health, Report 78-210. September 1985.

APPENDIX A
SUMMARY OF OSHA REQUIREMENTS
FOR EXCAVATIONS

SUMMARY OF OSHA 1926.650, 651, AND 652

The following is an overview of the OSHA regulations governing excavations and the personnel protection requirements. Some of the items listed below are requirements set forth by the ER Program safety manager based on conservative interpretation of the regulations.

General Requirements

These requirements must be followed in any excavation activity no matter what the depth.

- Any obstruction on the surface near the excavation site will be either removed or secured so that it will not create a hazard to personnel working in the area.
- A utility search for power, water, gas, sewer, telephone, or any other underground installation that could be encountered will be performed before any excavation activity may be initiated.
- Excavations will be at least 5 ft from any marked underground utility.
- Ramps will not be used as a means of personnel or equipment egress for the excavation.
- Some means of egress, such as a ladder, shall be provided for personnel in an excavation deeper than 4 ft and must be available no further than every 25 ft.
- Personnel must wear a warning vest when exposed to public vehicular traffic.
- Personnel will not be permitted within 5 ft of a load being carried by digging equipment. For samples taken from the bucket of a piece of equipment such as a backhoe, the bucket must be on the ground.
- Operators may not remain in vehicles that are being loaded.
- When mobile equipment is being operated adjacent to an excavation, a warning system such as a barricade will be placed at the edge of the excavation.
- In excavations deeper than 4 ft, monitoring for flammable atmospheres (>20% LEL), oxygen deficiency (<19.5%) and toxic atmospheres (1/2 the exposure limit for the most restrictive contaminant) will be implemented.
- Emergency rescue equipment will be readily available when hazardous or potentially hazardous atmospheres exist. This equipment will be attended while in use.
- If water accumulates in the excavation, the water will be removed and the stability of the walls of the excavation will be inspected by a competent person.
- Excavations will not be placed within 20 ft of any structure such as buildings, walls, sidewalks, or streets.

- In order to protect personnel, all soils, tools, or any other item which may cause injury by falling into the excavation, will be stored at least 2 ft from the edge of the excavation, or retaining devices that are sufficient to prevent materials or equipment from falling into the excavation will be used.
- When personnel exposure is anticipated, inspections must be performed for evidence of possible cave-ins, failure of protective systems, hazardous atmospheres, or any other hazardous situation. This inspection must be performed by a competent person prior to the start of work, after a rainstorm or other hazard-increasing occurrence, and periodically throughout the workday.
- Personnel will leave the excavation immediately after discovery of a potential hazard and will not return until mitigative measures are taken.
- Personnel and equipment are not allowed to cross over the excavation, and the edge must be identified with barricades or bannerguard. Upon completion of the excavation, trenches and pits will be covered or backfilled. Unbarricaded excavations will not be left unattended.
- Hardhats and steel-toed boots will be worn when entering an excavation.

Requirements For Protective Systems

In general, test pits and trenches are the extent of excavations performed by WESTON except for underground storage tank removals. This section is directed toward the test pit and trenching activities which are short-term or temporary excavations. Three types of protective systems are discussed in CFR 1926.651: sloping, benching, and shoring. For the purpose listed above, this section will only discuss sloping.

- Protective systems are not required on excavations that are less than 5 ft in depth if an inspection is made by a competent person to ensure there is no sign of potential cave-ins or that the walls are stable rock.
- With sloping, there are two practical options to be used. One is the use of a slope 1-1/2 horizontal to 1 vertical (34 degrees measured from the horizontal). The other is using soil types to design slopes. The soil typing system and the angles of repose associated with different soil types are discussed throughout the rest of this section.

Definitions

Cemented soil - A soil in which the particles are held together by a chemical agent such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil - Clay (fine-grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist.

Cohesive soil is hard to break up when dry and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay, and organic clay.

Dry soil - Soil that does not exhibit signs of moisture content.

Fissured - A soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil - Gravel, sand, or silt (coarse-grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system - Two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil - A condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small-diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic - A property of a soil which allows the soil to be deformed or molded without cracking or appreciable volume change.

Saturated soil - A soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

Soil classifications system for the purposes of this section, is a method of categorizing soil and rock deposits in a hierarchy of stable rock, Type A, Type B, and Type C, in decreasing order of stability.

Stable rock - Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Submerged soil - Soil which is under water or is free-seeping.

Unconfined compressive strength - The load per unit area at which a soil will fail in compression. It can be determined by laboratory testing or can be estimated in the field using a pocket penetrometer, by thumb penetration tests, or other methods.

Wet soil - Soil that contains significantly more moisture than moist soil, but in range values that cause cohesive material to slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Soil Classification

Type A - Cohesive soils with an unconfined compressive strength of 1.5 tons per square ft (tsf) (144 kilo Pascals [kPa]) or greater. Examples of cohesive soils are clay, silty clay, sandy clay, clay loam, and, in some cases, silty clay loam, and sandy clay loam. Cemented soil such as caliche and hardpan are also considered Type A. However, no soil is type A if

- the soil is fissured;
- the soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- the soil has been previously disturbed;
- the soil is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater;
- the material is subject to other factors that would require it to be classified as a less stable material.

Type B - Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Type B soils may also include

- granular cohesionless soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, silty clay loam and sandy clay loam;
- previously disturbed soils except those that would otherwise be classified as Type C soils;
- soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration;
- dry rock that is not stable; or
- material that is part of a sloped layered system where the layers dip into the excavation on a slope less steep than 4 horizontal to 1 vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C - Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa), or less. Type C soils may also include

- granular soils including gravel, sand, and loamy sand;
- submerged soil or soil from which water is freely seeping;

- submerged rock that is not stable; or
- material in a sloped, layered system where the layers dip into the excavation or have a slope of 4 horizontal to 1 Vertical (4H:1V) or steeper.

Methods of Classifying Soils

- Soils must be classified, by a competent person, to be stable rock, Type A, Type B, or Type C.
- The classification system must be based on at least one visual and one manual test. For excavations other than drilling, a pocket penetrometer will suffice as a means of manual testing.
- For a layered system, the weakest layer will be measured and used for classifying the entire excavation.
- If conditions in the excavation change (for example, due to rain), the soils from the excavation must be reclassified, and where the reclassification results in a weaker type being assigned, the excavation slope will be altered appropriately.

Acceptable Visual Tests

Visual tests are performed by analyzing the soil removed from and inspecting the side walls of the excavation. The following are a few general ways to classify soils:

- Fine-grained material is considered cohesive, and coarse-grained sand or gravel is considered granular material.
- Soil that remains in clumps when excavated is considered cohesive, and soil that breaks up easily is granular.
- Tension cracks in the walls of the excavation could indicate fissured material as well as larger chunks of soil falling off the walls of the excavation. Smaller chunks separating from the wall indicate unstable walls and a potentially hazardous situation.
- Observe the excavation for evidence of previously disturbed soils and layered systems. If layered systems are noted, try to determine if the layered system is sloped toward the excavation. If so, estimate the degree of slope.
- Check for the presence of surface or groundwater and general saturation of the soils.
- Check the area around the excavation for sources of vibration and estimate the effect on the stability of the walls.

Manual Soil Testing

The use of a pocket penetrometer is preferred to estimate compressive strength in the field. However, if a pocket penetrometer is not available or a person trained to use a pocket penetrometer is not available,

OSHA has suggested some additional manual tests that are sufficient to satisfy the manual testing requirements. Be aware that pocket penetrometers are good for very soft to stiff clays and do not work well with cohesive soils that contain pebbles, fissures, etc. Additionally, these manual tests may be used in conjunction with the pocket penetrometer tests for further determination of soil types. They are as follows:

Plasticity - Mold a moist or wet sample into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be rolled into threads of at least 2 inches without crumbling.

Dry Strength - If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and crumbles into clumps that break into smaller clumps that can only be broken up with difficulty, it may be clay with sand, silt, or gravel. If the dry soil breaks into clumps that do not break into smaller clumps and that can only be broken with difficulty and there is no visual indication that the soil is fissured, the soil may be considered unfissured.

Thumb Penetration - The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils can be readily indented by the thumb only with very great effort. Type C soils can be easily penetrated several inches by the thumb and can be lightly molded by light finger pressure. This test should be performed on an undisturbed sample as soon as possible after excavation.

Drying Test - The basic purpose of the drying test is to distinguish between cohesive material, with fissures, unfissured cohesive material, and granular material. This involves drying a 1-inch-thick and 6-inch-long sample until thoroughly dry:

- If a sample cracks as it dries, significant fissures are indicated.
- Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil can be classified as unfissured cohesive material, and the unconfined compressive strength should be determined.
- If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If the soils pulverizes easily into small chunks, it is granular.

Sloping

This section describes the procedure and the tables from which the maximum slope for the excavation will be selected.

If the appropriate slope is selected and signs of stress are exhibited in the sides of the excavation, the actual slope will be reduced to at least 1/2 horizontal to 1 vertical (1/2H:1V). Distress may be recognized as signs of cave-ins such as the development of fissures in the face of or adjacent to an open excavation.

The maximum allowable slope refers to the steepest incline of an excavation allowable for the most favorable site conditions. The tables and figures that follow describe the maximum allowable slope for the existing conditions on each site (OSHA 29CFR 1926.651 and 652).

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) [1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP [3]
STABLE ROCK TYPE A [2] TYPE B TYPE C	VERTICAL (90°) 3/4 : 1 (53°) 1:1 (45°) 1½ : 1 (34°)

NOTES:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

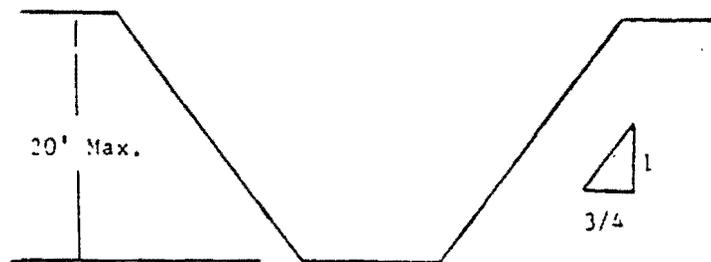
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

B-1.1 Excavations made in Type A soil.

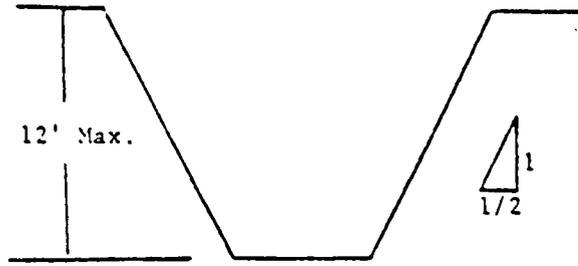
1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



Simple Slope—General

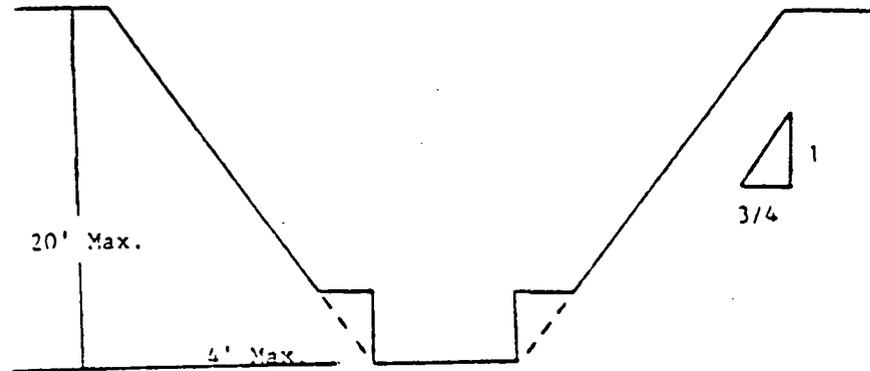
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

[Sec. 1926.652, Table B-1]

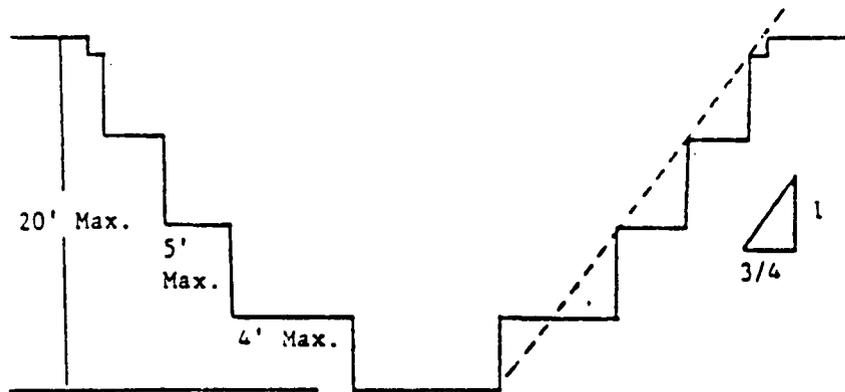


Simple Slope—Short Term

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:



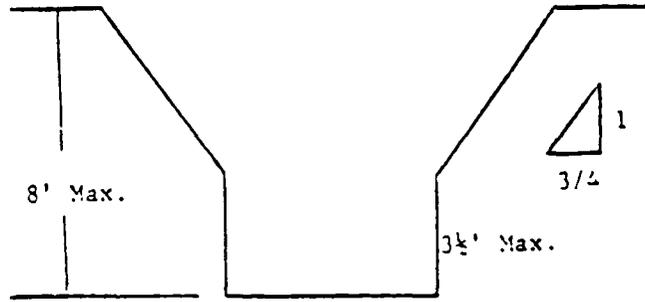
Simple Bench



Multiple Bench

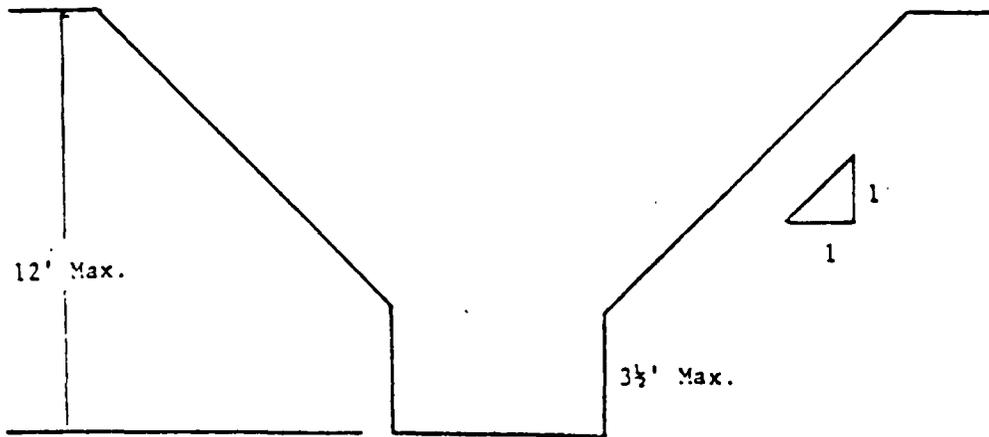
3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3 1/4 feet.

[Sec. 1926.652, Table B-1]



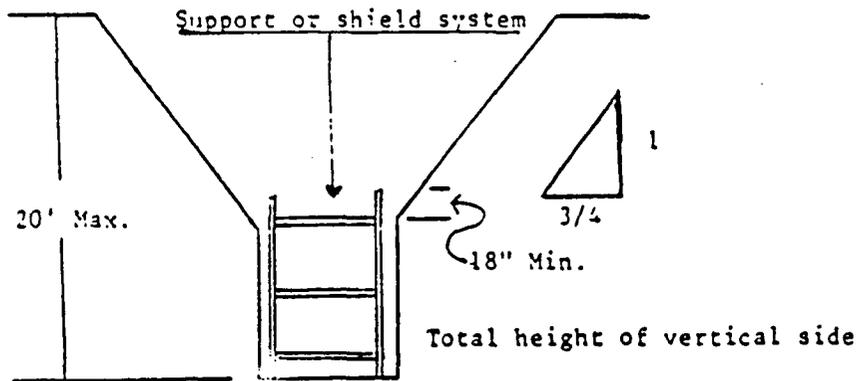
Unsupported Vertically Sided Lower Portion—Maximum 8 Feet in Depth

All excavations more than 8 feet but not more than 12 feet in depth which unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3 1/2 feet.



Unsupported Vertically Sided Lower Portion—Maximum 12 Feet in Depth

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 3/4:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



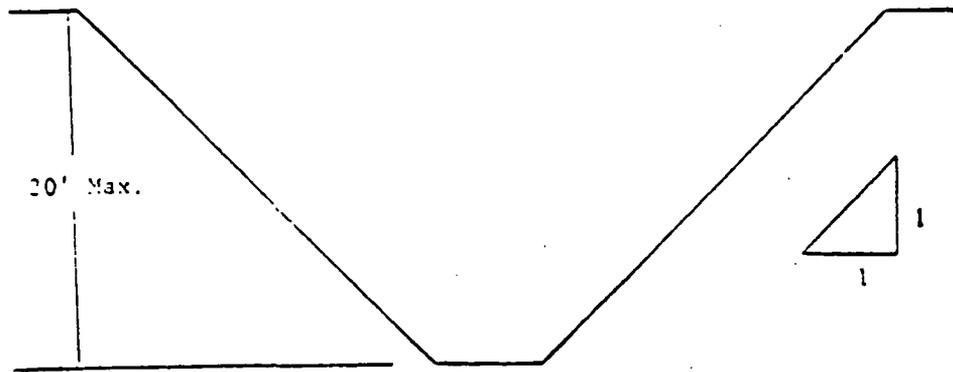
Supported or Shielded Vertically Sided Lower Portion

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under § 1928.652(b).

B-1.2 Excavations Made in Type B Soil

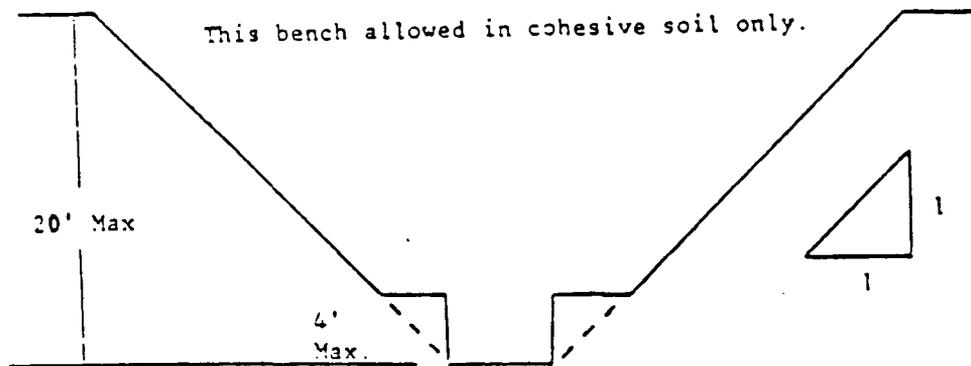
1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

[Sec. 1926.652, Table B-1.2]

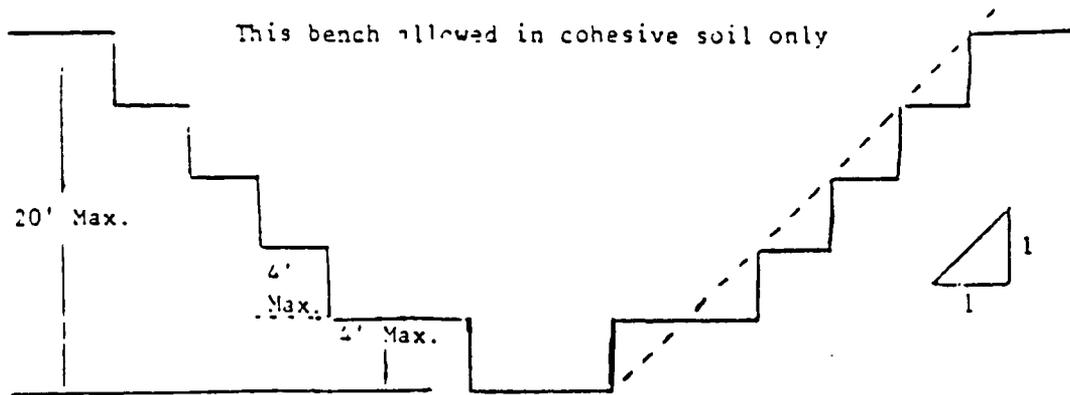


Simple Slope

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:



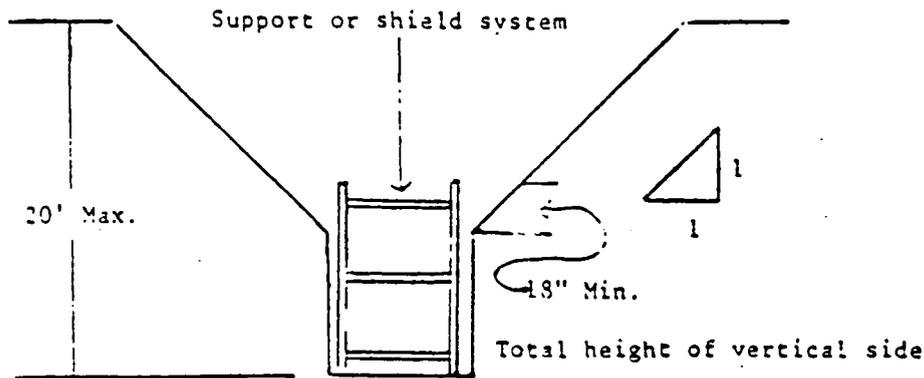
Single Bench



Multiple Bench

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

[Sec. 1926.652, Figure B-1.3]

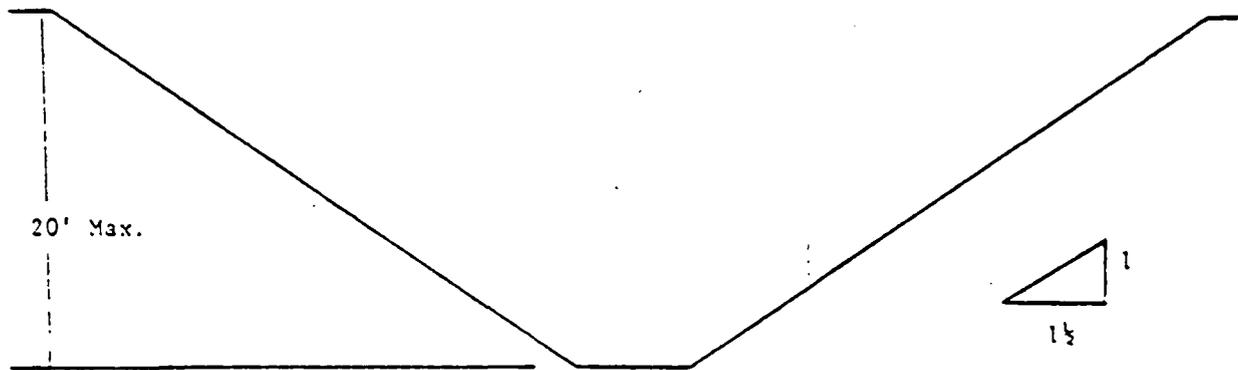


Vertically Sided Lower Portion

4. All other sloped excavations shall be in accordance with the other options permitted in § 1928.652(b).

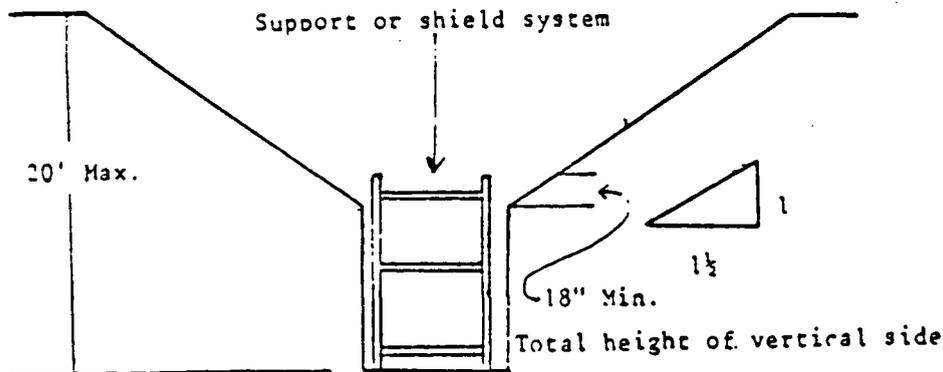
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



Simple Slope

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.



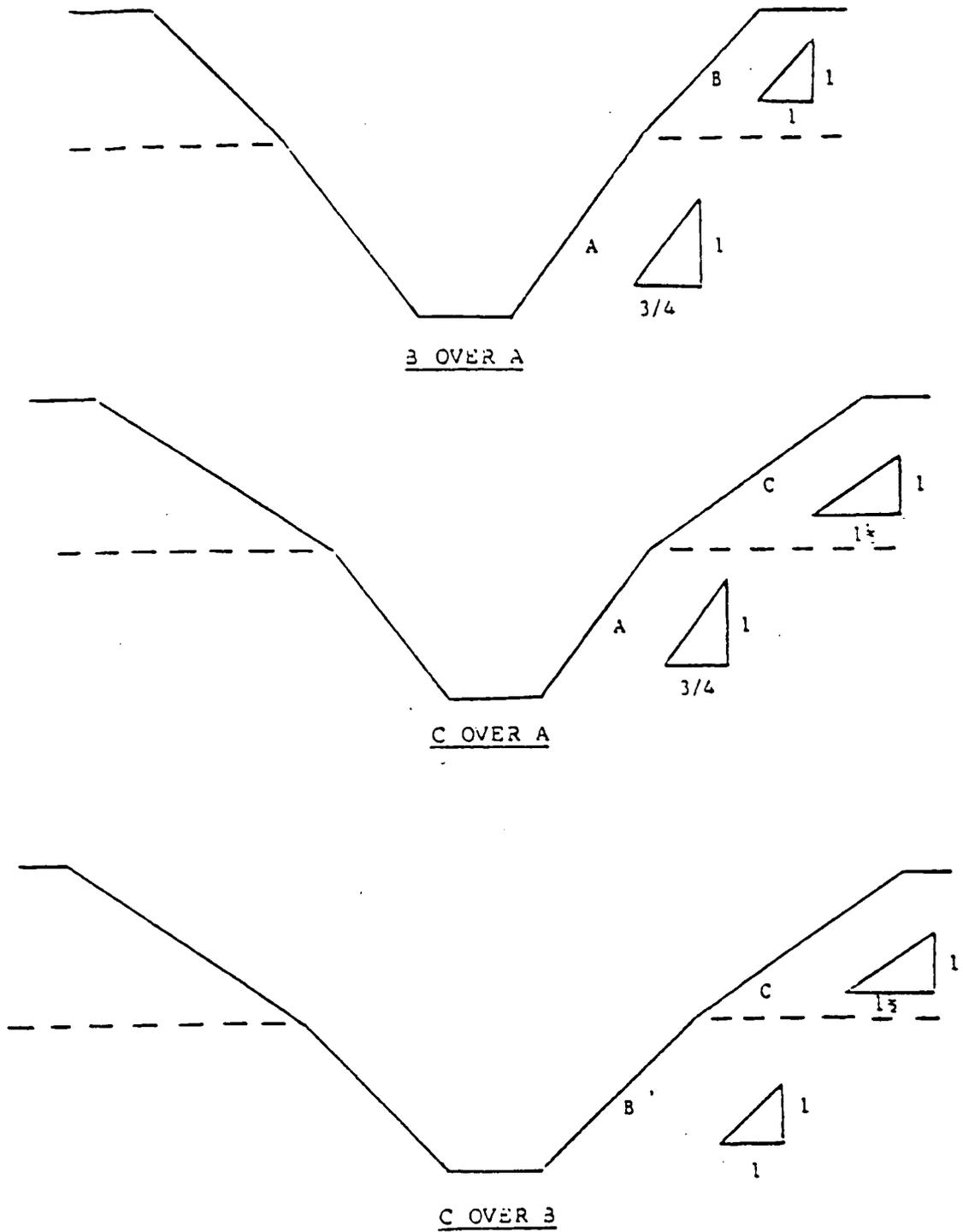
Vertical Sided Lower Portion

3. All other sloped excavations shall be in accordance with the other options permitted in § 1928.652(b).

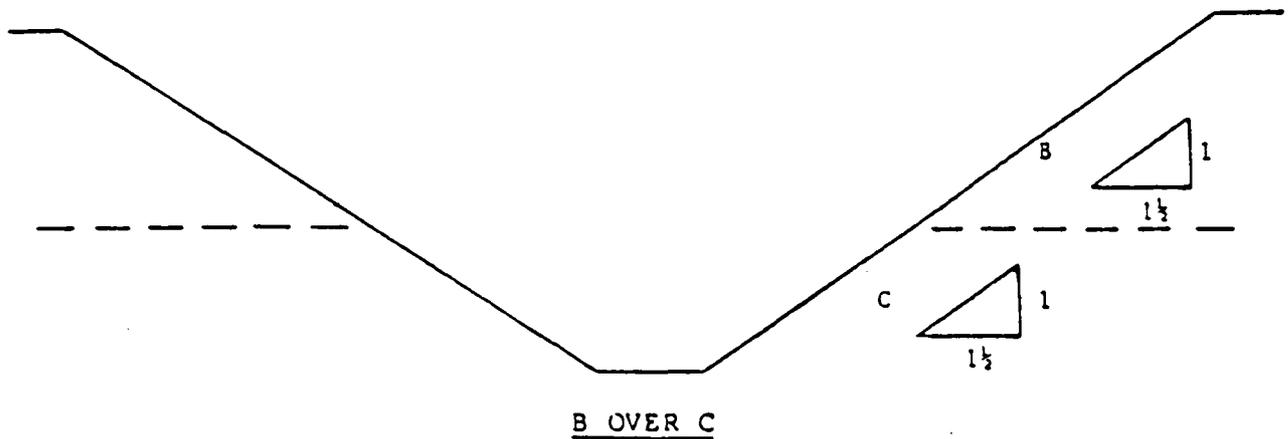
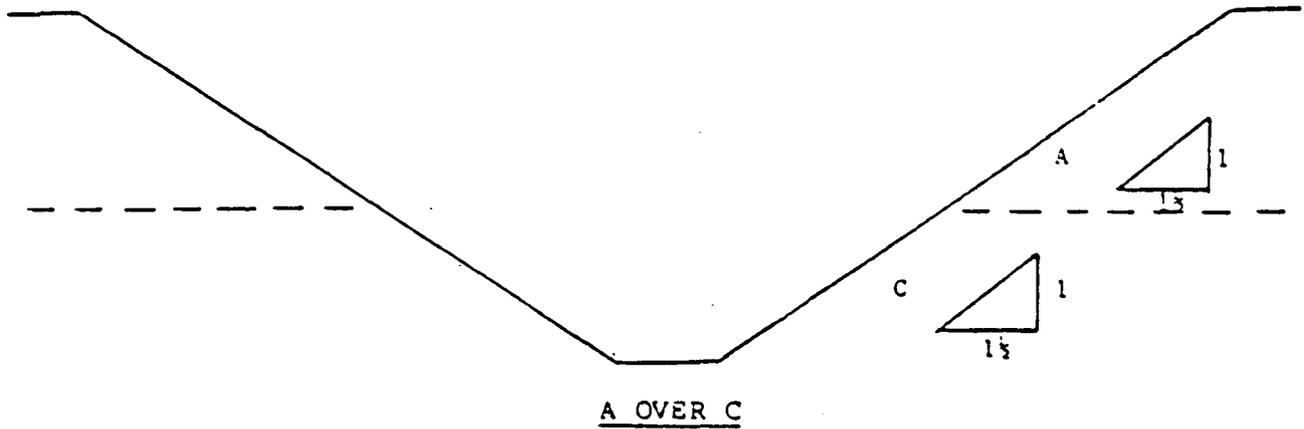
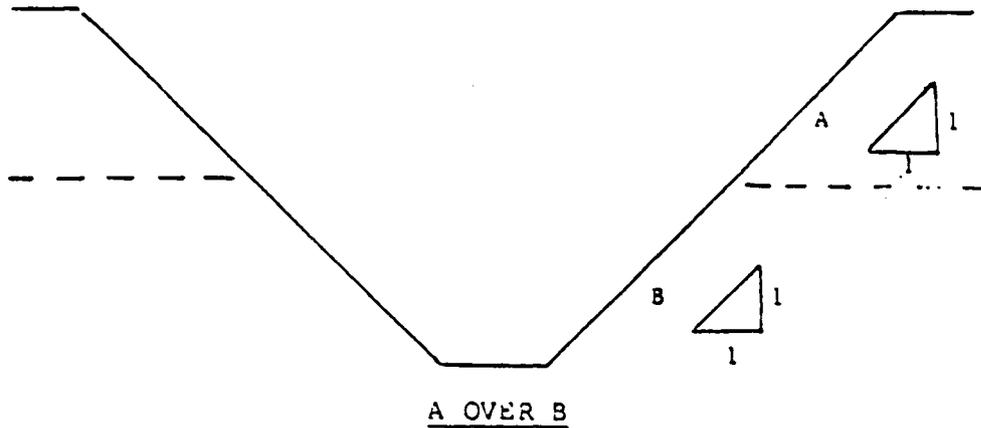
B-1.4 Excavations Made in Layered Soils

1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

[Sec. 1928.652, Figure B-1.4]



[Sec. 1926.652, Figures B-C]



2. All other sloped excavations shall be in accordance with the other options permitted in § 1928.652(b).

Appendix C to Subpart P
Timber Shoring for Trenches

(a) *Scope.* This appendix contains information that can be used timber shoring is provided as a method of protection from cave-ins in trenches that do not exceed 20

feet (6.1 m) in depth. This appendix must be used when design of timber shoring protective systems is to be performed in accordance with § 1928.652(c)(1). Other timber shoring configurations; other systems of support such as hydraulic and pneumatic systems; and other protective systems such as sloping, benching, shielding, and freezing

systems must be designed in accordance with the requirements set forth in § 1928.652(b) and § 1928.652(c).

(b) *Soil Classification.* In order to use the data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil

[Appendix C]

APPENDIX B

TRAINING OUTLINE

HEALTH AND SAFETY PLAN

MOUND PLANT

MISCELLANEOUS SITES, OPERABLE UNIT 3

TRAINING OUTLINE

- I. Purpose and objectives of training
- II. Recognizing and identifying health and safety hazards at the Mound Plant Miscellaneous Sites areas.
 - A. Physical hazards
 - explosives
 - structures
 - noise
 - equipment
 - terrain
 - heat
 - cold
 - B. Chemical hazards
 - heavy metals
 - volatile organics
 - flammable materials
 - other (PCBs, asbestos, etc.)
 - C. Radiological hazards
 - internal
 - external
 - D. Biological hazards
 - insect
 - snake
 - plant
 - E. Potential health effects

- III. Safety and monitoring requirements
 - A. Controlled area restrictions
 - eating/drinking/smoking
 - access control points
 - B. Protective equipment requirements
 - clothing: hard hats, boots, gloves, coveralls
 - respiratory protection
 - C. Procedures for using protective equipment
 - respirator fit-test and use
 - impermeable clothing
 - D. Personnel contamination monitoring and decontamination
- IV. Emergency response requirements
 - A. Getting emergency assistance
 - B. Emergency notification procedures
- V. Communicating information on hazards (right to know)
 - A. List of hazardous materials
 - B. Material safety data sheets (MSDS)
 - as applicable from the site safety evaluation form (Appendix C)

APPENDIX C

SAFETY EVALUATION FORM

HEALTH AND SAFETY PLAN

MOUND PLANT

MISCELLANEOUS SITES, OPERABLE UNIT 3

WORK LOCATION PERSONNEL PROTECTION AND SAFETY EVALUATION FORM

WO# 2744-40-63

Reviewed by Robert Schoenfelder

Date September 1990

Office Albuquerque

Approved by _____

Prepared by Jeff Slater

Date _____

Date March 1989, revised September 1990

A. Work Location Description

1. Name Farm trash area (previous

2. Location Miamisburg, Ohio

owner); underground sewage lines; paint

shop area; powerhouse area; Area C

waste storage area; Building 61 former

heavy equipment area; oil burn structure;

fire-fighting training facility pit; Area I,

Buildings 1 and 27 leach pits; Building 27

sump; Building 27 concrete flume;

Building 27 solvent storage area; glass

melter room sump; WD Building drum

staging area; Area H, pyrotechnic waste

disposal area; pyrotechnic waste shed;

thermal treatment unit area; trash burner

area; waste oil drum field; old firing range

drum storage site; Building 34 aviation

fuel tank; and Building 51 waste solvent

storage tank.

3. Type: HW site () Industrial () Other ()
Spill () Construction ()

Describe: DOE-owned, contractor-operated facility.

4. Status: Active.
5. Anticipated activities: Surface soil, subsurface soil, and water sampling; drilling; hand
augering; and surveying.
6. Size: As given in the Limited Field Investigation Work Plan.
7. Surrounding population: Miamisburg, Dayton, and suburbs. Within 10 miles, there are
400,000 people; within 20 miles, there are 1,400,000 people.
8. Buildings/homes/industry: Generally residential; some light industry and farmland.
9. Topography: Alluvial valley and steep hills. Some areas have steep gradients and are
heavily vegetated.
10. Anticipated weather: Rain, hot weather.
11. Unusual features: Heavy vegetation; steep grades in some areas.

12. Site history: See information on the individual areas given in the Limited Field

Investigation Work Plan.

B. Hazard Description

1. Complete background review (X)

Partial background review ()

If partial, why? _____

2. Hazard level: A () B () C (X) D (X) Unknown ()

Justification: Level D will be used based on known low levels of chemical and radiological
contaminants. Level C will be used if airborne dust levels exceed 5 mg/m³ on the real-
time aerosol monitor. If the PID reads 12.5 units above background in the breathing zone,
the area will be evacuated until levels return to background.

3. Types of hazards (attach additional sheets as necessary):

a. Chemical

Inhalation (X) Ingestion (X) Skin contact (X) Skin absorption (X)

Describe: Acetone, ethanol, methanol, sodium bisulfate, potassium perchlorate, diesel
fuel, freon, and trichloroethene.

b. Physical

Cold Stress () Heat Stress (X) Noise (X) O₂ deficiency ()

Equipment (X) Explosives () Terrain (X) Other ()

Describe: _____

c. Biological

Insect (X) Snake (X) Plant (X) Other ()

Describe: Chiggers, mosquitos, poison ivy

d. Radioactive

Internal (X) External (X)

Describe: Thorium (all isotopes), plutonium-238

4. Nature of hazards:

a. Air (X) Describe: Airborne dust, organic compounds, and radionuclides.

b. Soil (X) Describe: Radionuclides and organic chemicals given in sections 5 and 6.

c. Surface water (X) Describe: _____

d. Groundwater (X) Describe: Groundwater may contain the chemicals and radionuclides given in sections 5 and 6.

5. Chemicals of Concern

<u>Contaminant</u>	<u>Exposure Limit^a</u>	<u>IDLH</u>	<u>Symptoms of Exposure</u>	<u>Ionization Potential (eV)</u>	<u>Monitoring Instrument</u>
Acetone	250 ppm	2,000 ppm	Eye, nose, throat, irritation; headache; dizziness; dermatitis	9.69	PID
Sodium bisulfate	5 mg/m ³	NA	Eye, skin, and mucous membrane irritation	N/A	Aerosol monitor
Trichloroethene	25 ppm	Ca	Headache, vertigo, visual distress, tremors, nausea, eye irritation, dermatitis, cancer	9.47	PID
Diesel	N.S.T.A.	NA	Eye, nose, throat irritation; coughing; gagging; dyspnea; central nervous system depression	N/A	Draeger tubes
Benzene	1 ppm	Ca	Eye, nose, respiratory system irritation; giddiness; headache; nausea; fatigue; anorexia; dermatitis; abdominal pain	9.2	PID, RR 100%
Toluene	100 ppm	2,000 ppm	Fatigue, weakness, confusion, euphoria, dizziness, headache, dermatitis	8.82	PID, RR 100%
Xylene	100 ppm	1,000 ppm	Dizziness; excitement; drowsiness; incoherence; eye, nose, and throat irritation; nausea; vomiting	8.56	PID, RR 111%
Methyl alcohol	200 ppm	25,000 ppm	Eye irritation, headache, drowsiness, lightheaded, nausea, vomiting, visual distortion	10.84	PID, RR 12%
Ethyl alcohol	1,000 ppm	NE	Nausea, vomiting, mental excitement or depression, drowsiness, impaired perception	10.48	PID, RR 25%
Ethylbenzene	100 ppm	2,000 ppm	Eye, mucous membrane irritation; headache; dermatitis; narcosis; coma	8.76	PID

^aThe exposure limit present is the most restrictive limit among available threshold limit values (ACGIH), permissible exposure limits (OSHA), or recommended exposure limits (NIOSH).

PID - photoionization detector.

IDLH - immediately dangerous to life or health

Ca - NIOSH recommends that this substance be treated as a potential human carcinogen (Ca).

NA - Not Available.

N.S.T.A. - No single exposure limit applies.

N/A - Not applicable.

RR - Relative response

NE - Not established

6. Radionuclides of Concern (all sites)

<u>Radionuclide</u>	<u>Major Radiations</u>	<u>DAC ($\mu\text{Ci/mL}$)</u>	<u>Critical Organ</u>	<u>Radioactive Half-Life</u>	<u>Monitoring Instrument</u>
Plutonium-238	Alpha, gamma	3×10^{-12}	Bone	87.7 yrs	Alpha scintillometer FIDLER
Thorium-229 (and decay products)	Alpha, beta, gamma	4×10^{-13}	Lung, bone	7340 yrs	Alpha scintillometer
Thorium-230	Alpha	3×10^{-12}	Lung, bone	8×10^4 yrs	Alpha scintillometer
Thorium-232 (and decay products)	Alpha, beta, gamma	5×10^{-13}	Lung, bone	1.41×10^{10} yrs	Alpha scintillometer, NaI
Uranium-234	Alpha, gamma	2×10^{-11}	Lung, gastro-intestinal	2.47×10^5 yrs	FIDLER, alpha scintillometer

DAC - derived air concentration (DOE Order 5480.11)

Critical organ - that part of the body that is most susceptible to radiation damage under the specific conditions being considered.

NaI - sodium iodide scintillometer

FIDLER - field instrument for the detection of low-energy radiation

C. Personnel Protection

1. Level of protection: A () B () C () D (X)

Location/activity: Augering, excavation of soil, soil sampling, and water sampling when dust levels are below 5 mg/m³ and when PID readings are below 12.5 units above background. If levels exceed 12.5 units above background, evacuate area until levels return to background.

Level of protection: A () B () C (X) D ()

Location/activity: All activities when dust exceeds 5 mg/m³.

2. Protective equipment

- | | | | |
|--|--------|---|--------|
| a. Respiration | NA () | b. Clothing | NA () |
| () SCBA, airline | | () Fully encapsulating suit | |
| (X) Full face respirator (as needed)
(cartridge type GMC-H) | | () Chemically resistant splash suit | |
| () Escape mask | | () Apron; specify: _____ | |
| () None | | (X) Cotton coverall or work uniform (Level D) | |
| () Other _____ | | (X) Tyvek coverall (Level C) | |
| _____ | | () Saranex coverall | |
| () Other _____ | | () Other _____ | |
| _____ | | _____ | |
| | | () Other _____ | |
| | | _____ | |

- c. Head and eye protection NA ()
- (X) Hard hat
- () Goggles
- () Face shield
- (X) Safety glasses - (Level D)
- (X) Ear plugs (over 85 dB)
- () None
- () Other _____
- d. Hand protection NA ()
- (X) Undergloves PVC or Latex
Type
- (X) Gloves Nitrile
Type
- () Overgloves _____
Type
- () None
- () Other _____

e. Foot protection NA ()

- (X) Safety boots
- (X) Disposable overboots (Level C)
- () Other _____

3. Monitoring equipment NA ()

- (X) CGI
- Type: Gastech 750
- () O₂ Meter
- (X) Radiological survey
- Type: FIDLER, Alpha Scintillometer
- (X) Detector tubes
- Type: Petroleum Hydrocarbons 100/a
- (X) PID
- Probe: 10.2 eV Probe
- () FID
- (X) Other Thermoluminescent detector
- (X) Other Aerosol Monitor

D. Decontamination

1. Decontamination of personnel (attach diagram)

Required (X)

Not required ()

Describe: According to SOPs 1.8, Personnel Decontamination-Level D Protection

(revision 2); and 1.9, Personnel Decontamination-Level C Protection (revision 2)

(DOE 1988).

2. Decontamination of equipment (attach diagram)

Required (X)

Not required ()

Describe: According to SOP 1.6, General Equipment Decontamination (revision 2)

(DOE 1988).

E. Personnel

NAME	WORK LOCATION TITLE/TASK	CURRENT MEDICAL	CURRENT FIT TEST	CERTIFICATION LEVEL
1.	()	()	()	
2.	()	()	()	
3.	()	()	()	
4.	()	()	()	
5.	()	()	()	
6.	()	()	()	
7.	()	()	()	
8.	()	()	()	
9.	()	()	()	
10.	()	()	()	

Site Safety Coordinator: Eric Larsen

F. Activities Covered Under This Plan

<u>Task No.</u>	<u>Description</u>	<u>Preliminary Schedule</u>
<u>2744-40-63</u>	<u>Miscellaneous Sites, Operable</u>	<u>FY 1991</u>
	<u>Unit 3, Limited Field Sampling</u>	

G. Emergency Contacts

<u>Agency</u>	<u>Contact</u>	<u>Phone number or ext.</u>
Fire Department	<u>Fire Chief - Dave Heitz</u>	<u>7111 or (513) 865-3313</u>
Police Department	<u>Security - Mark Gibson</u>	<u>7111 or (513) 865-3281</u>
Poison Control Center	<u>Poison and Drug Center</u>	<u>(513) 222-2227</u>
Ambulance	<u>Mound Plant Fire Department</u>	<u>7111 or (513) 865-3313</u>
EPA	<u>State EPA</u>	<u>(800) 282-9378</u>
Site Health and Safety Officer	<u>Eric Larsen</u>	<u>(505) 255-1445 or 866-6884 on site</u>
Onsite coordinator	<u>Dick Neff</u>	<u>(513) 865-3616</u>
Site telephone	<u>WESTON trailer</u>	<u>(513) 866-6884</u>
Nearest telephone (site-specific)	1) _____	<u>To be determined</u>
	2) _____	_____
	3) _____	_____

H. Contingency Plans

Spill, accidental release; describe: Call 7111.

Fire, explosion; describe: Call 7111. Evacuate the work area.

Other; describe: _____

Exit routes, communication systems; describe: To be determined.

MEDICAL EMERGENCY

Name and address of hospital: Sycamore Hospital, 2150 Leiter Rd., Miamisburg, OH.

Phone: (513) 296-7026.

Route to hospital: (attach map) Mound Plant south to Benner Rd. and turn left (east)

to Gebhart Church Rd. North on Gebhart Church Rd. to Leiter Rd. and turn right.

Sycamore Hospital is on the right, about 0.5 mile (Figure 1.1).

Travel time from site (minutes):

Distance to hospital (miles):

5-6

< 5

Name and number of 24-hour ambulance service: Mound Fire Department Medical Response.

Dial 7111.

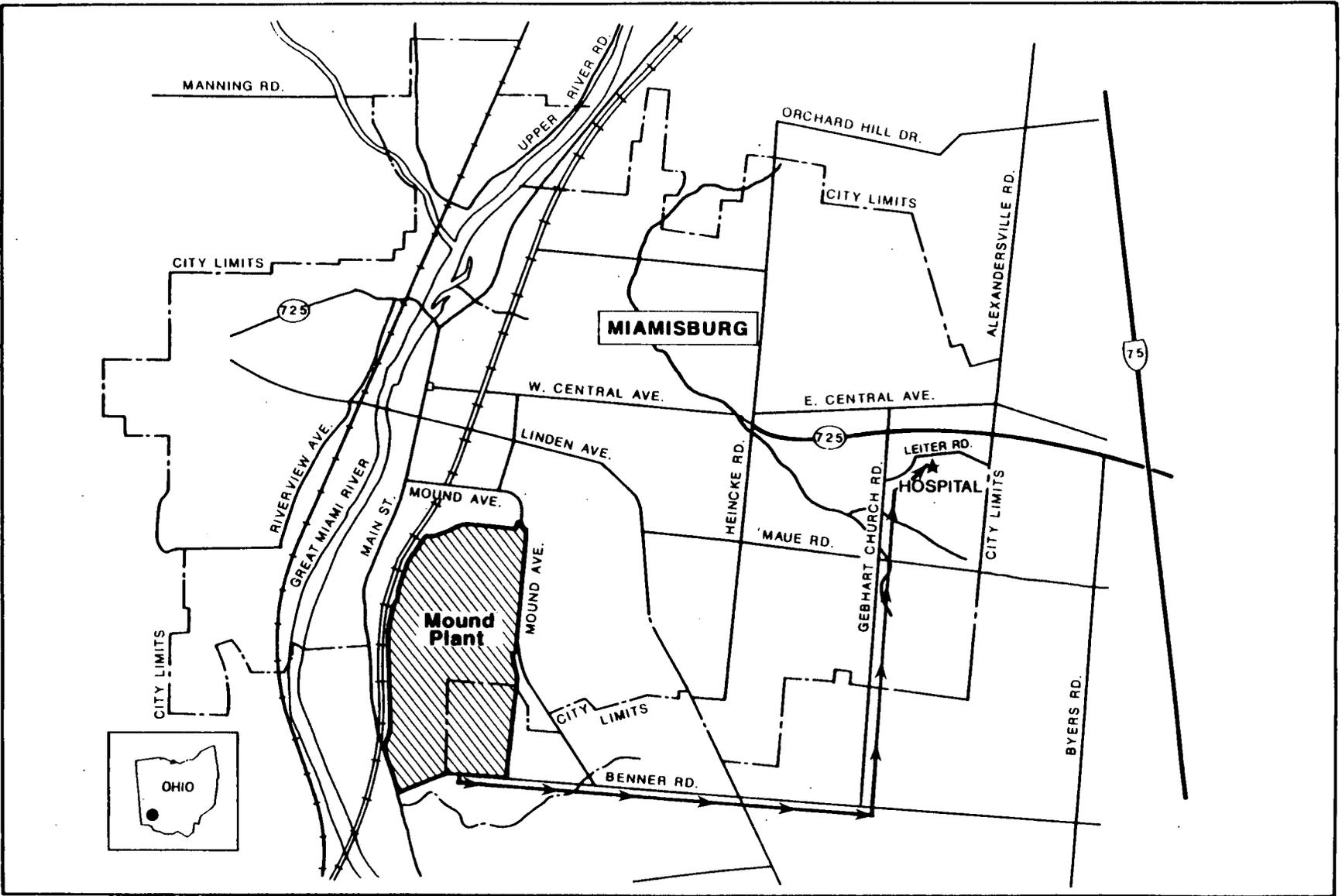


Figure 1.1. Route to hospital.

HEALTH AND SAFETY PLAN APPROVAL/SIGN OFF FORMAT

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and appendices) and discussed in the Personnel Health and Safety briefing.

Name Signature Date

Name Signature Date

Name Signature Date

George Crawford
WESTON Corporate Health
and Safety Director Signature Date

Eric Larsen
Site Health and Safety Officer Signature Date

Eric Larsen
Field Manager Signature Date

Elizabeth Zolper
Site Manager Signature Date

John Price
Project Manager Signature Date

Michael Mauzy
Project Director Signature Date

Personnel health and safety briefing conducted by:

Name Signature Date

APPENDIX D

DOE ORDER 5480.11 RELEASE CRITERIA

HEALTH AND SAFETY PLAN

MOUND PLANT

MISCELLANEOUS SITES, OPERABLE UNIT 3

12-21-88

SURFACE RADIOACTIVITY GUIDES

Nuclide ^{1/}	Removable ^{2/4/}	Total ^{2/3/} (Fixed Plus Removable)
U-nat, U-235, U-238, and associated decay products	1,000 dpm alpha/100 cm ²	5,000 dpm alpha/100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20 dpm/100 cm ²	300 dpm/100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200 dpm/100 cm ²	1,000 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above ^{5/} .	1,000 dpm beta-gamma/100 cm ²	5,000 dpm beta-gamma/100 cm ²

1/ Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

2/ As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

3/ The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm² is less than three times the guide values. For purposes of averaging, any square meter of surface shall be considered to be above the activity guide G if: (1) from measurements of representative number n of sections it is determined that $1/n \sum_n S_i \geq G$, where S_i is the dis/min-100 cm² determined from measurement of section i ; or (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm² area exceeds 3G.

4/ The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency.

(Note - The use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. Except for transuranics and Ra-226, Ra-228, Ac-227, Th-228, Th-230, and Pa-231 alpha emitters, it is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

- ^{5/} This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

APPENDIX E

ORIENTATION POLICY - PROCEDURE 8019

HEALTH AND SAFETY PLAN

MOUND PLANT

MISCELLANEOUS SITES, OPERABLE UNIT 3

Monsanto

Monsanto Research Corporation

Mound

ORGANIZATION
ENGINEERING

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8019

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TITLE
ORIENTATION OF VENDORS/CONTRACTORS FOR CONSTRUCTION OR SERVICES ACTIVITIES

PURPOSE

To establish point of contact between Mound and vendors/contractors entering the site for any type of construction or service activities in order that these vendors/contractors receive appropriate orientation regarding expected conduct.

SCOPE

This procedure applies to all employees at Mound whose duties may include procurement of services of an outside vendor or contractor who will be required to enter the Mound site to perform a service involving manual labor.

POLICY

All vendors and contractors who enter the site to perform any type of construction or service work or activity will be given complete and appropriate instructions on all Mound operational requirements for their projects by MRC personnel before such work or activity begins.

RESPONSIBILITIES

The Engineering Department will maintain a point of contact through which all vendors/contractors will pass prior to performing any work on Mound site.

The Construction Inspection Supervisor will be responsible for assigning and notifying appropriate personnel to ensure the contractors/vendors receive all information necessary for the work they have been contracted to perform. This responsibility includes the following duties:

- Briefing of the contractor/vendor on expected conduct. Hand out Contractors Guide to Safety, Security and Conduct at Mound booklet and/or show taped presentation on same subject.
- Review with contractor/vendor exact location of work and determine tools and equipment necessary for the job.
- If any disturbance of earth will occur, assist contractor/vendor in completing the Excavation/Digging permit (form ML 7844) per Mound Safety and Hygiene Manual, Section 05.
- If welding and burning is to be done, initiate a Welding/Burning Permit (form ML 7733) per Mound Safety and Hygiene Manual, Section 02.

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RESPONSIBILITIES - (continued)

- If entrance to a manhole, substation or other confined space is required, notify the proper Industrial Hygiene personnel to obtain a Vessel Entry permit per Mound Safety and Hygiene Manual, Section 03.
- Arrange for necessary Health Physics orientation if work is to be in or near contaminated areas.
- Schedule proper orientation and access if work is to be performed within T-Buildings or Buildings 50 and 51.
- Schedule security escort if required.

Uncleared vendors/contractors entering the site under escort of individuals other than the Mound Security Inspector and who will not be engaged in manual labor will not be required to notify the Engineering Construction Inspection Supervisor. However, the MRC personnel responsible for escort of such vendors/contractors will take the necessary steps to ensure the safety and conduct of the individuals they are escorting.

Cleared vendors/service contractors will receive an initial safety orientation when first issued a cleared badge. An annual reorientation will be required for continued access to the site.

PROCEDURE

PROJECT SPONSOR

1. Ensures that all contracts for construction or service work or activities contain a requirement to schedule pre-work orientations with the Engineering Construction Inspection Supervisor.

CONTRACTING AND PROCUREMENT

2. Ensures that all such contract packages contain "Special Conditions for Fixed Price Construction Contracts", including the requirement for a pre-work orientation.
3. Notifies vendor/contractor that he or she, prior to coming to the Mound site, must contact the Engineering and Construction Inspection Supervisor by telephone to receive instructions on time and place for an operational orientation.

CONSTRUCTION INSPECTION

4. Schedules and conducts a pre-work orientation in accordance with the responsibilities listed above.

PROJECT SPONSOR, PROJECT ENGINEER, OR CONSTRUCTION INSPECTION

5. Ensures that the vendor/contractor performs work in accordance with instructions given in the orientation.