Site Health and Safety Plan (HASP)
for Valley Asphalt
1901 and 1903 Dryden Road
Moraine, Ohio

For

Valley Asphalt
11641 Mosteller Road
Cincinnati, Ohio 45241

April 25, 2013

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HEALTH AND SAFETY PLAN (HASP)

This Health and Safety Plan (HASP) contains standard operating procedures that will be used for environmental site activities at the Valley Asphalt Facility, Dayton, Ohio. These procedures are designed to:

1) Protect the safety of all personnel working at the site.
2) Keep off-site personnel safe with regard to activities occurring on-site.
3) Reduce the potential for environmental degradation caused by the on-site activities.

1.0 INTRODUCTION

Safety is our first and highest priority. This HASP document is intended to provide the standard operating and safety procedures and guidelines to be used during environmental investigations and remediation projects. These procedures are designed to establish a framework in which operations at the work site will proceed. This Safety Plan was prepared based on an anticipated scope of work defined in the environmental investigation and remedial action specifications for the site.

Since it is, of course, impossible to anticipate and plan for all the safety requirements and contingencies that may arise during the performance of site work, this plan will be changed and modified in response to new situations that occur as the work progresses. This safety plan is intended to address the central foreseeable safety issues and procedures and to outline the ways of implementing necessary changes/additions to the plan in the field. This safety plan describes the procedures for:

- Safe work practices
- Preventing accidents
- Engineered safeguards
- Protecting personnel from injury and illness
- Medical surveillance
- Identifying specific hazards
- Environmental and personnel monitoring
- Personal protective equipment
- Education and training
- Standard operating safety procedures

2.0 SAFETY ORGANIZATION

Although everyone involved in the project shares the responsibility for safety, the Site Health and Safety Officer (SHSO) is primarily responsible for implementing the safety plan. The safety officer's responsibilities, if an SHSO is required on this project, are described below.

2.1 SITE HEALTH AND SAFETY OFFICER (SHSO)

The Site Health and Safety Officer is responsible for administering the safety program at the site. The duties of this officer, who reports to the Project Coordinator, include monitoring the site work to verify that it is conducted safely and making sure that safety regulations are adhered to by construction personnel and others on the work site. The Site Health and Safety Officer has full authority to stop any dangerous site activities. Other duties of the Site Health and Safety Officer are discussed below.

3.0 PERSONNEL TRAINING REQUIREMENTS

As noted earlier, no special zones are expected for this project. However, if during the field work, special "Exclusion" and "Contamination Reduction" zones as required in the OSHA regulations that govern hazardous waste operations and emergency responses will be designated, all personnel required to enter the "Exclusion" and "Contamination Reduction" zones will have completed documented training in accordance with the requirements stated in 29 CFR 1910.120.

3.1 OFF-SITE TRAINING

All contractor and subcontractor personnel assigned to or regularly entering the Exclusion Zones or Contamination Reduction Zones on the site will have received appropriate health and safety training in accordance with 29 CFR 1910.120. This requirement does not apply to the Support Zone where work is supervised or performed for health, safety, security, or administrative purposes, for maintenance, or for any other site-related function. Those who will enter the Exclusion or Contamination Reduction Zones will attend at least 40 hours of initial safety training off-site. All personnel will take at least eight hours of refresher safety training each year.

3.2 SITE-SPECIFIC TRAINING

As required, personnel assigned to the site will complete a training session of sufficient duration to demonstrate that they are capable of and familiar with the use and care of safety, respiratory, and protective equipment and with site control, decontamination, emergency, safety, and security procedures required for this site. If required, the site-specific training session will be conducted by the site health and safety officer. That site-specific training program would address elements of the HASP and hazards associated with that specific site and tasks. Only personnel who have successfully completed the site-specific training would then be allowed to enter the site to work.

3.3 PERIODIC TRAINING

If required, weekly follow-up training sessions, including discussions of operational problems and compliance with the site-specific health and safety plan, will be conducted by the Site Health and Safety Officer for personnel assigned to work at the site. Before any change that affects the on-site field work is implemented, a meeting to explain health and safety procedures will be held. Daily safety briefings will also be conducted as needed to update personnel on specific health and safety requirements.

4.0 MEDICAL SURVEILLANCE

4.1 MEDICAL MONITORING

Personnel entering an "Exclusion Zone" or "Contamination Reduction Zone" must meet the medical monitoring requirements of 29 CFR 1910.120. OSHA's 29 CFR 1910.120 regulation requires that employers implement a medical monitoring program consistent with paragraph (f) of the standard. This standard states that employees are to be medically examined before they are hired, at least once a year thereafter, and after injuries or overexposures.

4.2 POST-EXPOSURE/INJURY MONITORING

Any employee injured or suspected of being injured as a result of an uncontrolled release of hazardous substance or energy, or another emergency situation will be medically evaluated as soon as possible. The attending doctor will be given a copy of the OSHA Hazardous Waste Site regulations and its appendices (29 CFR 1910.120). The doctor will also be given:

- A description of the employee's duties as they relate to the person's physical and chemical exposures.
- A description of personal protective equipment used.
- A description of the employee's exposure levels.
- Information from previous medical examinations of the person.

5.0 SITE-SPECIFIC HEALTH AND SAFETY PLAN

The site-specific health and safety plan, which addresses concerns on this project, is outlined in the next section.

SITE HEALTH & SAFETY PLAN (HASP)

5.1 WORK LOCATION & DESCRIPTION **Project Number 161803**

1. Name: Valley Asphalt

2. Location: 1901 – 1903 Dryden Road
Moraine, Ohio

Prepared by: Henry M. Butcher
Date: April 25, 2013
Reviewed by: Katherine H. Beach, R.E.M.
Date: April 26, 2013
Approved by: _____
Date: _____

3. Type: Hazardous Waste Site (X) Industrial ( ) Construction ( )
Other ( ) Describe

4. Anticipated Activities: Soil Vapor Intrusion Mitigation

5. Size: Total = 10-acres; Work Areas < 1-acre

6. Surrounding Population: Site sits atop South Dayton Dump & Landfill (SDDL); surrounding population is commercial and light industry, with residential areas about ¼-mile away .

7. Buildings/Homes/Industry: Industrial Slab-on-grade or crawlspace.

8. Topography: Relatively flat, with storage piles

9. Weather Anticipated: Varied

10. Site History: The SDDL operated from the early 1940s to 1996 and is partially filled sand and gravel pit. The SDDL contains household waste, drums, metal turnings, fly ash, foundry sand, demolition material, wooden pallets, asphalt, paint, paint thinner, oils, brake fluids, asbestos, solvents, transformers and other industrial materials known to have been brought to the SDDL site. As the

excavated areas of the SDDL site were filled, some of the property was sold and/or leased to businesses along Dryden and East River Roads. Valley purchase Parcel 5054, consisting of approximately 10– acres, on May 7, 1993.

5.2 HAZARD DESCRIPTIONS

1. PPE Level: A ( ) B ( )

   Unknown ( ) C ( ) D (X)

   Justification This description is based on the chemical hazards known to be present.

2. Types of Hazards:

   A. Chemical (X) Inhalation ( ) Explosive (X)

   Ingestion (X) O_2 Def. ( ) Skin Contact (X)

   Toxic ( )

   B. Biological: ( )

   Describe: N/A

   C. Physical: Cold Stress (X) Noise (X)

   Heat Stress (X) Other ( )

   Describe: Heat stress or cold stress could be a factor, depending on weather. Noise will be generated during coring activities (during installation of the SSDS).

   D. Radiation (type, etc.)

   Describe: None known

3. Nature of Hazards:

   Air (X) Describe:

Soil (X) Describe: : _____

Surface Water ( ) Describe: N/A_____ _____

_____ _____ _____ _____

Ground Water ( ) Describe: _____

Other ( ) Describe: _____

_____ _____ _____ _____

4. Chemical Contaminants of Concern:

Contaminant	PEL, TLV, STEL	IDLH (PPM)	Characteristics	Route of Exposure	Symptoms of Exposure	Monitoring Instrument
Trichloroethylene	PEL = 100 PPM	1000 PPM	Colorless liquid with a chloroform like odor	Inhalation, ingestion, skin and eye contact	Irritation to the eyes, nose, throat, cough, pulmonary secretions, chest pain **Potential Human Carcinogen**	Air Sampling
Methane	PEL = 1000 PPM TLV = 1000 PPM	4500 PPM	Colorless gas	Inhalation, ingestion, skin and eye contact	Simple Asphyxiant, respiratory conditions may be aggravated by over exposure	Air sampling
Benzene	PEL = 1 PPM TLV = 0.1 PPM	500 PPM	Colorless to light-yellow liquid with an aromatic odor	Inhalation, ingestion, skin and eye contact	Irritation to eyes, skin, nose, headache, nauseau **Potential Human Carcinogen**	Air sampling

Vinyl Chloride	PEL =1 PPM	Not Determined	Colorless gas or liquid with a pleasant odor at high concentrations	Inhalation, skin and eye contact	Weak, abdomen pain, GI Bleeding **Potential Human Carcinogen**	Air Sampling

5. Physical Hazards (X)

Hazard	**Activity**	**Location**	**Control Measures**
Abrasions	Manual labor	Buildings 2, 4 and 5	Work gloves
Lacerations	Cutting and/or power tools	Buildings 2, 4 and 5	Kevlar gloves
Flying Objects	All	Buildings 2, 4 and 5	Safety glasses
Falling Objects	All	Buildings 2, 4 and 5	Hard Hat and Steel Toe footwear
Fire/Explosion	Cutting and/or power tools	Buildings 2, 4 and 5	Hot Work Permit, Including Administrative Controls

6. Air Monitoring Readings (X)

Readings of Gas Meter must be taken at 15-minute increments throughout work in Buildings 2, 4 and 5. Gas Meter must operate continuously throughout work performed in Buildings 2, 4 and 5. Record readings below:

Building: Date/Time:	Building: Date/Time:	Building: Date/Time:
% O_2	% O_2	% O_2
% LEL	% LEL	% LEL

VOCs (ppb or ppb)	VOCs (ppb or ppb)	VOCs (ppb or ppb)
Other: _____	Other: _____	Other: _____

Building: Date/Time:	Building: Date/Time:	Building: Date/Time:
% O_2	% O_2	% O_2
% LEL	% LEL	% LEL
VOCs (ppb or ppb)	VOCs (ppb or ppb)	VOCs (ppb or ppb)
Other: _____	Other: _____	Other: _____

Building: Date/Time:	Building: Date/Time:	Building: Date/Time:
% O_2	% O_2	% O_2
% LEL	% LEL	% LEL
VOCs (ppb or ppb)	VOCs (ppb or ppb)	VOCs (ppb or ppb)
Other: _____	Other: _____	Other: _____

Building: Date/Time:	Building: Date/Time:	Building: Date/Time:
% O_2	% O_2	% O_2
% LEL	% LEL	% LEL
VOCs (ppb or ppb)	VOCs (ppb or ppb)	VOCs (ppb or ppb)
Other: _____	Other: _____	Other: _____

5.3 PERSONAL PROTECTIVE EQUIPMENT

1. Level of Protection

A ( ) B ( ) C ( ) D (X)

Location/Activity: Soil Vapor Extraction Installation

A ( ) B ( ) C ( ) D ( )

Location/Activity _____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____

2. Protective Equipment

Respiratory (X) N/A	Clothing ( ) N/A
( ) SCBA, Airline	( ) Fully Encapsulating Suit
( ) Full Face Respirator	( ) Chemically Resistant Splash Suit
	( ) Apron, Specify _____
( ) Escape Mask	( ) Tyvek Coverall
	( ) Saranex Coverall
( ) None	( ) Coverall, Specify _____
( ) Other _____	(X) Other: Standard work clothes
_____	( ) Other: Nomax Coveralls

Head & Eye (X)	Hand Protection (X)
(X) Hard Hat	( ) Undergloves Nitrile_____
( ) Goggles	(X) Gloves Work Gloves____ _____ Type
( ) Face Shield	( ) Overgloves _____ Type

( ) Chemical Eyeglasses ( ) None

( ) None

(X) Other Safety Glasses, (X) Other Kevlar

Hearing Protection (X) When using power tools

Foot Protection ( ) N/A

(X) Safety Boots

( ) Disposable Overboots

( ) Other _____

_____

3. Monitoring Equipment (X)

( ) CGI ( ) PID

( ) O_2 Meter ( ) FID

( ) Rad. Survey (X) Other Methane Monitor

(X) Type- TBD; must include O_2, LEL, VOC, others as indicated

5.4 PERSONNEL DECONTAMINATION

(Attach Diagram if required) Required ( ) Not Required (X)

Equipment Decontamination (Attach Diagram if required)

Required ( ) Not Required (X)

If required, describe and list equipment: See Section 21.0, "Decontamination."

5.5. SITE PERSONNEL

Name

1. Tim Boehmer
2. Ken Boehmer
3. Ron Price

5.6 ACTIVITIES COVERED UNDER THIS PLAN

Task No.	Description	Preliminary Schedule
1	Soil Vapor Extraction Installation	As notified by client.

5.7 EVALUATION OF SUBCONTRACTOR'S HEALTH AND SAFETY PROGRAM

Name and Address of Subcontractor: _____

Activities to be Performed by Subcontractor:_____

EVALUATION CRITERIA

Item	Adequate	Inadequate	Comments
Medical Surveillance Program	( )	( )	_____
Personal Protective Equipment	( )	( )	_____
On-Site Monitoring Equipment	( )	( )	_____
Safe Working Procedures	( )	( )	_____
Training Protocols	( )	( )	_____
Emergency Procedures	( )	( )	_____
Evacuation Procedures Contingency Plan	( )	( )	_____
Decontamination Procedures Equipment	( )	( )	_____

Decontamination Procedures	( )	( )	_____ _____
Personnel			
Incident/Injury Rate	( )	( )	_____ _____

EVALUATION CONDUCTED BY: _____

DATE: _____

5.8 CONTINGENCY CONTACTS

Agency	Contact	Phone Number
Fire Department		911
Police Department		911
Emergency Medical Service/ Ambulance		911

5.9 CONTINGENCY PLANS

If during work activities on-site a release or accident occurs, the following emergency communication steps should be taken immediately:

1) Emergency communications are to be made verbally (face-to-face, radio or phone), by vehicle horns, by hand/arm signals, or by hand-held sirens;

2) One long blast of a siren or one arm continuously waving over a worker's head means to stop work and return to a pre-determined muster location;

3) Repeated short blasts of a siren or both arms continuously waving over a worker's head will mean that an emergency condition exists on-site and employees are to leave the site immediately and gather at the site gate.

In a life-threatening situation, decontamination procedures will be ignored.

In the event of a fire, follow instructions on the Hot Work Permit. Fire extinguishers will be made readily available within the work area to fight fires.

5.10 EMERGENCY PHONE NUMBERS

EMERGENCY PHONE NUMBERS

AMBULANCE	**911**
FIRE DEPARTMENT	**911**
POLICE	**911**

5.11 SITE CONTROL

Site workers will not be physically exposed to the solid/hazardous waste that lies below the surface of the Site. It is expected, however, that workers will be exposed to low levels of volatile organic compounds (VOCs) and methane once they enter Buildings 2, 4 and 5. As required in Sections B.5 and C.2 of this HASP, administrative controls must be employed to eliminate these hazards before additional work may proceed. In addition, once the concrete slabs associated with Buildings 2, 4 and 5 are penetrated in preparation of installation of the sub-slab depressurization systems (SSDSs), workers may encounter additional exposure to low levels of volatile organic compounds (VOCs) and methane rising from beneath the sub-slab. As required in Sections B.5 and C.2 of this HASP, administrative controls must continue to eliminate these hazards before additional work may proceed.

5.12 SITE HEALTH AND SAFETY PLAN

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

Name	Signature	Date
Name	Signature	Date

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

6.0 AIR MONITORING AND SITE ENTRY CRITERIA

Level	Action
RADIATION	
Background - 1 mrem/hr	Continue
mrem/hr - 10 mrem/hr	Proceed with CAUTION at direction of radiation physicist
10 + mrem/hr	Exit
OXYGEN	
19.5% - 25.0%	Continue
Less than 19.5%	SCBA required, combustible gas meters not reliable.
Greater than 25.0%	Exit
COMBUSTIBLE GAS	
Less than 10% of LEL	Continue
10% - 25% of LEL	Proceed with CAUTION
Greater than 25% of LEL	Exit
ORGANIC VAPOR (VOC)	
Background	Level D
> Background - 5 PPM	Level "C" with constant monitoring with OVA and/or photo-ionizer.
5 - 500 PPM	Level "B" with routine monitoring
500 - 1000 PPM	Level "A" with routine monitoring

THESE CRITERIA ARE GUIDELINES WHICH TO BASE ENTRY DECISIONS. THEY ARE NOT GUARANTEES OF SAFETY AND ARE INTENDED ONLY FOR USE BY FULLY TRAINED AND QUALIFIED PERSONNEL.

7.0 LEVELS OF PROTECTION

I. INTRODUCTION

Personnel must wear protective equipment when work activities involve known or suspected atmospheric contamination, when vapors, gases, or particulate may be generated, or when direct contact with skin-effecting substances may occur. Respirators can protect lungs, gastrointestinal tract, and eyes against air toxicants. Chemical-resistant clothing can protect the skin from contact with skin-destructive and absorbable chemicals. Good personal hygiene limits or prevents ingestion of material.

Equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded:

- Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.
- Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies and appropriate personnel protection utilized.
- Level C: Should be selected when the type(s) of airborne substance(s) is known, the concentration(s) is measured, and the criteria for using air-purifying respirators are met.
- Level D: Should not be worn on any site with respiratory or skin hazards. Is primarily a work uniform providing minimal protection.

The Level of Protection selected should be based primarily on:

- Type(s) and measured concentration(s) of the chemical substance(s) in the ambient atmosphere and its toxicity.
- Potential of measured exposure to substances in air, splashes of liquids, or other direct contact with material due to work being performed.

In situations where the type(s) of chemical(s), concentration(s), and possibilities of contact are not known, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better characterized.

While personal protective equipment reduces the potential for contact with harmful substances, ensuring the health and safety of response personnel requires, in addition, safe work practices, decontamination, site entry protocols, and other safety considerations. Together these protocols establish a combined approach for reducing potential harm to workers.

II. LEVELS OF PROTECTION - EQUIPMENT DESCRIPTION

A. Level A Protection

1. Personal Protective Equipment

- Pressure-demand, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and National Institute of Occupational Safety and Health (NIOSH).
- Fully encapsulating chemical-resistant suit
- Coveralls*
- Long cotton underwear*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot)
- Hard hat* (under suit)
- Disposable protective suit, gloves, and boots* (Worn over fully encapsulating suit)
- 2-way radio communications (intrinsically safe)

2. Criteria For Selection

Meeting any of these criteria warrants use of Level A Protection:

- The chemical substance(s) has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:
  - measured (or potential for) high concentration(s) of atmospheric vapors, gases, or particulate

- or -

- site operations and work functions involving high potential for splash immersion, or exposure to unexpected vapors, gases, or particulate

- Extremely hazardous substances (for example: dioxin, cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances) are known or suspected to be present, and skin contact is possible.

- The potential exists for contact with substances that destroy skin.

- Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is demonstrated.

- Total atmospheric readings on the Century OVA System, HUN, and similar instruments indicate 500 to 1,000 ppm of unidentified substances.

3. Guidance on Selection Criteria

The fully encapsulating suit provides the highest degree of protection to skin, eyes, and respiratory system if the suit material is resistant to the chemical(s) of concern during the time the suit is worn and/or at the measured or anticipated concentrations. While Level A provides maximum protection, the suit material may be rapidly permeated and penetrated by certain chemicals from extremely high air concentrations, splashes, or immersion of boots or gloves in concentrated liquids or sludge. These limitations should be recognized when specifying the type of chemical-resistant garment. Whenever possible, the suit material should be matched with the substance it is used to protect against.

The use of Level A protection and other chemical-resistant clothing requires evaluating the problems of physical stress, in particular, heat stress associated with the wearing of impermeable protective clothing. Response personnel must be carefully monitored for physical tolerance and recovery.

Protective equipment, being heavy and cumbersome, decreases dexterity, agility, visual acuity, etc., and so increases the probability of accidents. This probability decreases as less protective equipment is required. Thus, increased probability of accidents should be considered when selecting a level of protection.

B. Level B Protection

1. Personal Protective Equipment

- Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved)

- Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant coveralls)

- Coveralls*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- Two-way radio communications (intrinsically safe)

*Optional

2. Criteria For Selection

Meeting any one of these criteria warrants use of Level B protection:

- The type(s) and atmospheric concentration(s) of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. These would be atmospheres:
  - with concentrations Immediately Dangerous to Life and Health (IDLH)

    - or -

  - exceeding limits of protection afforded by a full-face, air-purifying mask
  - containing substances for which air-purifying canisters do not exist or have low removal efficiency

    - or -

  - containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.
- The atmosphere contains less than 19.5% oxygen.
- Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.
- Total atmospheric concentrations of unidentified vapors or gases range from 5 ppm to 500 ppm on instruments such as the Century OVA System or HNU photo-ionizer, and vapors are not suspected of containing high levels of chemicals toxic to skin.

3. Guidance on Selection Criteria

Level B equipment provides a high level of protection to the respiratory tract but a somewhat lower level of protection to skin. The chemical-resistant clothing required in Level B is available in a wide variety of styles, materials, construction detail, permeability, etc. These factors all affect the degree of protection afforded. Therefore, a specialist should select the most effective chemical-resistant clothing (and fully encapsulating suit) based on the known or anticipated hazards and/or job function.

Generally, if a self-contained breathing apparatus is required, Level B clothing rather than a Level A fully encapsulating suit is selected, based on the protection needed against known or anticipated substances affecting the skin. Level B skin protection is selected by:

- Comparing the concentrations of known or identified substances in air with skin toxicity data.
- Determining the presence of substances that are destructive to and/or readily absorbed through the skin by liquid splashes, unexpected high levels of gases or particulates, or other means of direct contact.
- Assessing the effect of the substance (at its measured air concentrations or splash potential) on the small area of the head and neck unprotected by chemical-resistant clothing.

For initial site entry and reconnaissance at an open site, approaching whenever possible from the upwind direction, Level B protection (with good quality, hooded, chemical-resistant clothing) should protect response personnel, providing the conditions described in selecting Level A are known or judged to be absent. For continuous operations, the aforementioned criteria must be evaluated.

At 500 ppm total vapors/gases, upgrading to Level A protection may be advisable. A major factor for re-evaluation is the presence of vapors, gases, or particulates requiring a higher degree of skin protection.

C. Level C Protection

1. Personal Protective Equipment

- Full-face, air-purifying, canister-equipped respirator (MSHA/NIOSH)
- Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant coveralls)
- Coveralls*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant

- Boots (outer), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- Escape mask*
- Two-way radio communications (intrinsically safe)

*Optional

2. Criteria For Selection

Meeting any one of these criteria permits use of Level C protection:

- Measured air concentrations of identified substances will be reduced by the respirator to at or below the substance's exposure limit, and the concentration is within the service limit of the canister.
- Atmospheric contaminant concentrations do not exceed IDLH levels.
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
- Job functions have been determined not to require self-contained breathing apparatus.
- Total vapor readings register between background and 5 ppm above background on instruments such as the HNU Photo-ionizer and Century OVA System.

3. Guidance on Selection Criteria

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing air-purifying devices.

The air-purifying device must be full-face mask (MSHA/NIOSH approved) equipped with a canister suspended from the chin or on a harness. Canisters must be able to remove the substances encountered. Quarter- or half-masks or cheek-cartridge full-face masks should be used only with the approval of a qualified individual.

In addition, a full-face, air-purifying mask can be used only if:

- The oxygen content of the atmosphere is at least 19.5% by volume.
- The substance(s) is identified and its concentration(s) is measured.
    - The individual passes a qualitative fit-test for the mask.

- An appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators (Level C). Surveillance using direct-reading instruments and air sampling as needed should be conducted continuously to detect any changes in air quality necessitating a higher level or respiratory protection. See Part B for guidance on air monitoring.

Total unidentified vapor/gas concentrations of 5 ppm above background require Level B protection. Only a qualified individual should select Level C (air purifying respirators) protection for continual use in an unidentified vapor/gas concentration of background to 5 ppm above background.

D. Level D Protection

1. Personal Protective Equipment

- Coveralls*
- Gloves*
- Boots/shoes, leather or chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable)*
- Safety glasses or chemical splash goggles*
- Hard hat (face shield)*
- Escape mask*

*Optional

2. Criteria For Selection

Meeting any of these criteria allows use of Level D protection:

No hazardous air pollutants have been measured. Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

3. Guidance on Selection Criteria

Level D protection is primarily a work uniform. It can be worn in areas where: 1) only boots can be contaminated, or 2) there are no inhalable toxic substances.

III. PROTECTION IN UNKNOWN ENVIRONMENTS

In all site operations, selecting the appropriate personal protection equipment is one of the first steps in reducing the potential for adverse health effects. Until the hazardous conditions presented by an environmental incident can be identified and personal safety measures commensurate with the hazards -- real or potential -- can be instituted, preliminary measures will have to be based on applying experience, judgment, and professional knowledge to the particular incident at hand. Lack of knowledge concerning the hazards that could be encountered precludes selecting protective equipment by comparing environmental concentrations of known toxicants against protection afforded by each type of equipment.

One of the first considerations in evaluating the risk of an unknown environment is to measure immediate atmospheric hazards such as the concentrations (or potential concentrations) of vapors, gases, and particulate; oxygen content of the air; explosive potential; and, to a lesser degree, the possibility of radiation exposure. In addition to air measurements, visual observation and/or evaluation of existing data can help determine the degree of risk from other materials that are explosive, have high fire potential, are extremely toxic, or exhibit other hazardous characteristics that cannot be monitored by field instruments.

Total vapor/gas concentration as indicated by instruments such as the Century OVA System or the HNU photo-ionizer is a useful adjunct to professional judgment in selecting the Level of Protection to be worn in an unknown environment. It should not be the sole criterion, but should be considered with all other available information. Total vapor/gas concentration should be applied only by qualified persons.

The initial on-site survey and reconnaissance, which may consist of more than one entry, is to characterize the immediate hazards and, based on these findings, establish preliminary safety requirements. As data are obtained from the initial survey, the Level of Protection and other safety procedures are adjusted. Initial data also provide information on which to base further monitoring and sampling. No method can select a level of protection in all unknown environments. Each situation must be examined individually. Some general approaches can be given, however, for judging the situation and determining the level of protection required.

A. Level C.

Level C protection (full-face, air-purifying respirator) should be worn routinely in an atmosphere only after the type(s) of air contaminant(s) is identified and concentrations are measured. To permit flexibility in prescribing a level of protection at certain environmental incidents, a specialist could consider air-purifying respirators for use in unidentified vapor/gas concentrations of a few parts per million. The guideline of total vapor/gas concentration of background to 5 ppm above background should not be the sole criterion for selecting Level C. Since the individual contributors may never be completely identified, a decision on continuous wearing of Level C must be made after assessing all safety considerations including:

- The presence of (or potential for) organic or inorganic vapors/gases against which a canister is ineffective or has a short service life.

- The known (or suspected) presence in air of substances with low TLV or IDLH levels.

- The presence of particulate in air.

- The presence of (or potential for) substances in air which do not elicit a response on the instrument(s) used.

- The potential for higher concentrations in the ambient atmosphere or in the air adjacent to specific site operations.

The continuous use of air-purifying respirators (Level C) should be based on the identification of the substances contributing to the total vapor/gas concentration and the application of published criteria for the routine use of air-purifying devices. Unidentified ambient concentrations of organic/vapors or gasses in air approaching or exceeding 5 ppm above background require Level B protection.

Individuals without appropriate training and/or experience should be discouraged from modifying upward the recommended total vapor/gas concentration guideline and associated levels of protection.

B. Level A

Level A should be worn when maximum protection is needed against substances that could damage the surface of the skin and/or be absorbed through the skin. Since Level A requires the use of a self-contained breathing apparatus, the eyes and respiratory system are also protected. For initial site entry, skin toxicants would exist primarily as vapors, gases, or particulate in air, with a lesser possibility of splash. Continuous operations at an abandoned waste site, for instance, may require Level A due to working with and around severe skin toxicants.

Until air monitoring data are available to assist in the selection of the appropriate Level of Protection, the use of Level A for initial site entries may have to be based on indirect evidence of the potential for atmospheric contamination or direct skin contact.

Considerations that may require Level A protection include:

- Confined spaces: Enclosed, confined, or poorly ventilated areas are conducive to buildup in air of toxic vapors, gases, or particulates. (Explosive or oxygen-efficient atmospheres also are more probable in confined spaces). Low-lying outdoor areas like ravines, ditches, and gullies tend to accumulate any heavier-than-air vapors or gases.

- Suspected/known toxic substances: Various substances may be known or suspected to be involved in an incident, but there are no field instruments available to detect or quantify air concentrations. In these cases, media samples must be analyzed in the

laboratory. Until these substances are identified and the levels are measured, maximum protection may be necessary.

- Visible emissions: Visible emissions from leaking containers or railroad/vehicular tank car as well as smoke from chemical fires indicate high potential for concentrations of substances that could be extreme respiratory or skin hazards.

- Job functions: Initial site entries are generally walk-throughs in which instruments and/or visual observations provide a preliminary characterization of the hazards. Subsequent entries are to conduct the many activities needed to reduce the environmental impact of those hazards. Levels of protection for later operations are based not only on data obtained from the initial and subsequent environmental monitoring, but also on the probability of contamination. Maximum protection (Level A) should be worn when:

  -- there is a high probability for exposure to high concentrations of vapors, gases, or particulate

  -- substances could splash, or

  -- substances are known or suspected of being extremely toxic directly to the skin or by being absorbed.

Examples of situations where Level A has been worn are:

-- Excavating of soil suspected of being contaminated with dioxin.

8.0 HAND SIGNALS

Hand Signal	Means:
Hands on top of head.	I need assistance
Gripping partner's wrist or placing both hands around partner's arm.	Leave area immediately
Thumbs up.	OK; I'm all right.
Thumbs down.	No; negative.
Hand gripping throat.	Cannot breathe; out of air.
Pointed finger on extended arm.	Look in that direction.
Waving hands over head from side to side.	Attention; stand-by for the next signal.
Swinging hand up from direction of person receiving signal and continuing in circular motion.	Come here.

9.0 TEMPERATURE STRESS

A. Effects of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Standard reference books should be consulted for specific treatment.

Heat-related problems include:

- Heat Rash: Caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.

- Heat Cramps: Caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). *Signs: muscle spasm and pain in the extremities and abdomen.*

- Heat Exhaustion: Caused by increased stress on various organs to meet increased demands to cool the body. *Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.*

- Heat Stroke: The most severe form of heat stress. The body must be cooled immediately to prevent severe injury and/or death. *Signs and symptoms are: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.*

B. Heat Stress Monitoring

For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing impervious clothing should begin when the ambient temperature is 70° F or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 85° F workers should be monitored for heat stress after every work period.

- Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (33%), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.

- Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99° F. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the OT exceeds 99.7° F at the beginning of the next period, the following work cycle should be further shortened by 33%. Oral temperature should be measured against the end of the rest period to make sure that is has dropped below 99° F.

- Body water loss (BWL) due to sweating should be measured by weighing the worker in the morning and in the evening. The clothing worn should be similar at both weighings; preferably the worker should be nude. The scale should be accurate to ± 1/4 lb. Body water loss should not exceed 1.5% of the total body weight. If it does, the worker should be instructed to increase his daily intake of fluids by the weight lost. Ideally, body fluids should be maintained at a constant level during the work day. This requires replacement of salt lost in sweat as well.

10.0 COLD STRESS

A. Effect of Cold Exposure

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body with high surface-area-to-volume ratios such as fingers, toes, and ears are the most susceptible.

Two factors, ambient temperature and the velocity of the wind, influence the development of a cold injury. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10°with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18° F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. In additional, since water conducts heat 240 times faster than air, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is soaked with perspiration.

Local injury resulting from cold is included in the generic term "frostbite." There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: Characterized by suddenly blanching or whitening skin.

- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. *Its symptoms are usually exhibited in five stages: 1) shivering, 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F, 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate, 4) freezing of the extremities, and finally, 5) death.*

B. Prevention of Cold Stress

Cold stress is prevented by wearing adequate clothing in layers, by taking breaks, and through the use of a buddy system evaluation.

11.0 MOTOR VEHICLE OPERATIONS

Operate company vehicles only if you are authorized to do so, and have a valid operator's license or commercial driver's license (CDL) in your possession. Do not permit unauthorized persons to operate or ride in company vehicles. Obey all traffic laws and company safety rules applicable to the operation of the vehicle you are operating.

Use defensive driving techniques at all times. Make allowances for lack of skills and knowledge of others. Drive to prevent accidents in spite of incorrect actions of others and adverse conditions. Drive professionally. Protect yourself and the company by being courteous, safe, dependable, and defensive. Use knowledge, alertness, foresight, good judgment, and skill.

Safety-inspect your vehicle at regular intervals and make any repairs required. Keep your vehicle in good condition at all times.

Keep your vehicle clean and orderly. Debris, cans, bottles, and loose tools are not permitted in the driver's compartments. Make sure the vehicle is equipped with required emergency and warning devices in good condition.

Ensure good visibility by cleaning glass and lights, adjusting mirrors, and keeping wipers in good condition. Use safety belts as provided and required by law. Do not operate a motor vehicle when your physical or mental condition may constitute a hazard.

Do not permit riders on any part of the vehicle except seats with seat belts.

Use extreme caution when backing. Use the horn. Use another person as a guide. Keep constant lookout and always check blind areas. Back slowly; watch all sides. Do not depend entirely on mirrors. Park vehicle legally to reduce chances of an accident.

Do not park closer than 10 feet to traveled road surface unless proper warnings are used.

Secure your load to prevent shifting, sifting, dislodging, or creating a hazard. Do not exceed legal speed limits. Shift to lower gears when descending a steep hill.

Drive professionally and conserve fuel.

12.0 OFFICE AND BUILDING SAFETY

Wipe up spills, eliminate tripping and slipping hazards, pick up loose objects off floor, and keep aisles and steps uncluttered. Good housekeeping is essential.

Keep walkway, storage, and work areas clear and orderly.

Report unsafe conditions immediately.

Know the locations and use of exits, fire extinguishers, fire alarms, first aid kits, and emergency phone numbers. Know emergency exit and action procedures.

Keep file and desk drawers closed. Open only one drawer at a time to prevent tripping.

Handle sharp objects carefully.

Do not place broken glass, sharp objects, or ash tray contents into waste baskets.

Wear shoes with moderate heels. Flimsy footwear, dangling jewelry, and long draping clothes can be a risk.

Use step ladders, not chairs, for reaching high places.

Use proper lifting methods and carry loads you can see over. Do not read and walk. Approach intersections, corners, and doorways carefully. Do not run.

Avoid tipping chairs over. Be careful of chairs with rollers.

Make certain all electrical equipment is grounded, cords are in safe condition, and the equipment is located so as not to create a tripping or fire hazard. Do not overload circuits.

Be careful in using hazardous liquids. Read labels and follow warnings. Keep such substances in safety containers stored safely.

Be careful with mechanical and cutting equipment. Unplug or lock-out power equipment before adjusting.

Secure equipment properly.

Obey NO SMOKING rules.

13.0 EXCAVATIONS AND SHORING

In all cases, trench excavations are to follow 29 CFR 1926.650, or the latest modification, Occupational Safety and Health Standards, Excavations; final rule.

Any trench or trenching that does not follow these guidelines should not be entered by Bowser-Morner personnel.

In general, any trench deeper than five feet and less than 20 feet deep shall be benched and sloped back or braced in accordance with the soil type as specified in 29 CFR 1926.

If any other method is used, the design computation for such a device must be available for review.

Any trench or excavation deeper than 20 feet must have a professional engineer's design data sheet available for review.

14.0 CONFINED SPACES

Definition:

Confined Space -- A space in which, because of its construction, location, contents, or work activity, a hazardous gas, vapor, dust, or fumes or the creation of an oxygen-deficient or -enriched atmosphere may occur.

Examples:

Confined spaces are enclosed structures with limited access such as a manhole, tanks, pits, vats, vaults, bins, silos, pipelines, sewers, tunnels, and wells.

How to Recognize a Confined Space:

Construction

- Is the space totally enclosed?
- What is the number, location and size of openings?

Location

- Is the space above or below floor level?
- Can airborne contaminants accumulate in the space?

Contents

- What is the nature of materials in the space?
- Do they give off toxic gases, fumes, vapors and dusts?
- Is oxygen-enrichment or -deficiency possible?

Work Activity

- What is the nature of the work to be carried out?
- Will the activity affect oxygen supply?
- Will the process generate heat, toxic gases, dust, etc.?

Potential Hazards

Confined space accidents often result in serious injury or death. These accidents occur as a result of:

- Inability to identify conditions in the space.
- Lack of training in identifying hazards and control measures.
- Failure to implement protective measures.

a. Toxic Gases, Vapors, Fumes, and Dusts. These can cause serious injury or death and include toxins, asphyxiates and irritants such as all gases and vapors known to produce disease; asphyxiates (methane carbon monoxide; irritants); hydrogen sulfide; and sulfur dioxide.

b. Combustible Gases, Vapors, and Dusts. May ignite in the presence of a source of ignition. Depends on concentration in air -- within the upper and lower explosive limits (UEL, LEL).

c. Oxygen Deficiency. Atmospheres containing less than 18% oxygen -- normal air contains about 21%. The condition may result from purging with inert gases, oxidation, etc.

d. Oxygen Enrichment. Atmospheres containing more than 23% oxygen.

e. Entry of Material from Supply Lines. Liquids and gases

f. Electric Shock. Energized equipment

g. Mechanical. Dangerous moving parts of machinery.

h. Extremes of Temperature and Humidity. Equipment such as boilers, freezers, and ovens.

i. Shifting or Collapse of Bulk Material. Loose material such as grains.

Precautions for Entry

Selection, Education and Training

Selection -- In selecting persons to enter or work in confined spaces, attention should be paid to the following:

- Physical condition.
- Psychological Suitability -- the person should not be adversely affected by closed, cramped spaces or suffer from dizziness.

Training

Training should include:

- Information on actual and potential hazards of the space.
- Instruction on procedures and precautions for entry.
- Pre-entry procedures such as lock out, blanking, atmospheric testing.

Ventilation

- The space should be pressure ventilated when toxic/combustible atmosphere is present.
- Ventilation should continue throughout the work period.
- Ventilation should also be done to control temperature.

Fire and Explosion

- Sources of ignition should be removed.
- Electrical equipment should be flame- and explosion-proof.
- Except for breathing apparatuses, oxygen and other gas cylinders should not be taken into the space.
- Welding and cutting torches should not be left in the space.
- Firefighting equipment should be readily available.

Access/Egress

- Openings should be large enough (24-inch-diameter minimum) to permit the entry of workers wearing safety equipment.

- Covers, doors, etc., should be easily opened.
- Ladders should be secured.

Blanking Off

- The work area should be isolated to prevent ingress of hazardous substances. Valves may be chained and padlocked. Physical disconnection by blanks or blinds is preferred.

Locking Out

- Agitators, pumps, conveyors, etc., should be locked out.

Electric Shock

- Electrical tools and equipment should be grounded. Welding electrodes should be well insulated. Particular attention should be paid to conductive liquids.

Personal Protective Equipment

- Proper PPE to be provided - hard hats, goggles, gloves, coveralls, and respiratory equipment.

Work Area Evaluation

- The work area should be evaluated by a competent person before being entered.
- Each work evaluation is to be done separately for each job, and appropriate records should be kept.
- Permits to work should be issued. It is impossible to design a permit to fit all situations.

  Specific workplace conditions should be considered in designing each permit.

Rescue Plan and Equipment

Attention should be paid to:

- The sizes and locations of openings.
- Rescue gear -- safety belts, harnesses, and life lines.

- Safety watches.
- First aid and CPR.
- Your location to inform 911 personnel.

15.0 WELDING OR TORCH WORK

No task(s) that produces heat, sparks, or energy sufficient to serve as an ignition source may begin in any location which could potentially have ignitable atmospheres, until a Hot Work Protection Procedure has been instituted.

Examples of hot work include welding, cutting, burning, soldering, grinding, the use of power tools, and the use of internal combustion engines.

The Site Health and Safety Officer is responsible for obtaining any required hot work permits.

Permits must be reissued at the beginning of each day, each work shift or if the area has not been monitored within one-half hour.

Hot Work Permit Procedures

1. The SHSO is responsible for inspecting each site and determining the specific needs and procedures.
2. A fire watch is required for every activity where hot work could result in other than a minor fire due to ignition of combustibles.
3. Fire extinguishing equipment commensurate with the ignitable matrix and training level of the fire watch must be immediately available at the Hot Work location.
4. A combustible gas meter must be used to survey the Hot Work location and then must be left to constantly monitor the air between the flammable material and the immediate vicinity of the hot work.
5. Welding or cutting on close systems must be specifically approved by the SHSO or the CIH.

16.0 HEAVY EQUIPMENT OPERATION

Preventative maintenance procedures recommended by the manufacturer are to be followed. Any machinery or equipment found to be unsafe will be deadlined and its use prohibited until unsafe conditions have been corrected.

Inspections or determinations of road conditions and structures are to be made in advance to assure that clearances and load capacities are safe for the passing or placing of any machinery or equipment.

Machinery and mechanized equipment is to be operated only by designated personnel. Equipment deficiencies observed at any time that affect their safe operation must be corrected before continuing operation. Seats or equal protection must be provided for each person required to ride on equipment.

Getting off or on any equipment while it is in motion is *prohibited.* Machinery or equipment requiring an operator must not be permitted to run unattended. Machinery or equipment is not to be operated in a manner that will endanger persons or property nor are the safe operating speeds or loads to be exceeded.

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Exemption: Equipment designated to be serviced while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic for repair persons.

Heavy machinery, equipment, or parts thereof that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work under or between them.

Bulldozers, Scraper Blades, End-Loader Buckets and Dump Bodies

Bulldozers, scraper blades, end-loader buckets, dump bodies, and similar equipment must be either fully lowered or blocked when being repaired or when not in use. All controls are to be in the neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment is to be placed on a firm foundation and secured before being operated.

All points requiring lubricating during operation are to have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment is to be shut down before and during fueling operations. Closed systems with automatic shut-offs to prevent spillage if connections are broken may be used to fuel diesel-powered equipment left running.

All towing devices used on any combinations of equipment must be structurally adequate for the weight drawn and securely mounted. Persons *are not permitted* to get between a towed and a towing piece of equipment until the towing equipment has been stopped.

All equipment with a windshield must be equipped with powered wipers. Vehicles that operate in conditions that cause fogging or frosting of windshields must be equipped with operable defogging and defrosting devices.

All equipment left unattended at night, next to a highway in normal use, or next to construction areas where work is in progress must have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake is to be set. Equipment parked on inclines is to have wheels chocked or the track mechanism blocked and the parking brake set.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms are not to be operated from a ground position unless so designed. Personnel are not to work or pass under the buckets or booms of loaders in operation.

17.0 HAND AND POWER TOOL SAFETY

Unsafe hand tools are not to be issued or used. All hand tools are to be kept in good repair and used only for the purpose for which they were designed. Wrenches with sprung jaws where slippage could occur, impact tools with mushroomed heads, and wooden-handled tools with cracks or splinters are examples of unsafe hand tools.

Tools having defects that will impair their strength or render them unsafe will be tagged or made inoperable and removed from service.

Guards must be in place during operation on all power tools designed to accommodate them. Guards and safety devices must remain in place on power tools unless removed according to the manufacturer's instruction for maintenance by a competent person; the guards must be replaced before the equipment is used. Belts, gears, shafts, drums, fly wheels, chains or other rotating, reciprocating or moving parts exposed to employee contact or representing other hazard must be guarded.

Proper personal protective equipment must be used when operating power tools or hand tools that may produce projectiles, cuts, abrasions, dusts, fumes, mists, or light, or which pose a risk of harm to arms, legs, or feet if dropped.

When work is being performed overhead, tools not in use are to be secured or placed in holders.

Throwing tools or materials from one location to another, from one person to another, or dropping them to lower levels, is not permitted

Only non-sparking tools are to be used in locations where sources of ignition may cause a fire or explosion.

Power tools are to be inspected, tested, and determined to be safe for operation prior to use. Continued periodic inspections are to be made to assure safe operating condition and proper maintenance.

Electric-powered tools must be approved double insulated or grounded in accordance with 29 CFR 1926.404.

Rotating or reciprocating portable power tools must have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control if it can be turned off by a single motion of the same finger or fingers that turned it on.

All hydraulic or pneumatic tools which are used on or around energized lines or equipment will have non conducting hoses having adequate strength for the normal operating pressures.

Loose and frayed clothing, loose long hair, dangling jewelry, rings, chains, and wrist watches will not be worn while working with any power tool or machine.

18.0 ILLUMINATION

Construction site offices, stairways, passageways, construction roads, and working areas are to be lighted while work is in progress by at least the following minimum light intensities:

Facility Name or Function	Lighting Intensity (Foot Candles)
Accessways - General Indoor	5
Accessways - General Outdoor	3
Administrative Areas (Offices, Drafting Rooms, Conference Rooms, etc.)	50
Barracks, BOQ's Mess Halls, Base Exchanges	30
Construction Areas	5
Indoor - General	5
Outdoor - General	3
Concrete Placement Operation	3
Excavation and Fill Areas	3
Docks and Loading Platforms	3
Exitways, Walkways, Ladders, and Stairways	10
Maintenance, Operating and Construction Shops and Areas	
Aircraft Maintenance	50
Auto Maintenance Shops	30

Carpenter Shops	10
Field Maintenance Area Outside	5
Refueling - Outside	5
Shops - Medium Work	30
Mechanical and Electrical Equipment Rooms	10
Medical and First-Aid Stations	30
Toilets and Wash Rooms	10
Tunnels and General Underground Work Areas	5
Warehouses and Storage Rooms and Areas	
Active or Bulk Storage -- Inside	10
Inactive Storage -- Inside	5
Stockrooms	10
Outside Storage -- Active	3
Work Areas -- General	30

Where artificial light is required, it is to be maintained until personnel have had an opportunity to leave the area.

19.0 LADDERS

- Use approved, correct-size ladders designed for the job.
- Never use metal ladders near energized lines or equipment.
- Check the ladder's condition and use it only if it's safe; tag, report, and take defective ladders out of service.
- Place the ladder base not less than one-fourth of its working length from the supporting surface (a 4 to 1 ratio) and not more than one-third of the working length from the supporting surface unless it's securely held or tied in place.
- Inspect ladders regularly, maintain in good condition, and store properly. Do not paint ladders.
- Fasten ladders securely when transporting. Use proper lifting and safety precautions when carrying them.
- Never use a box or chair in place of a ladder.
- Place ladder on a firm, substantially level base -- not on a movable object. Place the ladder so that side rails have a secure footing on solid ground to prevent sinking.
- Never place a ladder against insecure support.
- Make sure straight ladders have non-skid feet or are securely tied off.

- Fasten ladders placed against aerial cable strands and secure the user properly.
- Make sure the top of the ladder extends three feet above the landing and is secured.
- Do not leave a placed ladder unattended. Remove ladders at the end of the work day.
- Ascend or descend ladders one step at a time, facing the ladder and using both hands.
- Make sure your footwear is not greasy, muddy, or slippery. Use extreme caution during wet or icy weather.
- Do not climb a ladder while wearing climbers.
- Do not climb higher than the third rung from the top on straight ladders or the third step from the top on stepladders.
- Do not shift the position or "walk" a ladder while on it.
- Keep both feet on the ladder and do not overreach.
- Do not walk or stand under a ladder holding a worker.
- Fully extend the stepladder spreader and set the locking device before climbing the ladder.
- Do not use a stepladder as a straight ladder.
- Do not place a ladder near an unsecured door.

20.0 BORING SAFETY

Pre-Subsurface Exploration Work

Although predicting every contingency that may occur during subsurface exploration is difficult, the items listed below are very important. Following them will help reduce the chance of an injury occurring on the job site. The crew chief should always, always:

- Complete the vehicle inspection checklist before each trip.
- Review maps showing underground and overhead utilities if they're available.
- Call local utility companies and the Ohio Utilities Protection Service (OUPS) to ask them to physically mark the locations of any underground utility lines. Remember that the utility companies need 2 working days notice.
- Visually inspect the area where the subsurface exploration will take place for signs of utilities such as gas lines, manholes, water lines, electric lines, etc.

- Review any available site map with a client representative to determine where the utilities are.

- If necessary, surveying may need to be done to locate underground utilities.

- Obtain proper permits from the client representatives before you start work. these permits include hot work, lockout/tagout, utility clearance, etc.

- Check the area for overhead power lines. If the lines are within 10 to 20 feet of the planned work area, the decision of whether the power lines need to be de-energized or insulated before subsurface exploration begins must be made by the client and/or the crew chief.

- If you are working around process lines inside or outside of a plant, extreme caution needs to be taken during the subsurface exploration. If you smell any unusual odors, hit a process line, or notice any other signs that may indicate that the lines are leaking, the area should be evacuated and the proper plant personnel should be notified. Air sampling or another sampling method may be required before safe access to that area can be obtained.

Mobilization

For your safety, you should follow the steps listed below when you mobilize to a job site.

- First, you should inspect the boring rig using the subsurface exploration equipment checklist, a copy of which is attached.

- Before you mobilize to the actual exploration site, you should walk the route of travel looking for creeks and streams, depressions, gullies, ruts, debris, plant hazards such as overhanging branches, and other possible hazards. You should also be sure that the ground is solid enough for heavy equipment to travel safely on it.

- You must also make sure that plant personnel, pedestrians, or any other bystanders are clear of equipment when the rig is moving.

- When the equipment has been moved to the boring location, you should set the brakes. You should also make sure that the rig is level before the subsurface exploration begins.

- Always use extreme caution when you travel up or down steep grades. Whenever possible, travel directly downhill or uphill. If you travel at an angle down or up a hill, the center of gravity of the rig or truck may shift as the tools move, perhaps causing an accident.

- When you travel up a steep grade, you should anchor the winch line from the boring rig to a suitable unmovable object at the top of the grade if at all possible.

- You should cross relatively small obstacles like logs, ditches, and channels squarely, not at an angle.

- When overhead or lateral clearance is restricted, you should use a "spotter" to keep you aware of where your rig and other objects are.

- **THE ONLY TIMES YOU MAY TRAVEL WITH THE DERRICK OF THE RIG IN THE PARTIAL OR FULLY RAISED POSITIONS ARE WHEN:**

  The surface between the locations is generally flat, no overhead wires are in the area, no public traffic is in the area, and the next location is no more than 300 feet away. If a rig is moving with the derrick or spindle in the up position, a spotter must be at the rear of the rig.

- Do not raise the derrick or operate the rig if the distance to overhead power lines is less than 10 feet. A general rule of thumb is the distance between the overhead power line and the boom should not be less than the height of the boom.

  Remember to **" ALWAYS LOOK UP ".**

  And don't forget that power lines can and will move when it is windy. Always keep a close eye on the power lines when they are moving due to the wind. If the lines move too close to the rig, you should stop work and consider having the local utility company cover the power lines or wait for the winds to die down before you begin boring again.

- Do not leave the equipment running or idling unattended. The vibrations from the rig may cause the rig to move accidentally.

- "Tailgate" safety meetings must be held once a week. In addition, these meetings must be documented.

Pre-Subsurface Exploration Preparation And Initial Exploration

Before you do the rest of the pre-subsurface exploration preparations, you should review *each* item listed below at **each and every** subsurface exploration location.

- If you are working in an exclusion zone, proper barricades should be placed around it.

- You must set the brakes before the subsurface exploration activities begin. If you are working on a steep grade, the wheels should be chocked to keep the rig from

tipping over or moving. The level jacks should also be used to keep the rig stable during the exploration.

- To keep the rig jacks from sinking, you should place blocks under rig jacks.
- If you are working on the mast above five feet, you should use a safety harness. If you can, you should lower the mast so fall protection does not become an issue when working on the mast.
- You should also inspect the rig pulley sheaves for wear and proper cable/rope positioning.

After you complete the pre-boring preparation, the following items should be reviewed with your fellow employees:

- You must **make sure** that every employee knows the location of the "kill switch" and how to use it.
- While the engine is being started, the rig personnel and bystanders must stand clear of the rig.
- Before you start the rig engine, you should double-check to make sure that all gear boxes are in neutral, that every hydraulic lever is in the correct non-actuating position, that the cathead rope is not on the cathead, and that all of the hoist levers are disengaged.
- You should check the brakes and the hydraulic system on the derrick by raising it a few inches to see if it holds or bleeds off.
- **YOU MUST ALWAYS CHECK FOR OVERHEAD POWER LINES.**
- Place the fire extinguisher in an easily accessible location.

Subsurface Exploration

This section of the safety plan is where the most severe accidents can happen. These items need to be reviewed regularly with crew chiefs and technicians:

- Only necessary and authorized personnel should be in the exclusion zone during subsurface exploration operations.
- Hard hats, ear plugs, gloves, safety glasses, and steel-toed boots (weather permitting) should be worn at all times during augering or boring operations.

- Every employee should wear safety goggles when welding, grinding, chipping, or hammering on metal. Safety glasses or goggles must be worn on any job where there is a hazard to the eyes.

Every employee should also:

- Wear protective gloves when handling cable, augers, rods, or any sharp, jagged or splintery materials.
- Wear appropriate personal protective equipment as outlined in the site health and safety plan, such as proper gloves for different chemicals.
- Wear noise protection if the employee is working around the boring operations and if necessary.
- Never perform maintenance activities or refueling while equipment is running.
- Never, ever work in a lightning storm.
- Be trained in the use of hand signals and knows what each means.
- Never climb the mast when the equipment is running.

In addition:

- Only qualified personnel should operate the rig.
- The hydraulic lines should be inspected periodically for signs of leaks.
- A shovel should be used to place soil next to or away from auger when a test boring is being backfilled or advanced. You should never use to feet to kick soil toward or away from the auger -- whether it is rotating or stationary.
- You should stand clear of the auger or rod during rotation. Never clean the auger flight with your hand while the auger rotates.
- You should always use the proper tools for the job.
- You should be absolutely sure that the person acting as technician is clear of all moving parts before you start to auger or bore.

You should also:

- Use caution when erecting, operating, or moving equipment in or near an area where other people are working.
- Keep the job site clear of all debris, and move tools or equipment out from under foot.
- When using a hoist or cable, be sure all employees are out of the danger zone and use extreme caution.
- Never carry hand tools loosely in your pockets when you are working on the overhead mast.
- Never throw or drop any material or tool from overhead; instead, lower it with a rope or carry it down.
- Use a hoisting elevator to remove the rod from the hole. Do not use a pipe wrench as an elevator, and be sure that all of the wrenches are removed from rod before hoisting overhead.
- Visually inspect the rope daily for abrasions, broken fibers, cuts, fraying, or other defects. If the examination reveals any of the above defects, a new rope must be placed in service and the old rope should be discarded.
- Keep all tools, equipment, and trucks in good repair.
- Respect the equipment you are working with in the same manner as a loaded gun. Do not take chances because of familiarity.
- If you consider a site or a situation unsafe, Do Not Continue the Work until you bring your concern to the attention of your supervisor. When the site or situation is corrected, you may continue to work.
- Place lighted barricades at all obstructions left overnight in congested areas.
- In the case of emergency, know where your designated safe area is. Pre-planned evacuation routes are paramount. Know where your equipment is you do not run into it when you are evacuating a site in an emergency.
- Put the derrick and spindle down and all jacks or outriggers up when moving the rig between locations. It's standard procedure.

THE ONLY TIMES YOU MAY TRAVEL WITH THE DERRICK OF THE RIG IN THE PARTIAL OR FULLY RAISED POSITIONS ARE WHEN:

The surface between the locations is generally flat, no overhead wires are in the area, no public traffic is in the

area, and the next location is no more than 300 feet away. If a rig is moving with the derrick or spindle in the up position, a spotter must be at the rear of the rig.

Decontamination of Equipment

Because decontaminating subsurface exploration tooling involves high-pressure equipment, hot water, and heavy equipment, it can be **dangerous**. To keep yourself safe, remember to:

- Obtain the proper permits when required to use the steam cleaner. such as a "hot work" permit.
- Follow the decontamination requirements given in the Health and Safety Plan. When the Health and Safety Plan does not apply, follow company policies.
- Chock the wheels before you decontaminate the equipment.
- When decontaminating equipment, proper personal protective equipment should be worn to prevent possible contact with contaminants or debris.
- Inspect the steam cleaner before starting to decontaminate the equipment, looking for leaking hoses or other possible defects that may injure employees or bystanders.
- **Never** point the wand toward your body or another person when the steam cleaner is in use.
- In cold weather, use an antifreeze solution to keep the water from freezing on or inside the equipment.
- Maintain good housekeeping at all times while cleaning equipment.
- When dealing with heat and hot water from the steam cleaner, **be careful -- be cautious**.
- Other items of concern are slipping due to water on plastic, the hazards of lifting heavy equipment (**REMEMBER --** "*LIFT WITH YOUR LEGS AND NOT YOUR BACK*"), and sharp edges on augers and other boring equipment.

Well Construction

When you're constructing wells, you should always make sure that:

- Wastewater, drilling fluids and soil cuttings are properly contained and labeled if required. The site-specific health and safety plan specifications should be followed if applicable.

Safety and Housekeeping

- The subsurface exploration tools should be organized and secure before you move to the next location.
- Gasoline and other flammable materials should be stored in approved containers.
- Gas cylinders should be stored upright and securely. When cylinders are not in use, their protective caps should be in place.
- No horseplay will be tolerated on the job site.

Demobilization

The job is over, and it's time to go home. You and the rest of the crew are probably tired and in a hurry to go home. But don't let your haste get you into trouble! As you know, accidents are more likely to happen when you're tired and in a rush. That's why, when the job is done, you should:

- Allow plenty of time to demobilize.
- Review the day's activities and make sure your paperwork is in order and complete before you leave the job site.
- Secure and clean up the site before you leave.
- Follow Department of Transportation rules and regulations when traveling.

REMEMBER:

AT BOWSER-MORNER,

WE ARE COMMITTED TO SAFETY!

SUBSURFACE EXPLORATION EQUIPMENT CHECKLIST

RIG EQUIPMENT NUMBER_____

ITEM	CONDITION		REMARKS
	PASS	FAIL	
Backup Alarms			
Test Kill Switch			
Auger Racks			
Fire Extinguishers			
First Aid Kit			
Leveling Jacks			
Parking Brakes			
Brakes			
Horn			
Cable Safety			
Engine Gauges			
Guards			
Clutch			
Lights/Turn Signals			
Hydraulic Systems			
Muffler/Exhaust			
Ropes			
Mirrors			
Seat Belts			

SUBSURFACE EXPLORATION EQUIPMENT CHECKLIST

(CONTINUED)

RIG EQUIPMENT NUMBER_____

ITEM	CONDITION		REMARKS
	PASS	FAIL	
Tires and Tracks			
Fuel Fluid Systems			
Platform Stability			
Cable/Cable Clamps			
PPE			
Safety Harness			
Respirators			
Safety Hammer			

21.0 DECONTAMINATION

Decontamination procedures should be strictly adhered to prevent possible cross-contamination from affected areas on-site to other areas of the site, as well as from areas on-site to off-site areas. For the same reason, vehicles will be restricted from entering the Temporary Exclusion Zone unless authorized by the Site Engineer.

Any worker involved in decontamination procedures is to wear disposable suits, gloves, and boots as well as a respirator.

Equipment

Upon mobilization to the site, following boring, excavation, and backfilling activities at the site and before demobilization from the site, all equipment is to be decontaminated at the decontamination facility on the site. Continuous 10-mil polyethylene sheeting is to be secured over the decontamination facility to control dust and water particulates.

Equipment decontamination is to consist of degreasing (as required) followed by high-pressure, low-volume, hot water cleaning, or hand washing along with non-phosphate detergents (for example, Alconox) as appropriate. The steam-cleaning process should be capable of heating and maintaining wash waters to a minimum of 180 degrees Fahrenheit with a nozzle pressure of 150 pounds per square inch (psi).

Bore stem equipment used in the boring operations is to be decontaminated in wash tubs on the decontamination pad to collect wash water and sediment.

Using a sump pump, decontamination waters from the decontamination facility are to be transferred to specific drums. Soil sediments removed from equipment during decontamination are to be periodically collected and placed in specified drums. All drums are to be stored in locations on-site as approved by the site engineer. After equipment has been decontaminated in preparation to demobilize from the site, the site engineer must inspect and approve decontamination as being complete.

I have read the above and I understand all the items presented.

Date: _____ Signature _____

Mark Twain said it best: *"It's better to be careful a hundred times then to get killed once."*