HARZA-EBASCO
Susitna Joint Venture
Document Number

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VOLUME I

HARZA-EBASCO SUSITNA PROJECT

SAFETY PROGRAM

DCNO 903

VOLUME I

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SECTION I - SAFETY POLICY

Harza-Ebasco Joint Venture considers accident prevention an integral part of every job and is deeply concerned for the safety and health of the individual worker. But, aside from all humanitarian aspects, it also has been long recognized by Harza-Ebasco Joint Venture that unsafe performance is inefficient performance, and that injury and damage expenses and the hidden costs of accidents seriously affect the overall cost and satisfactory results of a job. Therefore, Harza-Ebasco Joint Venture strives to maintain the highest safety program integrated with construction activities, safety is also a major consideration in engineering and design.

At the beginning of each Harza-Ebasco Joint Venture construction job, the Construction Manager and the Safety Manager, map out a program of safety measures commensurate with the size of the project and with the conditions and hazards peculiar to it. A project safety committee comprised of job staff members (from the job staff) is established. Throughout the construction period, the Project Superintendent has overall responsibilities and maintains active direction of the accident prevention activities.

Harza-Ebasco's safety program also receives the active leadership and support of its management. The safety performance of each project is followed closely by the Vice President-Construction and by the Director of Industrial Relations-Construction. Harza-Ebasco's Safety Manager or his designee makes periodic visits to project sites to monitor its effectiveness. Harza-Ebasco's Safety Manager or his designee supplies accident prevention information and investigates serious accidents and fatalities.

Every Harza-Ebasco Joint Venture subcontractor is contractually required to have a safety program and comply with the Occupational Safety and Health Act and Regulations, and to be in accordance with other applicable Federal, State and local regulations. Harza-Ebasco's Project Superintendent and staff confer with each contractor's supervisory personnel before work is started in order to explain how the contractor's work will proceed in relation to the work of others, and their participation in the project safety program.

The Project Safety Program includes safety and health training for employees, an adequate medical and first-aid system, and efforts to arouse and maintain employee interest in the program.

A safe project requires the cooperation and sincere effort of everyone from the top supervisor to the newest employee on the project.

FUNCTIONS & RESPONSIBILITIES

1.1 Safety Department

The Joint Venture Safety Department is responsible for developing, implementing and administering all aspects of occupational safety and health and first aid policies.

The Joint Venture Safety Department is also responsible for monitoring the safety program performance at the construction sites. This includes the fire protection program, site safety regulations, and compliance with required Federal, State, Local & Client safety and fire regulations.

The Department reviews and interprets the Occupational Safety and Health Standards promulgated by the Labor Department under the Occupational Safety and Health Act of 1970. It provides technical assistance to the Design, Engineering, Procurement and Medical Departments. It assists the Legal Department in legal actions arising out of project site accidents, Occupational Safety and Health contest actions, and other legal matters involving Federal and State Safety Health agencies.

The Department works in consultation with client project personnel and client safety officers: to further the purposes of the related project safety programs to maintain liaison with the Federal and State OSHA officers in areas where there is construction activity to review reports and safety committee minutes originating from the construction projects to develop and implement job safety guide booklets and training materials for employees and supervisors. Safety Bulletins are issued periodically to the field organizations. The Safety Department is responsible for staffing each project site with qualified safety and first aid personnel. The site-assigned Safety Representatives provide staff service to the project supervisory personnel and submit daily reports on field safety which include deficiencies noted and corrective actions instituted.

The Department will also provide safety support for international projects, as requested; this includes providing qualified personnel, procedures and educational programs.

1.2 Construction Manager

Prior to the start of construction activities on a project, the Construction Manager in conjunction with the Safety Manager, shall establish a safety program to accommodate the specific project requirements. The program will conform to the Construction Department Safety Manual. The Construction Manager will monitor the performance of the project safety program, implementing corrective administrative measures, as needed, through the Project Superintendent.

1.3 Project Superintendent

The Project Superintendent is responsible for the site safety program. He will also be responsible for the construction activity compliance with the applicable Federal and State Occupational Safety and Health regulations as well as Harza-Ebasco Joint Venture and client safety regulations.

The supervisors reporting to the Project Superintendent shall be held accountable for the compliance with the safety and health program, including all OSHA regulations, in their respective areas of responsibility. Each of the supervisor's subordinates will be likewise responsible for his respective area of authority.

On management projects, the Project Superintendent will be responsible for the contractors' compliance with the applicable Harza-Ebasco project site safety program. It is especially important that each contractor be contractually obligated to comply with the safety program and be aware of the program requirements.

1.4 Project Safety & First Aid Responsibilities

1.4.1 Safety Supervisor

Reports To:

Project Superintendent
Safety Manager

Supervises:

Senior Safety Representatives
Safety Representatives
Fire Marshal
Nurses, Paramedics, EMT's.
First Aid Assistant

Primary Responsibilities:

1. Establishes and enforces on-site safety, fire safety and industrial hygiene programs adhering to Company policy established by the Safety Manager, federal and state regulations and various practices adhered to by the Construction crafts, as well as any other criteria to enforce the safety and health of all on-site personnel. Updates site procedures as needed.

2. Directs subordinates in the inspection of work areas and observes all aspects of the construction operation to ensure conformance to the established health, safety and fire program; compiles reports of all existing and potential safety hazards and reports same to the supervisor or responsible party. Reinspects to ensure corrective action is taken to rectify unsafe practices or safety hazards.

3. Ensures that all personnel are instructed in the safe operations of all heavy equipment and that required warnings are posted on or near heavy equipment. Ensures machinery safeguards are properly inspected and documented and are in proper functioning order.

4. Develop site safety orientation and continuing training programs to meet regulatory safety and health requirements and specific job needs. Supervise the implementation of the training programs.

5. Ensures that personal safety equipment such as hard hats, protective boots, safety glasses and toe guards are properly utilized and functional. Instructs site personnel in the proper use of safety equipment.

6. Directs the inspection of construction site and storage areas to determine whether fire hazards or potential fire hazards exist. Inspects fire extinguishers and fire protection equipment to ensure operability. Reports hazards and sees that inoperable equipment is repaired or replaced.

7. Establishes safety and health procedures for specific operations peculiar to the work site.

8. Responsible for the management of project safety, fire and first-aid personnel and for the first-aid facilities, emergency fire and accident equipment.

9. Investigates, determines causes, and reports all accidents and cases of industrial illness. Recommends appropriate corrective measures to eliminate possibility of recurrence. Supervises the preparation of all required safety oriented reports.

10. Represents Harza-Ebasco Joint Venture on site as liaison between regulatory agencies such as Occupational Safety and Health Agency regarding site inspection and accident investigations.

11. Develops and administers on site safety awards and safety incentive programs between contractors.

1.4.2 Senior Safety Representative

Reports To: Project Superintendent
Safety Manager

Supervises: Safety Representatives
Safety Inspectors
Project Nurses, Paramedics, EMT's.

Primary Responsibilities:

1. Establishes and enforces on-site safety and industrial hygiene programs adhering to Harza-Ebasco's policy established by the Safety Manager, Federal and State regulations; enforces other required safety and health practices applicable to the construction crafts and any other criteria which he deems appropriate to promote the safety and health of all on-site personnel.

2. Inspects work areas and observes all aspects of the construction operation to ensure conformance to the established health and safety program; notes and reports to supervisor or other responsible party; all existing and

potential safety hazards; reinspects work areas periodically to ensure that corrective action is taken to rectify unsafe practices and eliminate safety hazards.

3. Ensures that all personnel are supplied with sufficient instructions for safe operation of all heavy equipment, and that required warnings are posted on or near heavy equipment; ensures that machinery safeguards and safety apparatus are in proper functioning order.

4. Ensures that personal safety equipment, such as hard hats, protective boots, safety glasses and arm guards, are properly utilized and functional; instructs site personnel in the proper use of safety equipment.

5. Inspects site and storage areas to determine whether fire hazards or potential fire hazards exist; inspects fire extinguishers and fire protection equipment to ensure operability; reports hazards and inoperable equipment to supervisor or responsible party and ensures that hazards are corrected and that inoperable equipment is repaired or replaced.

6. Takes charge of the implementation of appropriate procedures at the scene of an accident, provides immediate first aid as necessary, and ensures that proper and adequate medical treatment is provided in a manner which will not endanger the health and welfare of the accident victim.

7. Investigates, determines causes, and files necessary reports on all accidents and cases of industrial illnesses. Recommends appropriate corrective measures to eliminate possibility of recurrence.

8. Organizes safety education programs in order to make all personnel safety-conscious, conducts safety meetings, publishes and circulates minutes of safety meetings, issues safety bulletins, designs safety posters and organizes safety committees, etc..

9. Accompanies Federal and State inspectors during on-site safety inspections.

10. Prepares, as required, all safety-oriented reports.

1.4.3 Safety Representative

Reports To:

Project Superintendent
Safety Manager
Senior Safety Representative

Supervises:

Safety Inspectors
Project Nurses, Paramedics, EMT's.

Primary Responsibilities:

1. Establishes and enforces on-site safety and industrial hygiene programs which adhere to Harza-Ebasco Joint Venture policy established by the Safety Manager, Federal and State regulations, and assists the Senior Safety Representative in the enforcement of other required safety and health practices applicable to the construction crafts. Also utilizes any other criteria to promote the safety and health of all on-site personnel.

2. Inspects work areas and observes all aspects of the construction operation to ensure conformance to the established health and safety program; notes and reports to supervisor or other responsible party all existing and potential safety hazards. Reinspects work areas periodically to ensure that corrective action is taken to rectify unsafe practices and eliminate safety hazards.

3. Ensures that all personnel are supplied with sufficient instructions for safe operation of all heavy equipment and that required warnings are posted on or near heavy equipment. Ensures that machinery safeguards and safety apparatus are in proper functioning order.

4. Ensures that personnel safety equipment, such as hard hats, protective boots, safety glasses and arm guards are properly utilized and functional. Instructs site personnel in the proper use of safety equipment.

5. Inspects site and storage areas to determine whether fire hazards or potential fire hazards exist. Inspects fire extinguishers and fire protection equipment to ensure operability. Reports hazards and inoperable equipment to supervisor or responsible party. Ensures hazards are corrected and that inoperable equipment is repaired or replaced.

6. Takes charge of the implementation of appropriate procedures at the scene of an accident to provide immediate first aid as necessary and ensure that proper and adequate medical treatment is provided when needed in a manner which will not endanger the health and welfare of the accident victim.

7. Investigates, determines causes, and makes necessary reports on all accidents and cases of industrial illness. Recommends appropriate corrective measures to eliminate possibility of recurrence.

8. Initiates safety education programs to make all personnel safety conscious, conducts safety meetings, issues safety bulletins, designs safety posters, organizes safety committees, etc.

9. Accompanies Federal and State inspectors during on-site safety inspections.

10. Prepares, as required, all safety-oriented reports.

1.4.4 Safety Inspector

Reports To: Senior Safety Representative
Safety Representative

Primary Responsibilities:

1. Reviews safety policies and procedures; acquires and maintains familiarity with functions, responsibilities and inter-relationships of other divisions and departments.

2. Develops sound thorough technical knowledge of safety requirements; maintains current knowledge of all applicable State and other governmental safety and health standards and regulations.

3. Performs first aid duties when required.

4. Conducts daily inspections of Harza-Ebasco Joint Venture and contractors/ subcontractors operations to ensure compliance with OSHA and State safety standards and regulations. Identifies substandard safety conditions, initiates and supervises corrective action by responsible personnel.

5. Obtains interpretations of safety regulations and procedures from immediate supervisor.

6. Participates in accident investigations; prepares reports; maintains records as assigned.

7. Develops materials for safety meetings and toolbox meetings.

8. Conducts safety orientation of new hires.

1.4.5 Project Nurse, Paramedics, EMT's.

Reports To: Senior Representative on Project

Primary Responsibilities:

1. Provides prompt emergency treatment for serious injuries or illnesses until the employee can be placed under the care of a physician. Gives basic first aid treatment for non-serious injuries or illnesses, evaluates severity of injuries and illnesses and refers to the project physician those individuals whose injuries or illnesses require more extensive treatment.

2. Administers follow-up care for occupational injuries and illnesses as directed by a physician.

3. Refers non-occupational injuries and illnesses to the employee's own physician as the need is indicated.

4. Participates in the project safety program by maintaining current knowledge of existing and/or potential accident hazards, toxic hazards and occupational disease exposures, renders safety suggestions during employee visits to first aid station, advises management of pre-existing medical aspects of any employee injury or illness.

5. Assists in promotion and teaching of first aid courses for employees.

6. Maintains appropriately documented first aid records and individual employee medical records; prepares Harza-Ebasco and State injury reports; compiles with OSHA recordkeeping requirements.

7. Maintains a file of medical directives from the project physician for the treatment of occupational illness and injuries.

8. Attends and participates in meetings of the safety committee when required.

Safety Policy

Safety Department

1.5 Project Safety Program

1.5.1 Orientation of New Employees

When a new employee is signed up he shall be oriented in the general requirements for safety and first aid of the project.

Particular emphasis will be placed on:

1. The nature and scope of the project including the Harza-Ebasco Safe Practices Handbook shall be issued at this time.

2. Any hazards particular to the project and the phase of work then in progress.

3. The importance of wearing the proper work clothes and protective equipment when required.

4. The importance of a constant awareness of safety for his/herself and his/her fellow employees.

5. The fact that continual disregard of safety requirements will be considered grounds for termination of employment.

6. Information as to location of first aid facilities ambulance, fire equipment and necessity for reporting all accidents and injuries.

The equipment the employees will be required to use should be shown to them and they should be at hand to handle it.

Safety orientation of other contractor supervisors and employees should be conducted prior to entering the work area. The information given to them should include general project safety program rules which requires participation by everyone.

Specific instructions should be given regarding:

1. Hard hat requirements

2. The need for personal alertness at all times

3. Special hazards peculiar to the construction operations

4. Safety equipment requirements and location of site first aid and emergency facilities.

General visitors should not be permitted in work areas without benefit of escort by one of the Projects personnel.

No visitor should be allowed access to work areas prior to the Project Management's knowledge and authorization. Personal protective equipment shall be used by all persons to the extend normally required for the work conditions.

1.5.2 Safety Meetings

The following three types of meetings shall be held throughout the life of the project.

1. Tool-box Safety Meetings: Each foreman on the project will be required to conduct a tool-box safety meeting of approximately 15 minutes duration, with the employees, at least once a week, at their tool box or meeting place before starting work. All craftsmen shall be required to attend these meetings. All unsafe conditions or unsafe work practices noted on the project which may affect the workmen will be brought to their attention and the proposed method for eliminating any further occurrence of these practices or conditions will be discussed. The foreman shall also discuss work that will be taking place in the following week and bring to the workmen's attention any possible hazards pertaining to the type of work they will be performing at that time. Employees shall be encouraged to make safety suggestions at these meetings. If especially hazardous conditions are about to be encountered, or crews appear to be careless in regard to safety, special tool-box meetings will be required at more frequent intervals. Foremen shall submit a brief written summary of each tool-box meeting to the project superintendent.

The following tips will help to make the tool-box meeting effective:

1. Keep them short - not over fifteen minutes.

2. Limit the subject to not over two to three items pertaining to safety.

3. Plan the meeting so as to keep the Topics current and presented in an orderly manner.

4. Review the ongoing work and immediate future work and any recent injuries.

5. Keep the meetings objective. Avoid mentioning names in assigning blame at a tool-box meeting.

6. Don't overlook discussing near misses, a near miss Today can result in Tomorrow's fatal injury.

7. Have the employees participate, but control the topic discussed.

8. When the employees present suggestions, give a feedback at the next meeting.

Remember to give the foreman the Instructors Key.

A. Tell the crew what they are about to hear in the opening remarks.

B. Go into the Topic in a manner all will understand, and ask to make sure your point is getting home.

C. Review what has been gone over in a closing summary.

By applying this approach diligently, you have a much greater assurance that the tool-box meetings will be an effective tool in the Project Safety Program. The employees will understand and retain the message the foremen communicated.

2. Superintendent Weekly Safety Meeting: Each Project shall have a superindenent's weekly safety meeting with the discipline supervisors and craft general foreman in attendance. Safety consideration of planned work schedules and coordination to safety effect the work that shall be part of this meeting. Discussion shall also cover any recent accidents, unsafe conditions, and near miss incidents occurring on the project. The proceedings of the meetings shall be typed with distribution to all Supervisors, General Foreman and Foreman (see Exhibit 1 Sample Meeting Minutes).

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3. Subcontractor Weekly Safety Meeting: all subcontractors shall have a designated representative attend the weekly safety meeting. The meeting is held at the direction of the Project Superintendent and run by the Ebasco Project Safety Representation. The coordination of the safety aspects of the subcontractors activities shall be discussed. In addition, the injuries of any unsafe practices or act since the previous meeting shall be reviewed. Any other safety related matters in the work schedule for the next week shall also be reviewed.

1.5.3 Subcontractor Safety Program

Each subcontractor shall have a safety program delineating their responsibilities toward maintaining a safe and healthful workplace. Harza-Ebasco Joint Venture will meet with the subcontractors when they arrive on the project. The purpose of this will be to inform the subcontractor of his obligations with regard to the Project safety and health policies.

All subcontractor's superintendents or their designated representative shall be required to attend and participate in the Project Subcontractor Weekly Meeting directed by Harza-Ebasco.

The subcontractor shall make all reasonable efforts to correct unsafe conditions or acts. Satisfactory corrective action shall be taken within a specified time.

One or more of the following actions shall be taken if the unsafe condition is not halted, or if corrective action is not taken by the subcontractor.

1. Cease operation of the work or that portion thereof.

2. Correct the situation using Harza-Ebasco Joint Venture employees or another subcontractor and back charge the subcontractor for expenses incurred.

3. Stop payment for the work being performed.

As a minimum the subcontractor Safety program should include the following items:

1. Each subcontractor shall observe all applicable federal state and local regulations and standards, Harza-Ebasco and client regulations and programs pertaining to safety and health, fire protection, waste disposal and other safety related requirements.

2. OSHA mandatory Safety and Health Notice shall be posted in a conspicuous location along with emergency phone numbers.

3. A copy of all occupational injuries and illnesses shall be maintained along with supplement OSHA form 101 or the substitute workmens compensation report. These shall be made available to Ebasco.

4. All subcontractors shall coordinate their work activities with other subcontractors they interface with on the project.

5. Provision in the subcontractors safety program shall provide for good housekeeping. This shall include that daily waste, debris and garbage be removed in appropriate containers. All tools and equipment shall be stored in a safe and orderly fashion.

6. Provision for and enforcement of the use of hard hats, appropriate personal protective equipment and health relate protective equipment.

7. Provision for the safety orientation and continuing weekly tool-box safety meetings to cover safety and health standards requirements.

1.5.4 Safety Promotion

A safety sign shall be erected on the project in a conspicuous place to show the numbers of days worked without a lost accident. The sign shall be kept current on a daily basis by the project safety staff.

The project shall have bulletin boards where safety posters and other required safety information will be posted. Such posters and information shall be changed frequently. The bulletin boards shall be maintained in good repair and displayed where all the employees can read them.

1.5.5 Accident Investigations

Proper reporting and investigation of accidents are a necessary part of the Harza-Ebasco Joint Venture Safety Program.

Each accident is to be promptly investigated by the site safety staff. All circumstances involved in the incident should be studied and the corrective actions instituted. Recurrence of similiar accidents should be prevented.

The investigation should reveal what operations were being carried out at the time of the accident. Foreman's and witnesses' imput are important because they will be knowledgeable of the operations and have first hand knowledge. The investigator should determine:

1. The basic cause of the accident.

2. The steps which can be taken to prevent a recurrence of the same type of accident.

3. The preventive measures that have actually been put into effect.

Thoroughness in an investigation and attention to causes and details are all important. The tendancy to blame an accident on an employee's "carelessness" is to be avoided. The term is vague and hides problems which could be corrected if identified.

The accident investigation is not a fault-finding task but a fact-finding endeavor. An employee has been hurt and your mission is to prevent a recurrence.

1.5.6 Notification Procedure for Fatalities, Serious Accidents and Illnesses

Fairness and objectiveness must be prime considerations in practical search for the causes of the accident.

An accident has many causes but the investigator must determine the who, when, where, what, why and how of the incident for a complete report.

Death and multiple serious injuries or illnesses of Harza-Ebasco Joint Venture or contractor employees shall be reported to the home office Safety Manager's office immediately.

Additional notification of death and multiple serious injuries and illnesses must go to:

Construction Manager
Client's Representative
Insurance Carrier Claims Adjuster Representative
Appropriate law enforcement agency

State or Federal OSHA Area Office

Notification of the next of kin in the case of a fatality, serious injury or illness is of primary importance and shall be handled in a tactful manner. Notification should be done in person whenever possible. If this is not possible, then through the aid of friends, local church or the police.

In all cases involving a fatality or serious injury and illness the Safety Manager will conduct an investigation.

Harza-Ebasco Joint venture must notify the OSHA area office within 48 hours of an accident involving an occupational fatality or in the hospitalization of five or more employees. The OSHA agency should be notified only of the fact that a fatality or multiple hospitalization event occurred. No other information should be supplied at this time as to the details of what occurred or probable causes.

1.5.7 Project Inspection

Safety Inspections are one of the principal means of locating accident causes. They assist in determining what safeguard is necessary to protect against hazards before accidents and injuries occur. Finding unsafe conditions by means of inspection and promptly correcting them is one of the best methods for Harza-Ebasco Joint Venture to demonstrate to our employees its interest and sincerity in accident prevention. Safety inspections should not be conducted primarily to find how many things are wrong, but rather to determine if everything is satisfactory. The whole purpose is to conserve the projects resources in a helpful manner by discovering conditions that lead to accidents and injuries that when corrected bring the project up to an accepted and approved standard. (see Exhibit 2)

The manner in which inspections are conducted is important to the success of the overall safety and health program. The inspector should be conscientious, familiar with the standards, and diplomatic in handling situations and personnel.

1.5.8 Construction Safety Standards Guides

The following checklist issued by the Department of Labor covers approximately 90 percent of OSHA's construction standards but should not be regarded as a substitute for the Federal Register.

1. Abrasive Grinding

   a. All abrasive wheel bench and stand grinders shall be provided with safety guards which cover the spindle ends, nut, and flange, and should be strong enough to withstand the effects of a bursting wheel.

   b. Floor and bench-mounting grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept at a distance not to exceed one-eight inch from the surface of the wheel.

   c. All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from defects.

2. Accident Recordkeeping Requirements

   a. Within 48 hours after its occurrence, an employment accident which is fatal to one or more employees or which results in the hospitalization of five or more employees shall be reported by the employee, either orally or in writing, to the nearest OSHA Area Director.

   b. Records as prescribed in the Recordkeeping Requirements booklet shall be kept for all accidents that result in a fatality, hospitalization, lost workdays, medical treatment, job transfer or termination, or loss of consciousness.

3. Air Tools

a. Pneumatic power tools shall be secured to the hose in a positive manner to prevent accidental disconnection.

b. Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent them from being accidentally expelled.

c. The manufacturer's safe operating pressure for all fittings shall not be exceeded.

4. Belt Sanding Machines (Woodworking Tables)

a. Belt sanding machines shall be provided with guards at each nip point where the standing belt runs onto a pulley.

The unused run of the sanding belt shall be guarded against accidental contact.

5. Boilers

Boilers provided by the employer shall be deemed to be in compliance with the requirements of this part when evidence of current and valid certification by an insurance company or regulatory authority attesting to the safe installation, inspection, and testing is presented.

6. Compressed Air, Use of:

a. Compressed air used for cleaning purposes shall not exceed 30 psi and shall be used with effective chip guarding and personal protective equipment.

b. This requirement does not apply to concrete form, mill scale, and similar cleaning operations.

7. Compressed Gas Cylinders

a. Valve protection caps shall be in place when compressed gas cylinders are transported, moved, or stored.

b. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved.

c. Compressed gas cylinders shall be secured in an upright position at all times, except when cylinders are actually being hoisted or carried.

d. Cylinders shall be kept at safe distance or shielded from welding or cutting operations. Cylinders shall not be placed where they can contact an electrical circuit.

e. Oxygen and fuel gas regulations shall be in proper working order while in use.

8. Concrete, Concrete Forms and Shoring

a. All equipment and materials used shall comply with ANSI A10.9-1970. "Safety Requirements for Concrete Construction and Masonry Work."

b. Employees shall not be permitted to work above vertically protruding reinforcing steel, unless it has been protected to eliminate the hazard of impalement.

c. Power and rotating-type concrete toweling machines that are manually guided shall be equipped with a deadman-type operating control.

d. Formwork and shoring shall safely support all loads imposed during concrete placement. Drawings or plans of formwork and shoring systems shall be available at the jobsite.

9. Conveyers

a. Conveyer systems shall be equipped with an audible warning signal which can be sounded immediately before starting up the conveyer.

b. Where conveyers pass over work areas or aisles, guards shall be provided to protect employees from falling materials.

c. Conveyers shall be in compliance with ANSI B20. 1-1976, "Safety Code of Conveyors, Cableways, and Related Equipment.

10. Cranes and Derricks

a. The employer shall comply with the manufacturer's specifications and limitations.

b. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted on all equipment and visible from the operator's station.

c. Equipment shall be inspected before each use and all deficiencies corrected before further use.

d. Accessible areas within the swing radius of the revolving superstructure shall be barricaded.

e. Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the equipment or machinery have been erected to prevent physical contact with the lines, no part of a crane or its load shall be operated within 10 feet of a line rated 50 kV or below. For lines rated over 50 kV or below. For lines rated over 50 kV, the minimum clearance is 10 feet + 0.4 inches for each kV over 50, or twice the length of the line insulator, but never less than 10 feet.

11. Disposal Chutes

a. Whenever materials are dropped more than 20 feet to any exterior point, an enclosed chute shall be used.

b. When debris is dropped through holes in the floor without the use of chutes, the area where the material is dropped shall be enclosed with barricades not less than 42 inches high and not less than six feet back from the projected opening.

12. Drinking Water

a. An adequate supply of potable water shall be provided in all places of employment.

b. Potable drinking water containers shall be capable of being tightly closed and be equipped with a tap.

c. The common drinking cup is prohibited.

d. Unused disposable cups shall be kept in sanitary container, and a receptable shall be provided for the used cups.

13. Electrical

a. All electrical work shall be in compliance with the 1971 National Electrical Code unless otherwise provided by OSHA regulations.

b. The noncurrent-carrying metal parts of fixed, portable and plug-connected equipment shall be grounded. Portable tools and appliances protected by an approved system of double insulation need not be grounded.

c. Extention cords used with portable electric tools and appliances shall be the 3-wire type. Flexible cords shall be used only in continuous lengths without splices, except that suitable molded or vulcanized splices may be used where properly made, and the wire connections soldered. Worn or frayed cords shall not be used.

d. Exposed bulbs on temporary lights shall be guarded to prevent accidental contact except where bulbs are deeply recessed in the reflector. Temporary lights shall not be suspended by their electric cords unless designed for this use.

e. Receptacles for attachment plugs shall be of approved, concealed contact type with a contact for extending ground continuity and shall be so designed and constructed that the plug may be pulled out without leaving any live parts exposed to accidental contact. Where different voltages, frequencies, or types of current (a.c. or d.c.) are to be supplied by portable cords, the receptacles shall be designed so that attachment plugs are not interchangable.

f. Each disconnecting means for motors and appliances and each service feeder or branch circuit at the point where it originates shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

g. If GFCI's are not used for temporary wiring then an assured grounding program must be established.

14. Excavating and Trenching

a. Before opening any excavation, efforts shall be made to determine if there are underground utilities in the area, and they shall be located and protected during the excavation operations.

b. The walls and faces of all excavations and trenches in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or some other equivalent means.

c. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least two feet or more from the edge of the excavation.

d. Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard the employees.

e. Trenches more than four feet deep shall have ladders or steps located so as to require no more than 25 feet (750 cm) of lateral travel.

15. Explosives and Blasting

a. Only authorized and qualified persons shall be permitted to handle and use explosives.

b. Explosive material shall be stored in approved facilities as required by provisions of the Internal Revenue Service regulations published in 26 CFR 181, "Commerce in Explosives."

c. Smoking and open flames shall not be permitted within 50 feet (1500 cm) of explosives storage magazines.

d. Procedures that permit safe efficient loading shall be established before loading is started.

16. Eye and Face Protection

a. Eye and face protection shall be provided when machines or operations present potential eye or face injury.

b. Eye and face protective equipment shall meet the requirements of ANSI Z87.1-1979, "Practice for Occupational and Educational Eye and Face Protection."

c. Employees involved in welding operations shall be furnished with filter lenses of the proper shade number.

d. Employees exposed to laser beams shall be furnished suitable laser safety goggles which will protect for the specific wave length of the laser and be of the optical density (O.D.) adequate for the energy involved.

17. Fire Protection

a. A fire fighting program is to be followed throughout all phases of the construction and demolition work involved. It shall provide for effective fire fighting equipment to be available without delay and designed to effectively meet all fire hazards as they occur.

b. Fire fighting equipment shall be conspicuously located and readily accessible at all times and be maintained in operating condition.

c. Carbon tetrachloride and other toxic vaporizing liquid fire extinguishers are prohibited.

d. If the building includes the installation of automatic sprinkler protection, the installation shall closely follow the construction and be placed in service as soon as applicable laws permit, following completion of each story.

18. Flagmen

a. When signs, signals, and barricades do not provide necessary protection on or adjacent to a highway or street, flagmen or other appropriate traffic controls shall be provided.

b. Flagmen shall be provided with and shall wear a red or orange warning garment while flagging. Warning garments worn at night shall be reflectorized material.

19. Flammable and Combustible Liquids

a. Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.

b. No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside an approved storage cabinet. No more than 60 gallons of flammable or 120 gallons of combustible liquids shall be stored in any one storage cabinet. No more than three storage cabinets may be located in a single storage area.

c. Inside storage rooms shall be constructed to meet the required fire-resistive rating for their use. Where an automatic extinguishing system is provided, the system shall be designed and installed in an approved manner. Materials which react with water and create a fire hazard shall not be stored in the same room with flammable or combustible liquids. Electrical wiring and equipment located in inside storage room shall be provided with either a gravity or mechanical exhausting system. In every inside room, one clear aisle, at least three feet wide, shall be maintained.

d. Storage of containers (not more than 60 gallons each) shall not exceed 1,100 gallons in any one pile or area. The storage area shall be graded to divert possible spills away from buildings or other explosives, or shall be surrounded by a curb or earth dike. Storage areas shall be free of weeds, debris, and other combustible material not necessary to the storage.

e. Flammable liquids shall be kept in closed containers when not actually in use.

f. Conspicuous and legible signs prohibiting smoking shall be posted in service and refueling areas.

20. Floor Openings, Open Sides, Hatchways, Etc.

a. Floor openings shall be guarded by a standard railing and toeboards or cover. In general, the railing shall be provided on all exposed sides, except at entrances to stairways. Temporary floor openings shall have standard railings.

b. Every open-sided floor or platform six feet or more above adjacent floor or ground level shall be guarded by a standard railing, or the equivalent, on all open sides except where there is entrance to a ramp, stairway, or fixed ladder.

c. Runways four feet or higher shall have standard railings on all open sides, except runways more than 18 inches wide used exclusively for special purposes, which may have the railing on one side omitted where operating conditions necessitate.

21. Gases, Vapors, Fumes and Mists

a. Exposure to toxic gases, vapors, fumes, dusts and mists at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants of 1970" of the American Conference of Governmental Industrial Hygenists shall be avoided.

b. Administrative or engineering controls must be implemented whenever feasible to comply with threshold limit values (TLV's).

c. When engineering and administrative controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep exposure of employees to air contaminants within the limits prescribed. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person.

22. General Duty Clause

Hazardous conditions or practices not covered in an OSHA standard may be covered under Section 5(a)(1) of the Occupational Safety and Health Act of 1970, which states: "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees".

23. General Requirements

a. The employer shall initiate and maintain such safety programs as may be necessary to provide for frequent and regular inspections of the jobsite, materials, and equipment.

b. The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and in the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.

24. Hand Tools

a. Employers shall not issue or permit the use of unsafe hand tools.

b. Wrenches shall not be used when jaws are sprung to the point that slippage occurs. Impact tools shall be kept free of mushroomed heads. The wood handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

c. Electrical power-operated tools shall be either approved double-insulated or properly grounded.

25. Head Protection

a. Head protective equipment (helmets) shall be worn in areas where there is a possible danger of head injuries from impact, flying or falling objects, or electrical shock and burns.

b. Helmets for protection against impact and penetration of falling and flying objects shall meet the requirements of ANSI Z89.1-1969.

c. Helmets for protection against electrical shock and burns shall meet the requirements of ANSI Z89.2-1971.

26. Hearing Protection

a. Protection against the effects of occupational noise exposure shall be provided when the sound levels exceed those shown in Table D-2 of the Safety and Health Standards when measured on the A scale of a standard sound level meter.

b. If engineering or administrative controls fail to reduce the noise level to within the levels of Table D-2 of the Safety and Health Standards, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

c. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

d. In all cases, where the sound levels exceed the values shown in Table D-2 of the Safety and Health Standards, a continuing, effective hearing conservation program shall be administered.

e. Table D-2 - Permissible Noise Exposures

Duration per day, hours:	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1-1/2	110
1/4 or less	115

f. Plain cotton is not an acceptable protective device.

27. Heating Devices, Temporary

a. Fresh air shall be supplied in sufficient quantities to maintain the health and safety of workers.

b. Solid fuel salamanders are prohibited in buildings and on scaffolds.

28. Hoists, Materials and Personal

a. The employer shall comply with the manufacturer's specifications and limitations.

b. Rated load capacities, recommended operating speeds, and special hazards warnings or instructions shall be posted on cars and platforms.

c. Hoistway entrances shall be protected by substantial gates or bars.

d. Hoistway doors or gates shall be not less than six feet six inches high and shall be provided with mechanical locks which cannot be operated from the landing side, and shall be accessible only to persons on the car.

e. Overhead protective coverings shall be provided on the top of the hoist cage or platform.

29. Housekeeping

a. During the course of construction, alteration, or repairs, form and scrap lumber with protruding nails and all other debris shall be kept cleared from work areas, passageways, and stairs, in and around buildings or other structures.

b. Combustible scrap and debris shall be removed at regular intervals.

c. Containers shall be provided for collection and separation of all refuse. Covers shall be provided for containers used for flammable or harmful substance.

d. Wastes shall be disposed of at frequent intervals.

30. Illumination

Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lighted to not less than the minimum illumination intensities listed in Table D-3 while any work is in progress.

Table D-3 - Minimum Illumination Intensities in Foot Candles

Foot Candles:	Area of Operation
5	General construction area lighting
3	General construction areas, concrete placement, excavation and waste areas, access-ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoor: warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas. (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.)
10	General construction plant and shops (ie, batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active storerooms, mess halls, indoor toilets, and workrooms).
30	First aid stations, infirmaries, and offices.

31. Jointers (Woodworking)

a. Each hand-fed planner and jointer with a horizontal head shall be equipped with a cylindrical cutting head. The opening in the table shall be kept as small as possible.

b. Each hand-fed jointer with a horizontal cutting head shall have an automatic guard which will cover the section of the head on the working side of the fence or gauge.

c. A jointer guard shall automatically adjust itself to cover the unused portion of the head and shall remain in contact with the material at all times.

d. Each hand-fed jointer with horizontal cutting head shall have a guard which will cover the section of the head back of the gauge or fence.

32. Ladders

a. The use of ladders with broken or missing rungs or steps, broken or split rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered they shall immediately be withdrawn from service.

b. Portable ladders shall be placed on a substantial base of a 4-1 pitch (toes touching at base of ladder with arms fully extended to side rails), have clear access at top and bottom, extend a minimum of 36 inches above the landing, and be secured against movement while in use.

c. Portable metal ladders shall not be used for electrical work or where they may contact electrical conductors.

d. Job-made ladders shall be constructed for intended use. If a ladder is to provide the only means of access or exit from a working area for 25 or more employees, or simultaneous two-way traffic is expected, a double-cleat ladder shall be installed. Cleats shall be inset into the edges of the side rails 1/2-inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or other fasteners or equivalent strength. Cleats shall be uniformally spaced, 12 inches top-to-top.

33. Lasers

a. Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.

b. Employees shall wear proper eye protection where there is a potential exposure to laser light greater than 0.005 watts (5 milliwatts).

c. Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser shall be turned off.

d. Employees shall not be exposed to light intensities above: direct staring - 1 micro-watt per square centimeter; incidental observing - 1 milliwatt per square centimeter; diffused reflected light - 2-1/2 watts per square centimeter. Employees shall not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter.

34. Liquefied Petroleum Gas

a. Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type.

b. All cylinders shall meet Department of Transportation specifications.

c. Every container and vaporizer shall be provided with one or more approved safety relief valves or devices.

d. Containers shall be placed on firm foundations and secured in an upright position.

e. Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas in the event of flame failure.

f. Storage locations shall have a least one 20-B:C rated fire extinguisher.

35. Medical Services and First Aid

a. The employer shall ensure the availability of medical personnel for advice and consultation on matters of occupational health.

b. Provisions shall be made prior to commencement of the project for prompt medical attention in case of serious injury. In the absence of reasonably accessible medical facilities, which are available for the treatment of injured employees, a person who has a valid certificate in first aid training from the American Red Cross, the US Bureau of Mines, or equivalent training that can be verified by documentary evidence shall be available at the worksite to render first aid.

c. First aid supplies approved by the consulting physician shall be readily available.

36. Motor Vehicles and Mechanized Equipment

a. Motor vehicles covered are those vehicles that operate within an off-highway jobsite, not open to public traffic. All vehicles shall have a service brake system, an emergency brake system, and a parking brake system. All vehicles in use shall be checked at the beginning of each shift to assure that all parts, equipment, and accessories affecting safe operation are free from defects and in safe operating condition.

b. No employer shall use any motor vehicle equipment having an obstructed view of the rear unless: a, the vehicle has a reverse signal alarm audible above the surrounding noise level or b, the vehicle is backed up only when an observer signals that it is safe to do so.

c. Bulldozer and scraper blades, endloader buckets, dump bodies, and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in neutral position with the motors stopped and brakes set, unless work being done requires otherwise. Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.

37. Noise (see Hearing Protection, No. 26)

38. Personal Protective Equipment

a. The employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where the need is indicated for using such equipment to reduce the hazard to the employees.

b. Lifelines, safety belts, and lanyards shall be used only for employee safeguarding.

c. Employees working over or near water, where danger of drowning exists, shall be provided with US Coast Guard approved life jackets or buoyant work vest.

39. Powder-Actuated Tools

a. Only trained employees shall be allowed to operate powder-actuated tools.

b. All powder-actuated tools shall be tested daily and all defects corrected before use.

c. Tools shall not be loaded until immediately before use. Loaded tools shall not be left unattended.

40. Power Transmission Mechanical Apparatus

a. All hand and power tools and similar equipment shall be maintained in a safe condition. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard.

b. Guarding shall meet the requirements of ANSI B15.1-1972 (4 1958), "Safety Code for Mechanical Power Transmission Apparatus".

41. Radiation, Ionizing

a. In construction and related activities involving the use of sources of ionizing radiation, the pertinent provisions of the Atomic Energy Commission's Standards for Protection Against Radiation (10 CFR Part 20) relating to protection against occupational radiation exposure shall apply.

b. Any activity which involves the use of radioactive materials or X-rays, whether or not under license from the Atomic Energy Commission, shall be performed by competent persons specifically trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee shall perform such work.

42. Railings

a. A standard railing shall consist of top rail, intermediate rail, and posts and have a vertical height of approximately 42 inches from upper surfaces of top rail to the floor, platform, etc.

b. The top rail of a railing shall be smooth-surfaced with a strength to withstand at least 200 pounds. The intermediate rail shall be approximately halfway between the top rail and floor.

c. A stair railing shall be of construction similar to a standard railing, but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of trend in line with face of riser at forward edge of trend.

43. Respiratory Protection

a. In emergencies, or when feasible engineering or administrative controls are not effective in controlling toxic substances, appropriate respiratory protective equipment shall be provided by the employer and shall be used.

b. Respiratory protective devices shall be approved by the US Bureau of Mines or accepted by the US Department of Labor for the specific contaminant to which the employee is exposed.

c. In selecting the proper respirators, the chemical and physical properties of the contaminant, as well as the toxicity and concentration of the hazardous material shall be considered. The nature and extent of the hazard, work requirements, and conditions, as well as the limitations and characteristics of the available respirators, shall also be factors considered in making the proper selection.

d. Employees required to use respiratory protective devices shall be instructed in their use.

e. Respiratory protective equipment shall be inspected regularly and maintained in good condition.

44. Rollover Protective Structures (ROPS)

a. Rollover protective structures (ROPS) apply to the following types of materials handling equipment: all rubber-tired, self propelled scrapers; rubber-tired front-end loaders; rubber-tired dozers; wheel-type agricultural and industrial tractors; crawler-type loaders; and motor graders, with or without attachments that are used in construction work. This requirement does not apply to sideboom pipelaying tractors.

b. Above equipment manufactured before 7-1-69 is not required to have ROPS as of this printing, except for site clearing which requires all equipment to have ROPS. 1926.604(a)(2).

45. Safety Nets

a. Safety nets shall be provided when workplaces are more than 25 feet above the surface where the use of ladders, scaffolds, catch platforms, temporary floor, safety lines, or safety belts is impractical.

b. Where nets are required, operations shall not be undertaken until the net is in place and has been tested.

46. Saws, Band (Woodworking)

a. All portions of bandsaw blades shall be enclosed or guarded except for the minimum arc required to allow proper retraction and contact with the work.

b. Bandsaw wheels shall be fully encased.

47. Saws, Portable Circular (Woodworking)

All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

48. Saws, Radial (Woodworking)

a. Radial saws shall have an upper guard which completely encloses the upper half of the saw blade. The side of the lower portion of the blade shall be guarded by a device that will automatically adjust to the thickness of and remain in contact with the material being cut.

b. Radial saws used for ripping shall have nonkickback finger or dogs.

c. Radial saws shall be installed so that the cutting head will return to the starting position when released by the operator.

49. Saws, Swing or Sliding Cut-off (Woodworking)

a. All swing or sliding cut-off saws shall be provided with a hood that will completely enclose the upper half of the saw.

b. Limit stops shall be provided to prevent swing or sliding type cut-off saws from extending beyond the front or back edges of the table.

c. Each swing or sliding cut-off saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel.

d. Inverted sawing or sliding cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or material being cut.

50. Saws, Table (Woodworking)

a. Circular table saws shall have a hood over the portion of the saw above the table, so mounted that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

b. Feed rolls and blades of self-feed circular saws shall be protected by a hood or guard to prevent the hands of the operator from coming in contact with the inrunning rolls at any time.

c. Circular table saws shall have a spreader aligned with the blade and placed so that there is nor more than 1/2 inch (1.25 cm) space between the spreader and the back of the saw when the largest saw is mounted in machine.

d. All woodworking tools and machinery shall meet other applicable requirements of American National Standards Institute, 01.1-1975, "Safety Code for Woodworking Machinery".

51. Scaffolds

a. Scaffolds shall be erected on sound, rigid footing capable of carrying the maximum intended load.

b. Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.

c. Guardrials and toeguards shall be installed on all open sides and ends of platforms more than 10 feet (300 cm) above the ground or floor, except needle beam scaffolds and floats. Scaffolds four feet to 10 feet (300 cm) in height, having a minimum dimension in either direction of less than 45 inches (1125 cm), shall have standard guardrails installed on all open sides and ends of the platform.

d. There shall be a screen with maximum 1/2 inch (1.25 cm) openings between the toeboard and the top rail where persons are required to pass or work under the scaffold.

e. All planking shall be scaffold grade as recognized by guarding rules for the species of wood used. The maximum permissible spans for 2 x 9 inch or wider planks are shown in the following table:

	MATERIAL				
	Full thickness undressed lumber			Nominal thickness lumber	
Working load (p.s.f.)-	25	50	75	25	50
Permissible span (ft.)-	10	8	6	8	6
(cm)-	300	240	180	240	180

The maximum permissible span for 1 1/4 x 9 inch (240x22.5 cm) or wider plank of full thickness is four feet with medium loading of 50 P.S.F.

f. Scaffold planking shall be overlapped a minimum of 12 inches (300 cm) or secured from movement.

g. Scaffold planks shall extend over their end supports not less than six inches (150 cm) nor more than 12 inches (300 cm).

h. All scaffolding and accessories shall have any defective parts immediately replaced or repaired.

52. Stairs

a. Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails.

b. On all structures 20 feet (600 cm) or over in height, stairways, ladders, or ramps shall be provided.

c. Rise height and tread width shall be uniform throughout any flight of stairs, including any foundation structure used as one or more treads of the stairs.

d. Stairs of hollow pan-type treads shall be filled to the level of the nosing with solid material. The requiremerts shall not apply during the period of actual construction of the stairways themselves.

53. Steel Erection

a. Permanent floors shall be installed so there is not more than eight stories between the erection floor and the uppermost permanent floor, except when structural integrity is maintained by the design.

b. During skeleton steel erection, a tightly planked temporary floor shall be maintained within two stories or 30 feet (900 cm), whichever is less-that portion of each tier of beams on which any work is being performed.

c. During skeleton erection, where the requirements of the proceeding paragraph cannot be met, and where scaffolds are not used, safety nets shall be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet.

d. When placing structural members, the load line shall not released until the member is secured by at least two bolts, or the equivalent, at each connection, drawn up wrench tight.

54. Storage

a. All materials stored in tiers shall be secured to prevent sliding, falling, or collapsing.

b. Aisles and passageways shall be kept clear and in good repair.

c. Storage of materials shall not obstruct exits.

d. Materials shall be stored with due regard to their fire characteristics.

e. Weeds and grass in outside storage areas shall be kept under control.

55. Tire Cages

A safety tire rack, cage, or equivalent protective shall be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

56. Toeboards (Floor and Wall Openings and Stairways)

a. Railings protecting floor openings, platforms, scaffolds, etc., shall be equipped with toeboards wherever there is an open side, beneath which persons can pass, there is moving machinery, or there is equipment with which falling material could cause a hazard.

b. A standard toeboard shall be at least four inches in height and may be of any substantial material, either solid or open, with openings not to exceed one inch in greatest dimension.

57. Toilets

a. Toilets shall be provided according to the following: 20 or fewer persons - one facility; 20 or more persons - one toilet seat and one urinal per 40 persons; 200 or more persons - one toilet seat and one urinal per 50 workers.

b. This requirement does not apply to mobile crews having transportation readily available to nearby toilet facilities.

58. Washing Facilities

a. The employer shall provide adequate washing facilities for employees engaged in the application of paints, coating, herbicides, or insecticides, or in other operations where contaminants may be harmful to employees. Such facilities shall be in near proximity to the worksite and shall be so equipped as to enable employees to remove such substances.

b. Washing facilities shall be in close proximity to the worksite and shall be equipped to remove all harmful substances.

59. Welding, Cutting and Heating

a. The employer shall thoroughly instruct employees in the safe use of fuel gas in gas welding and cutting operations.

b. Employers shall instruct employees in the safe means of arc welding and cutting operations.

c. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding or other "hot work" is being done. No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds, or heavy dust concentration creates a fire hazard.

d. Arc welding and cutting operations shall be shielded by noncombustible or flameproof shields to protect employees from direct arc rays.

0 0 0 9 0 3

e. When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

f. All arc welding and cutting cables shall be completely insulated and free from repair or splices within 10 feet from the electrode holder. Defective cables shall be repaired or replaced.

g. Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage shall not be used.

h. General welding, cutting, and heating operations (not involving conditions and materials described in Safety and Health Standards) may normally be done without mechanical ventilaton or respiratory protective equipment. But where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

i. Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protection equipment in accordance with the requirements of the Safety and Health Standards.

j. General mechanical or local ventilation shall be provided whenever welding, cutting, or heating is performed in a confined space. When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air

line respirators, and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

k. See also Compressed Gas Cylinders, No. 7.

60. Wire Ropes, Chains, Ropes

a. Wire ropes, chains, ropes, and other rigging equipment shall be inspected prior to use and as necessary to assure their safety. Defective gear shall be removed from service.

b. Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall not be used.

c. When U-bolts are used for eye spices, the U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

d. When U-bolt wire rope clips are used to form eyes, the following table shall be used to determine the number and spacing of clips.

NUMBER, SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel rope diameter inches	Number of Clips: Drop forged	Number of Clips: Other material	Minimum spacing (inches)
1/2	3	4	3
5/8	3	4	3-3/4
3/4	4	5	4-1/2
7/8	4	5	5-1/4
1	5	6	6
1-1/8	6	6	6-3/4
1-1/4	6	7	7-1/2
1-3/8	7	7	8-1/4
1-1/2	7	8	9

61. Woodworking Machinery

a. All fixed power-driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off position. Operating speed shall be etched or other permanently marked on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute.

b. Automatic feeding devices shall be installed on woodworking machines whenever the nature of the work will permit.

c. All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe.

d. All personnel protective equipment provided for use shall conform to the Safety and Health Regulations.

EXHIBIT 1

HOLD-OVER ITEMS

1. (6) All orange extension cords observed in the future with Orange Ty-Raps will be disconnected and/or removed from the area.

CURRENT CONDITIONS AND DISCUSSIONS

1. Memo from Mr. B. J. Escue regarding Reporting of Safety Defects and Non-compliance was read and discussed. This memo will be incorporated in the Training program and posted on craft bulletin boards as requested.

2. Attached memo to all Supervisors/Craft Personnel was read and discussed by Jack Furniss and should be discussed at all craft tool box meetings.

3. Many cables have been placed in cable trays and manholes, some have been energized and all are subject to damage. This also applies to switch gear, which we observe quite frequently with material leaning against and/or blocked which prevents immediate access. Employees shall not walk on, burn or weld over or in any way contribute to the damage of these cables. Cable trays shall be covered prior to any work above them that may cause damage. Cables, extension cords or welding leads shall not be secured with tie wire or any material which may cause damage to the protective cover.

4. Paul Duffy, Security Supervisor expressed his appreciation for the cooperation received from all Supervisors and Craftsmen for the orderly manner in which they participated in the evacuation drill last week.

RMH/ls

Exhibit 1.1

RECEIVED
DEC 2 1980
Labor Relations Dept

MEMORANDUM

FM2-80-5384

TO: J. L. Pakenham

FROM: R. M. Hawks

DATE: November 21, 1980

cc: K. N. Flanagan
R. W. Zaist

SUBJECT: FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT - UNIT NO. 2

FIELD REPORT

Our Safety Committee Meeting began at 12:35 PM, November 19, 1980, under the direction of K. N. Flanagan, Project Superintendent, and conducted by R. M. Hawks, Senior Safety Representative of Ebasco Services, Inc.

The work force has accumulated 8 days without a lost time accident. Our highest record days was 210.

WEEKLY REPORT OF INJURIES	EBASCO	SUBCONTRACTORS	TOTAL
First Aid Cases	95	43	138
Doctor Cases	14	5	19
Lost Time Accidents	0	0	0

BREAKDOWN	EBASCO F.A.	D.C.	LTA
Boilermakers	5	0	0
Carpenters	24	3	0
Cement Finishers	0	0	0
Electricians	24	2	0
Ironworkers	8	2	0
Laborers	24	4	0
Millwrights	2	0	0
Operators/Teamsters	4	3	0
Painters	1	0	0
Pipefitters	35	2	0
Sheetmetal Workers	2	1	0
U.S. Testing	3	0	0
Non-Manual	6	2	0

The three (3) leading types of injuries were:

46 - Eye - Foreign Objects
30 - Abrasions/lacerations
21 - Bruises/crushes

With an average work force of 2652 working five (5) days, there are 5.2% First Aid Cases, 0.7% Doctor Cases, and 0.0% Lost Time Accidents for the week.

SECTION VII
SECTION VII
SECTION VII

Exhibit 1.2

5755/11-72

Harza-Ebasco Susitna Project

CONSTRUCTION SAFETY INSPECTION CHECK LIST

Client _____

Project Supt. _____

Person in Charge _____

Date _____ Time _____

Person(s) making inspection:

_____

_____

_____

	Column: A – Adequate at time of inspection; B – Inadequate - needs immediate attention		
	A	B	REMARKS
(1) PROGRAM ADMINISTRATION:			
(a) Posting OSHA and other jobsite warning posters.			
(b) Do you have safety meetings?			
(c) Do you have job safety training, including first-aid training?			
(d) Are there medical service and first-aid equipment, stretchers, and emergency vehicles available?			
(e) Are jobsite injury records being kept?			
(f) Are emergency telephone numbers, such as police department, fire department, doctor, hospital, ambulance, posted?			
(2) HOUSEKEEPING AND SANITATION:			
(a) General neatness of working areas.			
(b) Regular disposal of waste and trash.			
(c) Passageways and walkways clear?			
(d) Adequate lighting.			
(e) Projecting nails removed.			
(f) Oil and grease removed.			
(g) Waste containers provided and used.			
(h) Sanitary facilities adequate and clean.			
(i) Drinking water tested and approved.			
(j) Adequate supply of water.			
(k) Disposable drinking cups.			
(3) FIRE PREVENTION:			
(a) Fire instructions to personnel.			
(b) Fire extinguishers identified, checked, lighted.			
(c) Phone number of fire department posted.			
(d) Hydrants clear, access to public thoroughfare open.			
(e) Good housekeeping.			
(f) "No smoking" posted and enforced where needed.			
(g) Fire brigades.			
(4) ELECTRICAL INSTALLATIONS:			
(a) Adequate wiring, well insulated.			
(b) Fuses provided.			
(c) Fire hazards checked.			
(d) Electrical dangers posted.			
(e) Proper fire extinguishers provided.			
(f) Are terminal boxes equipped with required covers? Are covers used?			

	Column: A - Adequate; B - Inadequate		
	A	B	REMARKS
(5) HAND TOOLS:			
(a) Proper tool being used for each job.			
(b) Neat storage, safe carrying.			
(c) Inspection and maintenance.			
(d) Damaged tools repaired or replaced promptly. Are employees' tools inspected and repaired?			
(6) POWER TOOLS:			
(a) Good housekeeping where tools are used.			
(b) Tools and cords in good condition.			
(c) Proper grounding.			
(d) Proper instruction in use.			
(e) All mechanical safeguards in use.			
(f) Tools neatly stored when not in use.			
(g) Right tool being used for the job at hand.			
(h) Wiring properly installed.			
(7) POWDER-ACTUATED TOOLS:			
(a) Local laws and ordinances complied with.			
(b) All operators qualified.			
(c) Tools and charges protected from unauthorized use.			
(d) Competent instruction and supervision.			
(e) Tools checked and in good working order.			
(f) Tools not used on any but recommended materials.			
(g) Safety goggles or face shields.			
(h) Flying hazard checked by backing up, removal of personnel, or use of captive stud tool.			
(8) LADDERS:			
(a) Ladders inspected and in good condition?			
(b) Properly secured to prevent slipping, sliding, or falling?			
(c) Do siderails extend 36" above top of landing?			
(d) Rungs or cleats not over 12" on center.			
(e) Stepladders fully open when in use.			
(f) Metal ladders not used around electrical hazards.			
(g) Proper maintenance and storage.			
(h) Are ladders painted?			
(i) Are safety shoes in use?			
(9) SCAFFOLDING:			
(a) Is erection properly supervised?			
(b) Will all structural members meet the safety factor?			
(c) Are all connections secure?			
(d) Is scaffold tied into structure?			
(e) Are working areas free of debris, snow, ice, grease?			
(f) Are foot sills and mud sills provided?			
(g) Are workers protected from falling objects?			
(h) Is the scaffold plumb and square, with cross-bracing?			
(i) Are guard rails, intermediate rails, and toeboards in place?			
(j) Is scaffold equipment in good working order?			
(k) Are ropes and cables in good condition?			

	Column: A - Adequate: B - Inadequate		
	A	B	REMARKS
(10) HOISTS, CRANES, AND DERRICKS:			
(a) Inspect cables and sheaves.			
(b) Check slings and chains, hooks and eyes.			
(c) Equipment firmly supported.			
(d) Outriggers used if needed.			
(e) Power lines inactivated, removed, or at safe distance.			
(f) Proper loading for capacity at lifting radius.			
(g) All equipment properly lubricated and maintained.			
(h) Signalmen where needed.			
(i) Signals understood and observed.			
(j) Are inspection and maintenance logs maintained?			
(11) HEAVY EQUIPMENT:			
(a) Regular inspection and maintenance.			
(b) Lubrication and repair of moving parts.			
(c) Lights, brakes, warning signals operative.			
(d) Wheels chocked when necessary.			
(e) Haul roads well maintained and laid out properly.			
(f) Protection when equipment is not in use.			
(g) Are shut-off devices on hose lines in case of hose failure?			
(h) Are noise arresters in use?			
(12) MOTOR VEHICLES:			
(a) Regular inspection and maintenance.			
(b) Qualified operators.			
(c) Local and state vehicles laws and regulations observed.			
(d) Brakes, lights, warning devices operative.			
(e) Weight limits and load sizes controlled.			
(f) Personnel carried in a safe manner – seated.			
(g) Is all glass in good condition?			
(h) Are back-up signals provided?			
(i) Are fire extinguishers installed where required?			
(13) GARAGES AND REPAIR SHOPS:			
(a) Fire hazards.			
(b) Dispensing of fuels and lubricants.			
(c) Good housekeeping.			
(d) Lighting.			
(e) Carbon monoxide dangers.			
(f) Are all fuels and lubricants in proper containers?			
(g) Proper ventilation.			
(h) Proper grounding and bonding.			
(14) BARRICADES:			
(a) Floor openings planked over or barricaded.			
(b) Roadways and sidewalks effectively protected.			
(c) Adequate lighting provided.			
(d) Traffic controlled.			

Exhibit 1.2 (cont'd)

	Column: A - Adequate: B - Inadequate		
	A	B	REMARKS
(15) HANDLING AND STORAGE OF MATERIALS:			
(a) Are materials properly stored or stacked?			
(b) Are passagewavs clear?			
(c) Stacks on firm footings, not too high.			
(d) Proper number of men for each operation.			
(e) Are men lifting loads correctly?			
(f) Are materials protected from weather conditions?			
(g) Protection against falling into hoppers and bins.			
(h) Is dust protection observed?			
(i) Extinguishers and other fire protection.			
(j) Is traffic controlled in the storage area?			
(16) EXCAVATION AND SHORING:			
(a) Are adjacent structures properly shored?			
(b) Is shoring and sheathing used for soil and depth?			
(c) Are roads and sidewalks supported and protected?			
(d) Is material stored too close to excavations?			
(e) Is excavation barricaded and lighting provided?			
(f) Is equipment a safe distance from edge of excavation?			
(g) Are ladders provided where needed?			
(h) Are equipment ramps adequate?			
(i) Is job supervision adequate?			
(17) DEMOLITION:			
(a) Are operations planned ahead?			
(b) Is there shoring of adjacent structures?			
(c) Are material chutes used?			
(d) Is there sidewalk and other public protection?			
(e) Clear operating space for trucks and other vehicles.			
(f) Adequate access ladders or stairs.			
18) PILE DRIVING:			
(a) Are there proper storage procedures?			
(b) Is unloading only by properly instructed workmen?			
(c) Are steam lines, slings, etc., in operating condition?			
(d) Are piledriving rigs properly supported?			
(e) Are ladders on frames?			
(f) Are cofferdams maintained and inspected?			
(g) Is adequate pumping available?			
(h) Is man protection adequate?			

	Column: A - Adequate: B - Inadequate		
	A	B	REMARKS
(19) EXPLOSIVES:			
(a) Qualified operators and supervision.			
(b) Proper transport vehicles.			
(c) Local laws and regulations observed.			
(d) Storage magazines constructed per regulations or as recommended.			
(e) Experienced personnel handling explosives at all times.			
(f) Cases opened properly.			
(g) "No smoking" posted and observed where appropriate.			
(h) Detonators tested before each shot.			
(i) All personnel familiar with signals, and signals properly used at all times.			
(j) Inspection after each shot.			
(k) Proper protection and accounting for all explosives at all times.			
(l) Proper disposition of wrappings, waste, and scrap.			
(m) Advise residents nearby of blasting cap danger, and inspect potential damage points.			
(n) Check radio frequency hazards.			
(20) FLAMMABLE GASES AND LIQUIDS:			
(a) All containers clearly identified.			
(b) Proper storage practices observed.			
(c) Fire hazards checked.			
(d) Proper storage temperatures and protection.			
(e) Proper types and number of extinguishers nearby.			
(f) Carts for moving cylinders.			
(21) WELDING AND CUTTING:			
(a) Are operators qualified?			
(b) Screens and shields.			
(c) Goggles, gloves, clothing.			
(d) Equipment in operating condition.			
(e) Electrical equipment grounded.			
(f) Power cables protected and in good repair.			
(g) Fire extinguishers of proper type nearby.			
(h) Inspection for fire hazards.			
(i) Flammable materials protected.			
(j) Gas cylinders chained upright.			
(k) Gas lines protected and in good condition.			
(l) Are cylinder caps in use?			
(22) STEEL ERECTION:			
(a) Safety nets or planked floors.			
(b) Hard hats, safety shoes, gloves.			
(c) Taglines for tools.			
(d) Fire hazards at rivet forge and welding operations			
(e) Floor opening covered and barricaded.			
(f) Ladders, stairs, or other access provided.			
(g) Hoisting apparatus checked.			
(h) Safe man position.			

	Column: A - Adequate; B - Inadequate		
	A	B	REMARKS
(23) CONCRETE CONSTRUCTION:			
(a) Forms properly installed and braced.			
(b) Adequate shoring, plumbed, and crossbraced.			
(c) Shoring remains in place until strength is attained.			
(d) Proper curing period and procedures.			
(e) Check heating devices.			
(f) Mixing and transport equipment supported, and traffic planned and routed.			
(g) Adequate runways.			
(h) Protection from cement dust and concrete contact.			
(i) Hard hats, safety shoes, shirts covering skin.			
(j) Nails and stripped form material removed from area.			
(24) MASONRY:			
(a) Proper scaffolding.			
(b) Masonry saws properly equipped, dust protection provided.			
(c) Safe hoisting equipment.			
(25) HIGHWAY CONSTRUCTION:			
(a) Laws and ordinances observed.			
(b) Competent flagmen properly dressed, instructed, posted.			
(c) Adequate warning signs and markers.			
(d) Equipment not blocking right-of-way.			
(e) Traffic control through construction site.			
(f) Adequate marking and maintenance of detours.			
(g) Dust control.			
(h) Adequate lighting.			
(26) PERSONAL PROTECTIVE EQUIPMENT:			
(a) Eye protection.			
(b) Face shields.			
(c) Respirators and masks.			
(d) Helmets and hoods.			
(e) Head protection.			
(f) Gloves, aprons, and sleeves: rubber or plastic, designed to afford protection from alkalis and acids; electricians' rubber gloves with protectors.			
(g) Respirators for harmful dust, asbestos, sand blasting, welding (lead paint and galvanized zinc or cadmium). Adequate ventilation when painting or applying epoxy resins. All safe practices in spraying asbestos materials using vacuum to clean up. When there is a question about injurious exposure, notify superior immediately who in turn shall arrange for atmospheric samples to be taken.			

(27) UNSAFE ACTS AND/OR PRACTICES OBSERVED (LIST):

SECTION 2

RECORD KEEPING & REPORTING

Section 2

Record Keeping & Reporting

2.0 General

The records and reports presented are intended to familiarize those employees involved with the current Harza-Ebasco Joint Venture Regulatory requirements. This section provides a description of records and reports an explanation for their use. Documentation of the safety and health program is absolutely necessary.

The first aid records provide for an accurate rendering of the day to day operations and a summary of those efforts. These records cover our workmen compensation and OSHA requirements and provide backups for subsequent liability claims. They also identify types of injuries and their causes. This information can then be used to study, control, or eliminate specific safety and health hazards. It also gives project management the tools needed to educate effectively supervisors and craftsmen regarding current experience. It is the basis used for evaluating the overall performance of the project safety program and gives recognition for those outstanding performances.

Finally, these records provide material for safety research information used to develop safety and health standards within the Harza-Ebasco Joint Venture, and as our contribution to the national construction standards development.

Medical Records

First Aid Log (Exhibit 2.1)

This is a chronological listing of all visits to the first aid station. Every employee injury and illness, no matter how slight, must be recorded. This rule applies to all force account projects and construction management projects where Ebasco has a project first aid station.

Adequate maintenance and storage of this record is necessary for future verification of claims. Entries should reflect treatment beyond first aid care i.e. doctor's cases, and lost work day cases.

Upon completion of the project, the First Aid Log is to be sent to the Home Office Safety Department as part of the permanent record.

2.2 Employee's Accident Record (Exhibit 2.2)

A personal accident record history is to be kept on each employee who receives treatment in the first aid station. This provides a treatment record for each employee along with other pertinent medical information ie.. heart disease, diabetes or epilepsy. (This is a personal and confidential record).

On the individual record card, the injury, cause, and related treatment are described in detail. The Employee's Accident Record cards are to be kept in alphabetical order for Ebasco Employees; each contractor using our first aid station should be retained separately in alphabetical order. At the end of the project, the Employee's Accident Record is sent to the Home Office Safety Department.

2.3 Employer's Report of Injury (Exhibit 2.3)

Injuries requiring the attention of a physician shall be reported on an Employer's Report of Injury. This form will be furnished by the insurance claims office or by the State Worker's Compensation division in those states that are self insured (Nevada, North Dakota, Ohio, Washington, West Virginia and Wyoming).

Distribution will include one copy to the Home Office Safety Department

Care must be taken that complete detail and correct wording is used in filling out this form. Under nature of Injury or Occupational Disease, the statement must be qualified with the words - "The employee alleges" or "The employee states", followed by a description of the injury & incident.

The orginal copy shall remain on site in the project files. At the conclusion of the project, the reports will be forwarded to the Home Office Safety Depart- ment.

Many states impose penalties if the Employer's Report of Injury is not promptly mailed to the Workmen's Compensation Board.

2.4 Supplementary Record of Occupation Injuries And Illnesses
(Exhibit 2.4)

This is a record keeping requirement of the Occupational Safety and Health Act of 1970. All entries in the OSHA log and Summary of Occupational Injuries and illnesses requires a supplementary record. However the OSHA No. 101 form itself does not have to be used. Worker's compensation or insurance Employer's Report of Injury are acceptable substitutes.

Supplementary records must be completed and present on the project within six work days after the employer has been notified of an injury or illness.

2.5 Log And Summary of Occupational Injuries and Illnesses Form 200
(Exhibit 2.5)

This form is required by OSHA for all medical treatment cases.

Occupational injuries and illnesses must be recorded within 48 hours of receiving information that a recordable case has occurred.

Complete detailed information on the methods to be used in completing the log 200 can be found on the back of the form. Copies of the form can be obtained from the OSHA area office or from the Home Office Safety Department. The form is to be retained at the project site. When the project is completed, the log 200 records are to be sent to the Home Office Safety Department.

A copy of the total OSHA log experience must be posted annually at each project, in a location where all the employees can see it.

The summary is taken from the last page of the log posted for the employees and a copy is sent to the Home Office Safety Department.

This posting must occur no later than February 1st and remain in place until March 1.

2.5.1 Guideline for Determining Recordability

1. An injury or illness is considered work related if it occurs in the work environment (defined as any area on the employer's premises, e.g., worksite, company cafeteria, or company parking lot.) (See chart 1.) The work environment surrounds the worker wherever he or she goes--in official travel, in dispersed operations, or along regular routes (e.g., sales representative, pipeline worker, vending machine repairer, telephone line worker).

2. All work-related fatalities must be recorded.

3. All diagnosed work-related illnesses must be recorded.

4. All work-related injuries requiring medical treatment or involving loss of consciousness, restriction of work or motion, or transfer to another job must be recorded.

Recordable and nonrecordable injuries are distinguished by the treatment provided; i.e., if the injury required medical treatment, it is recordable; if only first aid was required, it is not recordable. However, medical treatment is only one of several criteria for determining recordability. Regardless of treatment, if the injury involved loss of consciousness, restriction of work or motion, transfer to another job, or termination of employment, the injury is recordable.

Medical treatment. The following are considered to involve medical treatment and must be recorded for a work related injury.

- Antiseptics applied on second or subsequent visit to a doctor or nurse.
- Burns of second or third degree.
- Butterfly sutures.
- Compresses, hot or cold, on second or subsequent visit to a doctor or nurse.
- Cutting away dead skin (surgical debridement).
- Diathermy treatment.
- Foreign bodies, removal if embedded in eye.
- Foreign bodies if removal from wound requires a physician because of depth of embedment, size or shape of object(s) or location of wound.
- Infection, treatment for.
- Prescription medications used.
- Soaking, hot or cold, on second or subsequent visit.
- Sutures (stitches).
- Whirlpool treatment.
- X-ray which is positive.

First-aid treatment. The following are considered to involve only first-aid treatment and need not be recorded if the work-related injury does not involve loss of consciousness, restriction of work or motion, or transfer to another job.

- Antiseptics, application of, on first visit to a doctor or nurse.
- Bandaging on any visit to a doctor or nurse.
- Burns of first degree.
- Compresses, hot or cold, on first visit to a doctor or nurse only.
- Elastic gandage, use of, on first visit to a doctor or nurse only.
- Foreign bodies, not embedded, irrigation of eye for removal.
- Foreign bodies, removal from wound by tweezers or other simple techniques.
- Nonprescription medications, use of.
- Observation of injury on second or subsequent visit.
- Ointments applied to abrasions to prevent drying or cracking.

Other procedures not considered medical treatment. The following are not considered medical treatment.

- Tetanus shots, initial or boosters alone.
- Hospitalization for observation (no treatment other than first aid).
- X-ray which is negative.

Medical Case Disposition (Exhibit 2.6)

Employees sent to a physician by the first aid attendant are to be given a medical case disposition form to be completed and returned to the first aid attendant. The top of the form is to be completed by the first aid attendant with the physician completing the bottom portion of the form. The form is provided in triplicate one copy for the first aid station records second copy for the employees supervisor and third copy for the doctors records.

At the termination of the project the Medical Case Disposition forms can be destroyed.

Accident Summary (Exhibit 2.7)

Classification of the project injuries is by type of accident and part of the body affected by the injury. The employees craft is included in the break down within the accident summary.

If it is a construction management project contractor names can be substituted for the craft designations.

The report is to be completed weekly and forwarded to the Home Office Safety Department. Inserted on the first line is the estimated average number of employees on the project for that week. An explaination of the details for completing the form is part of the Exhibit 2.7.

Monthly Summary of Injuries & Illnesses (Exhibit 2.8)

Project injury and illness incident rates are computed and entered onto this from the completed form and will be sent monthly to the Home Office Safety Department. It is used to compare the Harza-Ebasco Joint Venture construction safety results for each project. The bases for comparison is the US Department of labor statistics for the heavy construction industry.

The monthly summary reports are to be submitted for Harza-Ebasco Joint Venture and Contractors.

Each month the total manhours worked will be used to determine the injury and illness incident rates. Each month there will be two entries. One is that months injury and illness experience, the second is the projects cumulative experience for the current award year. Only Harza-Ebasco Joint Venture employee manhours are included on this summary.

2.6 Monthly Summary

Every month the total project safety results will be reported on the summary with the heading "Harza-Ebasco Joint Venture and Contractors". If the project does not include contractor manhours only the Harza Ebasco Joint Venture Monthly Summary is required.

As in the Harza-Ebasco Joint Venture Monthly Summary there are to be two separate entries: a monthly summary and a cumulative summary.

The monthly summary reports are to be sent to the Home Office Safety Department at the conclusion of the project construction activities.

2.6.1 Calculation of the Incident Rate

The rate is calculated as:

$$\frac{N}{EH} \times 200{,}000 \text{ - where}$$

N = Number of occupational injuries and illnesses or lost workdays.

EH = Total hours worked by all project employees during the month or the calender year for the cumulative result.

200,000 = base for 100 full-time equivalent workers (40 hours week, 50 week per year)

Loss workday cases are cases which involve days away from work.

Lost workdays are the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury and illness.

Supervisor Accident Report (Exhibit 2.9)

The form provides documentaton of recognized safety hazards on the project. The form is done in quadruplicate to allow written notice to be given to the responsible contractor, the contract supervisor and the safety department. An agreed upon date of correction of the hazard is to be part of the report. All deficiency reports uncompleted by the designated date are to be referred to the Project Superintendent.

Record Retention & Employee Notification (Exhibit 2-10)

The Harza-Ebasco Joint Venture is required annually to inform all our employees exposed to toxic substances or harmful physical agents that such exposures were recorded and are kept in the safety and first aid station. Each affected employee is to be informed: in the annual notice the person responsible for maintaining these records and the provision for employee's access to his own records.

The employee toxic medical and exposure records must be retained for at least the duration of the employee's employment plus thirty (30) years. These long term retention records shall be separately designated when sent into the Home Office Safety Department at the completion of construction activities.

When an employee or his designated representative request and is granted access to his records as provided by OSHA part 1910.20, surveillance shall be provided by an Harza-Ebasco representative in order to safeguard our records.

EXHIBIT 2.1

BRASCH SERVICES INCORPORATED

INJURY REPORT

MONTH ENDING:_____

Fatal case — FA
Doctor case — DR
Lost time — LT (plus number of days lost)
Permanent partial — PP (plus scheduled charges)

PROJECT | CLIENT COMPANY | PREPARED BY | APPROVED (FIRST LINE)

DATE AND TIME	NAME OF INJURED AND OCCUPATION	FOREMAN	TYPE OF INJURY	DESCRIPTION OF ACCIDENT	TREATMENT GIVEN REMARKS	RESULT (SEE NOTE)	CAUSE	CORRECTIVE ACTION

EXHIBIT 2.2

EMPLOYEE NAME (LAST - FIRST - MIDDLE INITIAL)	ADDRESS	NUMBER

EMPLOYER	CRAFT	SUPERVISOR

TIME		DESCRIPTION OF ACCIDENT AND TREATMENT	DISPOSITION OF CASE*
DATE	HOUR		

FORM 5752

EMPLOYEE'S ACCIDENT RECORD

*Investigation Is Required on Lost Time and Serious Doctor Cases.

(OVER)

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

EXHIBIT 2.3

C-2.5

WORKMEN'S COMPENSATION BOARD

EMPLOYER'S REPORT OF INJURY

IMPORTANT: This form is not to be used to report accidents causing death, permanent injury or loss of time in excess of 7 days. Form C-2 should be used to report such accidents.

Send this notice directly to Chairman, Workmen's Compensation Board at address shown on reverse side within ten days after accident occurs. Copy also should be sent to your insurance carrier

PLEASE PRINT OR TYPE—INCLUDE ZIP CODE IN ALL ADDRESSES—EMPLOYEE'S SS# MUST BE ENTERED FIRST

CASE NO.	CARRIER CASE NO.	FILE NO.	DATE OF ACCIDENT	EMPLOYER'S NO.

ENTER CASE NUMBERS, IF KNOWN, IN ABOVE SPACES

	(a) NAME	MAIL ADDRESS	(b) OSHA ...
EMPLOYER			

LOCATION (if different from mail address)

(c) F P NO

INSURANCE CARRIER		
INJURED PERSON	(First Name) (Middle Initial) (Last Name)	(Home Address Give Number and Street, City, State, Zip Code and Apt. No.)

ACCIDENT

4. (a) Address where accident occurred *(Include county)* _____

(b) Was this employer's premises Yes ☐ No ☐

5. Date of accident: _____ 19__ Day of Week _____ Hour of Day _____ A. M. _____ P. M.
If occupational illness, date of initial diagnosis: _____ 19__

6. (a) Date disability began: _____ 19__. Hour of Day _____ A.M. _____ P.M.
(b) Was injured paid in full for this day? _____

7. Brief description of accident: (state also what employee was doing at time of accident; what machine, object, or substance caused the accident or occupational disease; name any tool, equipment, etc. employee was using) _____

INJURED PERSON

8. Check (X) ☐ Male ☐ Female

9. Age: _____ 10. Occupation: _____

NATURE OF INJURY OR OCCUPATIONAL DISEASE

11. State nature of injury and part or parts of body affected: (as "Injury to Chest," etc.) _____

12. Did you provide medical care? _____ If so, when? _____

13. Name and address of doctor: _____

14. Name and address of hospital: _____

15. (a) Has employee returned to work? _____ (b) If so, give date: _____

EMPLOYER

16. Nature of business: (State principal products manufactured or sold or services rendered) _____

17. Department where regularly employed: _____

FIRM NAME: _____

TEL. NO. _____ SIGNED BY _____

Official Title

DATE OF THIS REPORT: _____

LOCATION _____ NO: _____

C-2.5 C-2.5

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

EXHIBIT 2.4

OSHA No. 101
Case or File No. _____

Form approved
OMB No. 44R 1453

Supplementary Record of Occupational Injuries and Illnesses

EMPLOYER

1. Name _____
2. Mail address _____
   (No. and street) (City or town) (State)
3. Location, if different from mail address _____

INJURED OR ILL EMPLOYEE

4. Name _____ Social Security No. _____
   (First name) (Middle name) (Last name)
5. Home address _____
   (No. and street) (City or town) (State)
6. Age _____ 7. Sex: Male_____ Female_____ (Check one)
8. Occupation _____
   (Enter regular job title, *not* the specific activity he was performing at time of injury.)
9. Department _____
   (Enter name of department or division in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure _____
    (No. and street) (City or town) (State)
    If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.
11. Was place of accident or exposure on employer's premises? _____ (Yes or No)
12. What was the employee doing when injured? _____
    (Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them.)
13. How did the accident occur? _____
    (Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident. Use separate sheet for additional space.)

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

14. Describe the injury or illness in detail and indicate the part of body affected. _____
    (e.g.: amputation of right index finger at second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)
15. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)
16. Date of injury or initial diagnosis of occupational illness _____
    (Date)
17. Did employee die? _____ (Yes or No)

OTHER

18. Name and address of physician _____
19. If hospitalized, name and address of hospital _____

Date of report _____ Prepared by _____
Official position _____

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

EXHIBIT 2.5

Bureau of Labor Statistics
Log and Summary of Occupational
Injuries and Illnesses

U.S. Department of Labor

INJURIES

ILLNESSES

Columns
6 and 13 - INJURIES OR ILLNESSES WITHOUT LOST WORKDAYS. Self-explanatory.

Columns 7a
through 7g — TYPE OF ILLNESS.
Enter a check in only ***one*** column for each illness.

TERMINATION OR PERMANENT TRANSFER—Place an asterisk to the right of the entry in columns 7a through 7g (type of illness) which represented a termination of employment or permanent transfer.

V. Totals

Add number of entries in columns 1 and 8.
Add number of checks in columns 2, 3, 6, 7, 9, 10, and 11.
Add number of days in columns 4, 5, 11, and 12
Totals are to be generated for each column at the end of each page and at the end of each year. ***Only*** the yearly totals are required for posting.

If an employee's loss of workdays is continuing at the time the totals are summarized, estimate the number of future workdays the employee will lose and add that estimate to the workdays already lost and include this figure in the annual totals. No further entries are to be made with respect to such cases in the next year's log.

VI. Definitions

OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, amputation, etc., which results from a work accident or from an exposure involving a single incident in the work environment.
NOTE: Conditions resulting from animal bites, such as insect or snake bites or from one-time exposure to chemicals, are considered to be injuries.

OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact.

The following listing gives the categories of occupational illnesses and disorders that will be utilized for the purpose of classifying recordable illnesses. For purposes of information, examples of each category are given. These are typical examples, however, and are not to be considered the complete listing of the types of illnesses and disorders that are to be counted under each category.

7a. **Occupational Skin Diseases or Disorders**
Examples: Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants, oil acne, chrome ulcers; chemical burns or inflammations, etc.

7b. **Dust Diseases of the Lungs (Pneumoconioses)**
Examples. Silicosis, asbestosis, coal worker's pneumoconiosis, byssinosis, siderosis, and other pneumoconioses.

7c. **Respiratory Conditions Due to Toxic Agents**
Examples: Pneumonitis, pharyngitis, rhinitis or acute congestion due to chemicals, dusts, gases, or fumes, farmer's lung, etc.

7d. **Poisoning (Systemic Effect of Toxic Materials)**
Examples. Poisoning by lead, mercury, cadmium, arsenic, or other metals, poisoning by carbon monoxide, hydrogen sulfide, or other gases, poisoning by benzol, carbon tetrachloride, or other organic solvents, poisoning by insecticide sprays such as parathion, lead arsenate, poisoning by other chemicals such as formaldehyde, plastics, and resins, etc.

7e. **Disorders Due to Physical Agents (Other than Toxic Materials)**
Examples. Heatstroke, sunstroke, heat exhaustion, and other effects of environmental heat; freezing, frostbite, and effects of exposure to low temperatures; caisson disease; effects of ionizing radiation (isotopes, X-rays, radium), effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, sunburn); etc.

7f. **Disorders Associated With Repeated Trauma**
Examples. Noise-induced hearing loss; synovitis, tenosynovitis, and bursitis; Raynaud's phenomena, and other conditions due to repeated motion, vibration, or pressure.

7g. **All Other Occupational Illnesses**
Examples: Anthrax, brucellosis, infectious hepatitis, malignant and benign tumors, food poisoning, histoplasmosis, coccidioidomycosis, etc.

MEDICAL TREATMENT includes treatment (other than first aid) administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does NOT include first-aid treatment (one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care) even though provided by a physician or registered professional personnel.

ESTABLISHMENT: A single physical location where business is conducted or where services or industrial operations are performed (for example: a factory, mill, store, hotel, restaurant, movie theater, farm, ranch, bank, sales office, warehouse, or central administrative office). Where distinctly separate activities are performed at a single physical location, such as construction activities operated from the same physical location as a lumber yard, each activity shall be treated as a separate establishment.

For firms engaged in activities which may be physically dispersed, such as agriculture; construction, transportation; communications, and electric, gas, and sanitary services, records may be maintained at a place to which employees report each day.

Records for personnel who do not primarily report or work at a single establishment, such as traveling salesmen, technicians, engineers, etc., shall be maintained at the location from which they are paid or the base from which personnel operate to carry out their activities.

WORK ENVIRONMENT is comprised of the physical location, equipment, materials processed or used, and the kinds of operations performed in the course of an employee's work, whether on or off the employer's premises.

EXHIBIT 2.5 CON'T

Instructions for OSHA No. 200

I. Log and Summary of Occupational Injuries and Illnesses

Each employer who is subject to the recordkeeping requirements of the Occupational Safety and Health Act of 1970 must maintain for each establishment a log of all recordable occupational injuries and illnesses. This form (OSHA No. 200) may be used for that purpose. A substitute for the OSHA No. 200 is acceptable if it is as effective, easily readable, and understandable as the OSHA No. 200.

Enter each recordable case on the log within six (6) workdays after receiving information that a recordable case occurred. Although other records must be maintained at the establishment to which they refer, it is possible to prepare and maintain the log at another location, using data processing equipment if desired. If the log is prepared elsewhere, a copy updated to within 45 calendar days must be present at all times in the establishment.

Logs must be maintained and retained for five (5) years following the end of the calendar year to which they relate. Logs must be available (normally at the establishment) for inspection and copying by representatives of the Department of Labor, or the Department of Health, Education and Welfare, or States accorded jurisdiction under the Act.

II. Changes in Extent of or Outcome of Injury or Illness

If, during the 5-year period the log must be retained, there is a change in an extent and outcome of an injury or illness which affects entries in columns 1, 2, 6, 8, 9, or 13, the first entry should be lined out and a new entry made. For example, if an injured employee at first required only medical treatment but later lost workdays away from work, the check in column 6 should be lined out, and checks entered in columns 2 and 3 and the number of lost workdays entered in column 4.

In another example, if an employee with an occupational illness lost workdays, returned to work, and then died of the illness, the entries in columns 9 and 10 should be lined out and the date of death entered in column 8.

The entire entry for an injury or illness should be lined out if later found to be nonrecordable. For example, an injury or illness which is later determined not to be work related, or which was initially thought to involve medical treatment but later was determined to have involved only first aid.

III. Posting Requirements

A copy of the totals and information following the fold line of the last page for the year must be posted at each establishment in the place or places where notices to employees are customarily posted. This copy must be posted no later than ***February 1 and must remain in place until March 1.***

Even though there were no injuries or illnesses during the year, zeros must be entered on the totals line, and the form posted.

The person responsible for the ***annual summary totals*** shall certify that the totals are true and complete by signing at the bottom of the form.

IV. Instructions for Completing Log and Summary of Occupational Injuries and Illnesses

Column A - CASE OR FILE NUMBER. Self-explanatory.

Column B – DATE OF INJURY OR ONSET OF ILLNESS.
For occupational injuries, enter the date of the work accident which resulted in injury. For occupational illnesses, enter the date of initial diagnosis of illness, or, if absence from work occurred before diagnosis, enter the first day of the absence attributable to the illness which was later diagnosed or recognized.

Columns C through F– Self-explanatory

Columns 1 and 8 – INJURY OR ILLNESS-RELATED DEATHS.
Self-explanatory.

Columns 2 and 9 – INJURIES OR ILLNESSES WITH LOST WORKDAYS.
Self-explanatory.

Any injury which involves days away from work, or days of restricted work activity, or both must be recorded since it always involves one or more of the criteria for recordability.

Columns 3 and 10 – INJURIES OR ILLNESSES INVOLVING DAYS AWAY FROM WORK. Self-explanatory.

Columns 4 and 11 – LOST WORKDAYS––DAYS AWAY FROM WORK.
Enter the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury or illness. The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.
NOTE: For employees not having a regularly scheduled shift, such as certain truck drivers, construction workers, farm labor, casual labor, part-time employees, etc., it may be necessary to estimate the number of lost workdays. Estimates of lost workdays shall be based on prior work history of the employee AND days worked by employees, not ill or injured, working in the department and/or occupation of the ill or injured employee.

Columns 5 and 12 – LOST WORKDAYS––DAYS OF RESTRICTED WORK ACTIVITY.
Enter the number of workdays (consecutive or not) on which because of injury or illness:
(1) the employee was assigned to another job on a temporary basis, or
(2) the employee worked at a permanent job less than full time, or
(3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it.

The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.

EXHIBIT 2.6

MEDICAL CASE DISPOSITION

CASE NO. _____

DATE _____

INSTRUCTIONS:
White - First Aid
Pink - Supervisor
Yellow - Doctor retains

5754 (X) 9-79

To Be Completed By Project Office

PROJECT _____

SEND INVOICE TO _____

PATIENT'S NAME	SOC. SEC. NO.	EMPLOYEE NO.	OCCUPATION

DATE OF INJURY	APPROVED BY (SIGNATURE & TITLE)

To Be Completed By Physician

DIAGNOSIS (MINOR OR OBVIOUS NOT REQUIRED) _____

THIS PATIENT IS ABLE TO ASSUME:

☐ All normal duties ☐ Restricted duties only (Explain below) ☐ No work duties (Est. time off) _____

FUTURE APPOINTMENT:	DATE	TIME	ATTENDING PHYSICIAN	DATE

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

Harza-Ebasco Susitna Project

ACCIDENT SUMMARY

EXHIBIT 2.7

MONTH ENDING _____ 19 _____

CRAFT	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Example	BOILERMAKERS	CARPENTERS	ELECTRICIANS	INSULATORS	IRONWORKERS	LABORERS	MILLWRIGHTS	OPERATING ENGINEERS	PAINTERS	PIPEFITTERS	SHEETMETAL WORKERS	
→ First Aid												
Lost Time in Red												
AVERAGE NO. OF EMPLOYEES												
ACCIDENTS: STRUCK AGAINST												
STRUCK BY												
CONTACT OR ABSORB OBJECTS												
FALL ON SAME LEVEL												
FALL TO DIFFERENT LEVELS												
OVER-STRAINS												
CONTACT WITH TEMPERATURE EXTREMES												
ABRADED & PENETRATED												
OTHER												
TOTAL ACCIDENTS												
HAND INJURIES												
EYE - FOREIGN OBJECTS												
EYE - FLASH BURNS												
EYE - CHEMICAL BURNS												
FOOT - PUNCTURES												
BRUISES OR CRUSHES												
BODY INJURIES												
HERNIA												
TWISTING OR STRAINS NOT HAND OR FOOT												
BURNS												
INFECTIONS												
CUTS OR LACERATIONS												
HEAD INJURIES												
SKIN IRRITATIONS												
OTHER												
FIRST AID TOTAL												
DOCTOR'S CASES TOTAL												
LOST TIME	1											

PREPARED BY _____ DATE _____ APPROVED BY _____ DATE _____

CONSTRUCTION SUPT.

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

ACCIDENT TYPES

EXHIBIT 2.7 (CONT'D)

TYPES OF ACCIDENTS	DESCRIPTION
A. Struck against	
0. Stationary object on approximate horizontal plane.	Covers <u>impact</u> cases where the motion is primarily that of the injured person rather than of the object, substance, etc. Excludes striking against resulting from prior falls (Items D and E).
1. Moving object on approximate horizontal plane.	
2. Overhead object.	
B. Struck by	
0. Falling objects.	Covers <u>impact</u> cases where the motion is primarily that of the object rather than of the injured person. Excludes cases resulting from prior falls (Items D and E).
1. Flying objects.	
2. Moving (not falling or flying) objects in approximate horizontal plane.	
3. Moving (not falling or flying) objects in approximate vertical plane.	
4. Rotating parts of stationary object.	
C. Caught in or between	
0. Inrunning or meshing objects.	Covers <u>nonimpact</u> cases, as squeezing, pinching, or crushing between a moving and a stationary object, between two moving objects, or between parts of an object. Excludes cases resulting from prior falls (Items D and E).
1. Moving and stationary object.	
2. Two or more moving (not meshing) objects.	
3. Pulled or dragged.	
D. Fall of person (same level)	
0. To the ground, floor, etc.	Covers all cases where person actually falls on floor, platform, ramp, ground, etc. and is injured by contact with objects located approximately at body level. Excludes overexertion. It includes slips and stumbles where these result in falls. It is selected over all other events, except fall of person (different level), when it is a part of a multiple-event case and occurs <u>prior</u> to the injury.
1. Into water.	
2. Against objects.	
3. Into caustics, corrosives, etc.	

ACCIDENT TYPES	EXHIBIT 2.7 CON'T
E. Fall of person (different level) 0. To the ground, floor, etc. from higher level. 1. Into water. 2. Into toxic, corrosive, hot, caustic, or electrically charged substances. 3. Into moving equipment or machinery. 4. Onto sharp or defective objects.	Covers all cases where person <u>falls</u> to a lower level and is injured by contact with an object or substance at the lower level. It is selected over all other events when it is a part of a multiple-event cases and occurs <u>prior</u> to the injury.
F. Bodily strains 0. From lifting. 1. From pulling and pushing. 2. From noise. 3. From fright, surprise, etc. 4. From electrical shock.	Covers only <u>nonimpact</u> cases where sprains, strains, and ruptures or other internal injury result from overexertion, unsafe posture, sudden noise, fright, and efforts to recover from slips and loss of balance. Excludes cases resulting from <u>prior</u> falls (Items D and E).
G. Contact, temperature extremes 0. Molten metals. 1. Hot objects and substances (Not molten metals). 2. Cold objects and substances. 3. Freezing temperatures (not objects).	Covers only <u>nonimpact</u> cases where injury is due to contact with molten metals, hot or cold surfaces, gases and liquids, also freezing or frostbite. Does not include injury from contact with sun's rays or other radiations or injury by the toxic or caustic characteristics of substances. Excludes cases resulting from prior falls (Items D and E).
H. Rubbed, abraded and penetrated 0. Stepping, kneeling or sitting on sharp objects. 1. Handling sharp objects. 2. Friction. 3. Foreign matter in eyes. 4. Repetition of pressure.	Covers only <u>nonimpact</u> cases from handling materials, stepping or kneeling on sharp objects, foreign matter in eyes, etc. Excludes cases resulting from <u>prior</u> falls (Items D and E).

5719/2-75

Harza-Ebasco Susitna Project

EXHIBIT 2.9

SUPERVISOR'S ACCIDENT REPORT

INSTRUCTIONS:

1. *Complete this Report immediately after accident and attach "First Report of Injury."*
2. *Complete for all disabling injuries.*

INCIDENT NO. _____

PROJECT _____

1. Name of injured (or ill) person _____
2. Title/Craft _____ 3. Supervisor _____
4. Date of accident _____ 5. Time _____
6. Accident category ☐ Property Damage ☐ Fire ☐ Motor Vehicle ☐ Other
7. Severity of injury or illness ☐ Non-disabling ☐ Disabling ☐ Medical Treatment ☐ Fatality
8. Degree of disability ☐ Temporary Total ☐ Permanent Partial ☐ Permanent Total
9. Location _____
10. Estimated number of days away from job _____
11. Nature of injury or illness _____
12. Part of body affected _____
13. Describe causative agent most directly related to accident (kind of object, substance, material, machinery, equipment, conditions, etc.) _____

    Was weather a factor? _____
14. Unsafe mechanical/physical/environmental condition at time of accident (be specific) _____
15. What was injured doing? Include unsafe act and/or others contributing to the accident (be specific, must be answered) _____
16. Personal factors (improper attitude, lack of knowledge or skill, slow reaction, fatigue, etc.) _____
17. Personal protective equipment required (protective glasses, safety shoes, safety hat, safety belt, etc.)

    Was injured using required equipment? _____

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

EXHIBIT 2.8

5742'11.77

Harza-Ebasco
MONTHLY SUMMARY OF INJURIES AND ILLNESSES

PROJECT

SUPERINTENDENT _____ SAFETY REPRESENTATIVE _____

YEAR	AVERAGE NUMBER OF EMPLOYEES	NUMBER OF MAN-HOURS WORKED	Z 16.4								FIRST A.C CASES ONLY
			FATAL	CASES		NON-LOST WORKDAY CASES	TOTAL		DAYS		
				LOST WORKDAY CASES	INCIDENCE RATE†		TOTAL OSHA CASES	INCIDENCE RATE†	TOTAL LOST WORKDAYS	INCIDENCE RATE†	
JANUARY											
FEBRUARY											
Cumulative											
MARCH											
Cumulative											
APRIL											
Cumulative											
MAY											
Cumulative											
JUNE											
Cumulative											
JULY											
Cumulative											
AUGUST											
Cumulative											
SEPTEMBER											
Cumulative											
OCTOBER											
Cumulative											
NOVEMBER											
Cumulative											
DECEMBER											
Cumulative											

Z 16.4 Incidence rate = $\frac{\text{Number of injury and illness cases or days} \times 200{,}000}{\text{Employee hours worked}}$

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

EXHIBIT 2.9 CON'T

18. What can be done to prevent a recurrence of this type of accident (modification of machine, mechanical guards, correct environment, training, etc.) _____

19. Detailed narrative description of how accident occurred and why (objects, equipment, tools used, circumstance, assigned duties, etc.; be specific) _____

(Use additional sheets, as required)

20. Witnesses to accident _____

Date Prepared _____ Signature _____
FOREMAN/SUPERVISOR

SUPERINTENDENT'S APPRAISAL AND RECOMMENDATION

a. In your opinion, what action on the part of injured (or ill) person or others contributed to this accident?

b. Your recommendation _____

Date _____ Signature _____
SUPERINTENDENT

FOR SAFETY OFFICE USE ONLY

☐ Temporary Total
Started losing time _____
Returned to work _____
Time charge _____

☐ Permanent Partial
Part of body _____
% loss or loss of use _____
Time charge _____

☐ Death or Permanent Total
Time charge 6,000 days

Date _____ Signature _____
SAFETY REPRESENTATIVE

SECTION III SECTION IV SECTION V SECTION VI SECTION VII

SECTION 3

FIRST AID AND MEDICAL SERVICES FOR OCCUPATIONAL INJURIES AND ILLNESSES

SECTION 3 - FIRST AID & MEDICAL SERVICES FOR OCCUPATIONAL INJURIES & ILLNESSES

3.1 Policy

To provide adequate First Aid and Medical Services on the Harza-Ebasco Joint Venture project by treating injuries and illnesses arising out of work-related activities.

Achievement of this objective will benefit both Harza-Ebasco and its project employees by improving employee health, morale, and productivity.

3.2 Responsibility

The person responsible for evaluating the First Aid and Medical Services required by the project is the Construction Manager, with consultation of the Safety Manager.

The First Aid and Medical Services Facilities evaluations and determinations should be made prior to construction activities.

In considering the services required, some of the factors which will determine the scope of the First Aid and Medical Services required on site are:

- Estimated number of employees to be employed at the site and the time duration of the project.

- Relative location of the project to medical assistance, medical facilities and availability of prompt ambulance services.

- Anticipated exposure to unusual safety and health hazards - i.e. radiation and toxic hazards and underground work.

3.3 First Aid Facilities

The First Aid Facilities should be set up in a manner that reflects Harza-Ebasco's concern for the well being of its employees and should enable nurses and other medical personnel to function professionally.

The size of the facility shall be adequate for the intended manned peak period. It is to have finished interiors, covered floors (such as tile), toilet facilities, hot and cold running water, refrigerator, adequate illumination, heating and air-conditioning.

Telephone services are to be provided with outside lines available when the switchboard is closed.

The proposed layout for the First Aid Facility is to be approved by the Construction Manager in consultation with the Safety Manager.

3.3.1 First Aid Station Location & Size

The First Aid Station may be located in a portion of a construction building or in a separate building or trailer.

Suggested plans for First Aid Facilities are for:

Medium Projects - up to 1,000 employees (Exhibit 4.1)
Large Projects - over 1,000 employees (Exhibit 4.2)

3.3.2 First Aid Supplies

The type and quantity of instruments and supplies will be determined by the project nurse and project Safety Representative. A suggested list for a major project can be found in (Exhibit 3.3).

An open purchase order should be established with a medical supply company to expedite the processing of first aid supply orders.

3.4 First Aid Personnel

To have competent First Aid and Medical Services, it is important to staff the First Aid Station with a qualified attendant, preferably a registered nurse with experience in industrial nursing or hospital emergency room services.

Selection of personnel will be made by the Project Superintendent with the assistance of the Senior Safety Representative.

It is recommended that a First Aid Station be established on projects with a peak force of 200 or more craft personnel. First Aid Personnel will also be required on shift work and overtime work.

OSHA Construction Standards require that an employee trained in First Aid be in attendance whenever employees are working.

3.5 Transportation of Medical Cases

3.5.1 Routine Medical Trips

A vehicle should be designated as routine medical vehicle and a driver should be assigned to transport ill or injured employees. The ambulance will not be used for this purpose nor will the driver be the Safety Representative.

Employees should not be permitted to use their own vehicles for the first visit to the physician.

Subsequent physician visits should be arranged on employee's own time unless otherwise agreed to by the Construction Manager.

3.5.2 Emergency Transportation

Employees requiring immediate, urgent medical treatment shall be transported to the proper medical facility in a suitable emergency vehicle, boat or aircraft.

The Safety Manager and Construction Manager will jointly determine the best method for providing emergency transportation from the project site.

3.5.3 Project Ambulances

A project ambulance will be furnished on site whenever the nearest reliable ambulance service is more than 10 minutes from the project site.

Project ambulances will comply with all provisions of the applicable State Emergency Medical Equipment Requirements.

Two qualified employees will be assigned to the ambulance as driver and alternate. Although the driver's position is not a full-time position, either the driver or the alternate must be available for duty during all times when employees are at the project site. The Project ambulance attendant should have first aid training. Only in the most urgent cases should the nurse leave the project to accompany the ill or injured employee in the ambulance.

The hospital emergency room is to be notified when the project ambulance is dispatched. All pertinent information concerning the injury is to be given to the emergency room personnel.

The ambulance driver shall have the proper state license to drive the ambulance and shall obey all traffic lights, stop signs and all public highway regulations.

The ambulance shall be inspected and test driven (minimum 5 miles) on a weekly basis to determine that the ambulance is functioning properly. The person conducting the inspection and test drive will file a report with the safety representative who will assure that deficiencies are corrected. A suggested inspection report form can be found in Exhibit 4.6.

The equipment and supplies in the ambulance shall be inspected after each run, or on a weekly basis whichever is more frequent, by the Project Nurse or the First Aid Attendant and a report submitted to the Safety Representative on a weekly basis. A suggested inspection report form can be found in Exhibit 4.7.

3.6 Medical Services

The Workmen's compensation insurance carrier will provide, upon request, a list of physicians in the area who treat industrial cases. A review of the list should be made by the Project Superintendent and Safety Representative who will select the project physician.

The physician will issue medical directives to the first aid staff. These instructions should be specific and should identify those types of illnesses and injuries which are beyond the scope of the first aid staff. The physician will specify medications which can be used in the first aid station. Representative medical directives and emergency nursing procedures appear in (Exhibit 3.4).

3.6.1 Limited Work Authorization

In some medical cases, the physician will allow an employee to return to work on a light duty or on some other limited work basis. The Project Superintendent must approve the return to work of such employees.

Those employees who are physically limited due to prior injury or illness (epileptics, those with heart conditions, diabetics, etc.) should not be placed in work which may cause injury to themselves or others.

3.7 Late Report of Injury

All employees should promptly report any injuries and illnesses to the first aid station. Any medical cases not reported to the Project First Aid Station may be contested by Workmens' Compensation Insurance carrier. Notice for the prompt reporting of injuries to the First Aid Station should be posted. This is to be emphasized in the employee's initial orientation and at the Tool Box Meetings.

Non-occupational ailments, such as a headache, may be given temporary relief (for example, aspirin) as authorized by the phisician. Non-occupational ailments requiring a physician's attention should be referred to the employee's personal physician.

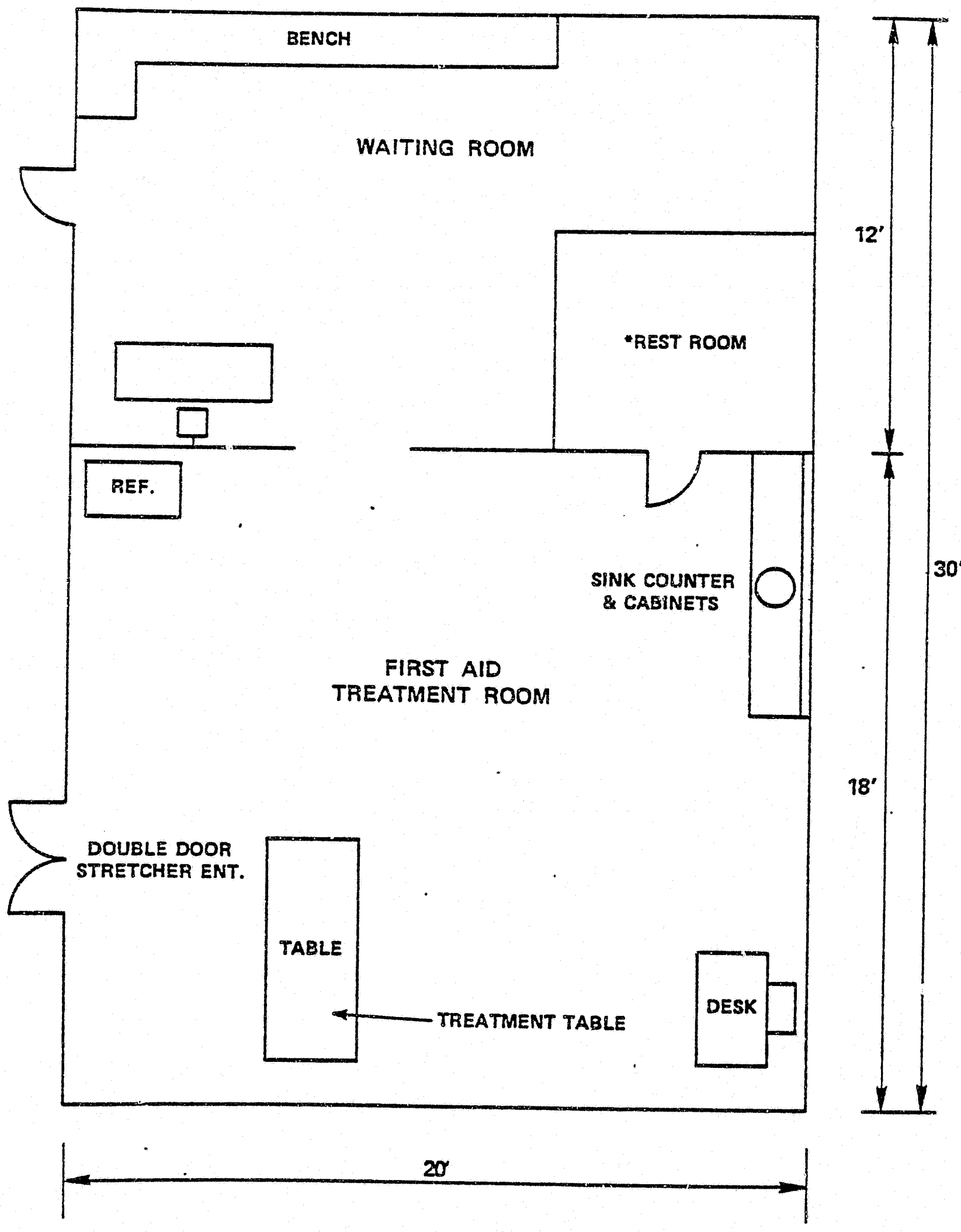
3.8 Treatment for Subcontractors' Employees

Treatment for subcontractors' employees may be given only if prior contractual agreements make provision for it. Hold Harmless Agreements must be obtained from the subcontractors. (Exhibit 3.5)

FIRST AID STATION LAYOUT
MEDIUM PROJECT

Exhibit 3.1

MINIMUM AREA – 600 SQ. FT.



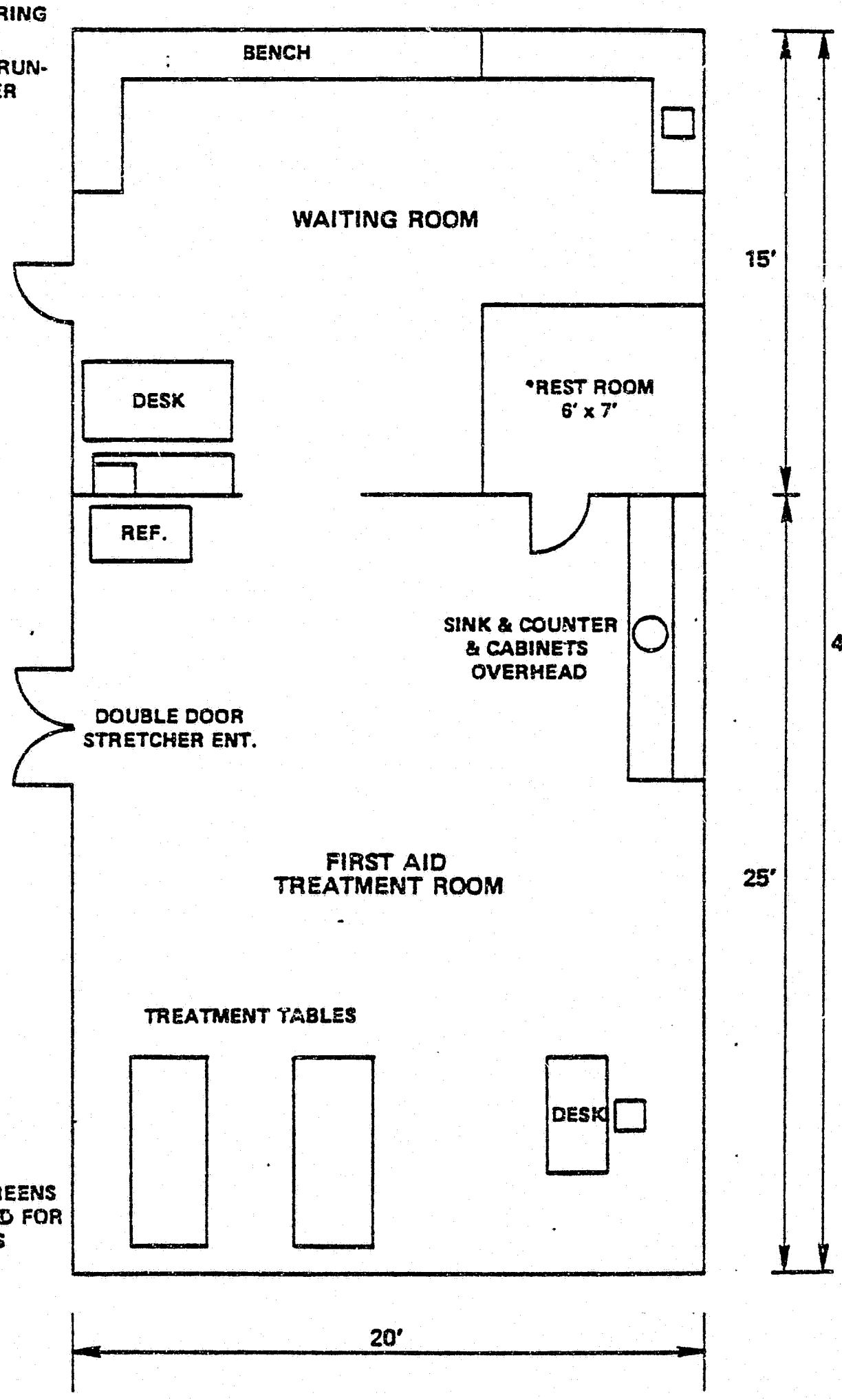
*REST ROOM REQUIRED

Exhibit 3.2

FIRST AID STATION LAYOUT
LARGE PROJECT

AIR CONDITIONED
HEATED
WELL LIGHTED
FLOOR COVERING (TILE)
HOT & COLD RUNNING WATER

MINIMUM AREA – 800 SQ. FT.



MOVABLE SCREENS CAN BE USED FOR PARTITIONS

*REST ROOM REQUIRED IF FIRST AID STATION ISN'T NEAR ADM. OFFICES.

SECTION IV
SECTION V
SECTION VI
SECTION VII

Exhibit 3.3

FIRST AID EQUIPMENT AND SUPPLIES

QUAN. UNIT	ITEM
1 each	Examination table (36 inches x 84 inches, with pad)
1 each	Paper dispenser with cutter for above
1 each	Examination - Treatment chair (Basic Model)
1 each	Resuscitator - Elder Demand Valve
1 each	Swivel stool with casters
1 each	Autoclave Ritter Speedclave
1 each	Heat lamp - Quartz
1 each	Hydrocollator
1 each	Sphygmomanometer
1 each	Stethoscope
1 each	Magnifying light (Floor Model)
1 each	Surgical tape dispenser
1 each	Covered waste receptable, foot pedal operated, 16 quart
1 box	Liners for waste receptable
1 each	Paper towel dispenser
1 each	Drinking cup dispenser - Lilly #502
1 box	Cups - #502
4 each	Stokes wire basket litters
4 each	Nylon wire basket litters
4 each	Nylon lifting straps for stokes litters
12 each	Blankets
1 pair	Adult crutches
2 each	Foam pillows
6 each	Pillowcases
1 each	Physician's bag (14 inches x 8 inches x 6 inches)
2 each	Emesis basin
2 each	Sponge bowls
1 each	Wash basin (12 inches)
1 each	Eye chart - Snellen, E-C-B

QUAN. UNIT	ITEM
1 each	Ishihara color blindness test (14 plate)
2 each	Inflatable splint kits - assorted sizes
1 each	Glass dressing jars - set of 5
1 each	Ear syringe
1 each	Instrument holder - Bard-Parker (8 inches)
2 each	Sponge forceps (7 inches)
1 each	Sponge forceps (7 1/4 inches high)
1 each	Thermometer jar
2 each	Thermometers - oral
1 each	Ralk splinter forceps
1 each	Walter splinter forceps
1 each	Scissors, bandage (4 1/2 inches)
1 each	Scissors, bandage (7 1/2 inches)
1 each	Scissors, cuticle (3 1/2 inches)
2 each	Hemostat, Kelly-Murphy, straight (5 1/2 inches)
2 each	Hemostat, Kelly-Murphy, curved (5 1/2 inches)
2 each	Forceps, Halstead Mosquito, straight (5 inches)
2 each	Forceps, Halstead Mosquito, curved (5 inches)
1 each	Bard-Parker surgical handle, No. 3
1 package	Bard-Parker blades, No. 11
1 package	Bard-Parker blades, No. 15
1 each	Nail drill
3 each	Neo-Polyein ointment (1/2 ounce tubes)
1 each	Hollandex ointment (1 pound)
1 each	Lanolor cream (8 ounce jar)
1 each	Analgesic balm (1 pound)
12 each	Tetanus toxoid 1/2 cc, Lederject disposable syringes
3 each	Hypertetanus immune globulin, 250 unit, disposable syringes
3 boxes	Vaseline gauze (3 inch x 18 inch strips)
3 boxes	Vaseline gauze, (6 inch x 36 inch strips)
4 boxes	Bandaids sheer strips (1 inch x 3 inch and 3/4 inch x 3 in.)
2 boxes	Bandaids, extra large

QUAN. UNIT	ITEM
2 boxes	Sterile gauze sponges, individually packaged 100's (3 inch x 3 inch)
2 boxes	Sterile gauze sponges, individually packaged 100's (4 inch x 4 inch)
6 packages	Non-sterile gauze sponges (4 inch x 4 inch)
1 dozen	Cohesive wrap (2 inch)
1 dozen	Cohesive wrap (3 inch)
1 dozen	Cohesive wrap (4 inch)
1 dozen	Coban cohesive wrap (6 inch)
24 each	Large finger cots
1 package	Kling (1 inch)
3 packages	Kling (2 inch)
3 packages	Kling (3 inch)
3 packages	Kling (4 inch)
1 package	Kling (6 inch)
1 box	(50) Telfa plain pads (2 inch x 3 inch)
1 box	(50) Telfa plain pads (3 inch x 4 inch)
1 box	Telfa ouchless pads (2 inch x 3 inch)
1 box	Telfa ouchless pads (3 inch x 4 inch)
1 box	Oval eye pads
1 box	Butterfly closures, large
1 box	Butterfly closures, small
1 box	J & J clear plastic tape (1/2 inch)
1 box	J & J clear plastic tape (1 inch)
1 box	J & J clear plastic tape (2 inch)
1 box	Bufferin 5 grain (in industrial 2 pack)
1 box	Aspirin 5 grain (in industrial 2 pack)
1 box	Emigran Forte (in industrial 2 pack)
1 box	Sepo lozenges (in industrial 2 pack)
1 bottle	Titralac tablets
3 each	Chloraseptic spray (6 ounce bottle)
1 gallon	17% zephiran concentrate

QUAN. UNIT	ITEM
1 each	Tinted tuncture of zephiran spray (6 ounce)
1 bottle	Parapectolin (10 ounce)
1 each	Calamine lotion
1 each	Surgitube or Tubegauze #2
1 each	Surgitube or Tubegauze #3
1 each	Colyrium eye wash
3 bottles	Alcohol (1 pint)
1 bottle	Ta-Poff (1 pint)
1 bottle	Tincture of benzoin (1 pint)
1 bottle	Anti-ruse tablets (50/bottle)
6 each	Triangular bandages
1 each	Aromatic ammonia vaporale (10/package)
1 each	Cepacol mouth wash (14 ounces)
3 bottles	Hydrogen peroxide
1 each	Q-tip applicators (3 inch), 1000/package
1 bottle	Tylenol 5 grain tablets (250/bottle)
12 each	Welders eye lotion (1 ounce)
1 bottle	Visine 16 cc - dropper bottle
1 box	Preptic alcohol swabs (100 medium)
1 box	Elastoplast bandages (3 inch)
1 box	Elastoplast digit-tip coverlets, #307 (50/box)
1 box	Elastoplast knuckle coverlets, #395 (50/box)
1 each	Stat white plastic 3/4 inch roll finger splint (20 feet)
1 package	Plastalume finger splints - assorted sizes
24 tins	Ointment (2 ounce)
1000 each	Cotton tipped eye spuds (Karel Supply)
1 gallon	Distilled water
1 gallon	Surgical soap
1 jar	Furacin luable dressing (1 pound)
1 each	Desenex baby powder
100 each	Brown coin envelopes
24 each	2 cc sterile syringes with 25 gauge needles

QUAN. UNIT	ITEM
24 each	Kwik-Kold ice packs
24 each	Heat packs
1 each	Normal saline injection (500 cc)
1 box	Alka seltzer (in industrial 2 pack)
2 each	Curity Trauma pack
3 each	Surgeons scrub brushes
1 box	Tongue blades (500/box)
1 each	Ice bag

Exhibit 3.4

PLANNING FOR EMERGENCY CARE IN THE OCCUPATIONAL SETTING

The following policies and procedures should be given consideration in planning for emergency care in the occupational setting. Some of these policies and procedures are obviously independent nursing functions and responsibilities, while others are not and must be carried out in cooperation with the physician, management, safety personnel, industrial hygienists, first aid teams and other appropriate individuals and groups.

Planning is necessary to insure:

1. Safe working environment.
2. Proper individual health protection.
3. Prompt and definitive emergency care for injured and ill employees.
4. Safe handling and transportation of injured and ill employees.

Planning includes such items as:

1. Assessment of Hazards in the Working Environment

   Assessment of, and planning for meeting the potential emergencies and possible disasters arising from internal hazards. In planning for emergency care, consideration should be given to the symptoms manifest by the employee which may be related to exposure to toxic or injurious materials in the work environment. It is recommended that a list of toxic or injurious materials, their location in the plant and their use, together with the symptoms which could be produced by exposure to these, be posted and readily available in the employee health service.

2. Disaster Planning and Community Resources

   It is recommended that all planning for disaster and emergency care be correlated with community health resources.

3. Nonoccupational Health Emergencies

Development of a plan and procedure for meeting personal health emergencies of both minor and major magnitude.

4. Portable Emergency Equipment

Plans should be drawn for providing portable emergency equipment which can be taken to various locations in case of emergency. Such portable emergency equipment should be clearly labeled and stored in appropriate areas throughout the plant, as well as in the employee health service.

5. Transportation of Injured and Ill Employees

It is recommended that the planning include a written policy approved by management outlining the transportation of ill and injured employees.

6. Trained First Aid Teams and Auxiliary Personnel

Plans for providing well-trained first aid teams with clearly identified responsibilities in emergency situations are essential.

7. Parsonal Emergency Medical Identification

All employees should be encouraged to wear or carry emergency medical identification information both on and off the job.

Wallet Cards should include:

1. Medical conditions - i.e. diabetes, etc.
2. Allergies - i.e. horse serum, penicillin, etc.
3. Medication regularly used: i.e. heart patients receiving anti-coagulants, etc.

4. Immunization status: date of tetanus booster, etc.
5. Name, phone number, address of personal physician and nearest of kin.

Durable devices should be worn on wrist or around neck to identify employees with diabetes, epilepsy, etc. where emergency medical care may be called for. For information on "emergency identification" is available from the American Medical Association, 535 North Dearborn, Chicago 60610.

8. Use of Contact Lens

The use of contact lens by employees may constitute a special eye hazard in certain job categories. The nurse is advised to take special care to record prominently on the medical record whether an employee "wears contact lens". Contact lenses should never be a substitute for approved eye protection, and where environmental hazard calls for special eye protection, it should be worn over contact lenses.

The placement of employees wearing contact lenses demands careful evaluation of the hazard of the job, the ocular status of the employee and the visual requirements of the occupation. Individualized consideration to placement by the medical director or consulting opthalmologist is warranted for some jobs in heavy industry, in chemical plants or elsewhere where there is risk of foreign material reaching the eye. In some situations the use of contact lenses by an employee may be a medical contra-indication for a specific placement.

9. Employee Health Record

Emergency medical identification information should also be recorded on individual employee records in the employee health service and be readily available to the nurse giving emergency care.

It is especially important to have up-to-date information on each individual employee's immunization status against tetanus.

10. Anticipatory Orders from Employee's Personal Physician

Special information and orders should be on file from the employee's personal physician covering emergency or routine care for special health problems. For example, diabetes, asthma and cardiovascular diseases. These anticipatory orders may be obtained either by the employee or by the nurse with the employee's permission.

11. Closed Chest Cardiac Resuscitation

The following statement was developed by representatives of the Wisconsin State Medical Society and the Wisconsin Nurses Association in 1964. It has been officially approved by both organizations.

"Closed chest cardiac resuscitation is normally an act of medical practice. When a physician is available, or as soon as a physician arrives, he should take charge of the treatment cardiac arrest. When a physician is not present, one should be summoned and the attending physician notified as soon as circumstances reasonably permit.

"In the absence of a physician and until a physician arrives, a professional nurse, if specially trained in recognition of cardiac arrest and the technique of closed chest cardiac resuscitation, may promptly apply the appropriate procedure as an emergency measure.

"Each hospital and health agency should determine policy as to whether its professional nurses are to function in cardiac arrest emergency and to provide or provide for the requisite special training for its professional nursing staff if its nurses are expected to function in such procedure, and such special training shall be taught by or under the direction of physicians thoroughly familiar with the technique as well as with the related problems and limitations."

12. Critical Illness and Death

It is recommended that a written policy covering the procedure to be followed in case of critical illness or death be prepared in collaboration with all persons concerned and be approved by management.

MEDICAL DIRECTIVES AND NURSING PROCEDURES FOR
EMERGENCY CARE OF OCCUPATIONAL AND
NONOCCUPATIONAL INJURIES
AND ILLNESSES

General Procedures Applicable to All Emergencies

The following procedures should be activated immediately whenever indicated:

1. Control Bleeding
2. Restore Breathing and Maintain Open Airway.
3. Prevent and Treat for Shock (See Shock)
4. Prevent Infection and Further Injury.
5. Provide the physician with as much history and information as possible about the injury or illness, including temperature, pulse, blood pressure, etc. Arrange for follow-up care and record all pertinent data.

Additional Medical Directives Applicable to All Emergencies_____

PHYSICIAN'S SIGNED AUTHORIZATION FOR MEDICAL DIRECTIVES AND NURSING PROCEDURES

Name & Address of Company or Institution Where These are to be Used

_____

_____

Name and Address of Physician Providing the Medical Direction

_____

_____

Name of Nurse in Charge_____

_____

_____

The medical directives and nursing procedures found in "Occupational Health Guide for Medical and Nursing Personnel" are approved, along with the additional directives and comments.

_____ _____ M.D.

Date Signature

Reviewed and up-dated:

_____ _____ M.D.

Date Signature

_____ _____ M.D.

Date Signature

Exhibit 3.4

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Abdominal Injuries, Acute

Trauma to the external abdominal wall may result in injury to underlying organs, even with little evidence of damage. Until seen by a physician, obviously sever or suspected internal abdominal injuries should be cared for as follows:

External Abdominal Injury

1. Keep employee flat and quiet
2. Control bleeding and cover open wounds.
3. If internal organs are exposed, cover with sterile bandage to avoid contamination.
4. Do not remove penetrating object.
5. Give nothing by mouth.
6. Treat for shock and avoid unnecessary handling.
7. Arrange for emergency transportation and for contact with the employee's personal physician.

Possible Internal Abdominal Injury

1. Keep employee flat and quiet.
2. Give nothing by mouth.
3. Treat for shock and avoid unnecessary handling.
4. Arrange for emergency transportation and for contact with the employee's personal physician.

Additional Medical Directives and/or Specific Medications _____

_____

_____

_____

Abdominal Pain (See Gastro-Intestinal Complaints)

Abrasions (See Wounds)

Amputations

1. In case of partial or complete amputation, make every effort to preserve the severed part. Keep clean and preferably place in sterile gauze.
2. Control bleeding and prevent shock.
3. Support with splint if indicated.
4. Arrange for medical care and transportation.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Artificial Respiration (See Asphyxiation, below)

Asphyxiation

1. Remove from exposure.
2. Immediately attempt to restore breathing.

_____

_____

_____

Asphyxiation (Cont'd)

Additional Medical Directives and/or Specific Mediations_____

_____

_____

_____

Asthma

1. Obtain written orders from employee's personal physician stating what care and treatment should be given if the individual has an acute attack at work.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Back Injuries and Back Complaints

Back injuries or complaints may or may not be occupational in origin. The major responsibility of the nurse when caring for these are:

1. Obtain an accurate and detailed history at the time the complaint is first reported. As much as possible of the data should be recorded in the employee's own words.

2. Refer to a physician for any substantial complaints.

Back Injuries and Back Complaints (Cont'd)

3. When complaints do not indicate the need for immediate medical evaluation, give care as follows:

   a) Give mild analgesic_____

   This may be repeated_____

   _____

   b) _____

4. Make arrangement for follow-up.

Additional Medical Directives and/or Specific Medications_____

_____

_____

_____

Bite Wounds

Animal Bites (Also see Puncture Wounds)

1. Wash thoroughly with soap and water as soon as possible.
2. Determine tetanus immunization status. (See Wounds)
3. Interprest the need for animal to be kept under observation.
4. Arrange for reporting to health department and, if indicated, refer to physician.

Bite Wounds (Cont'd)

Additional Medical Directives and/or Specific Medications_____

Insect Bites

1. If past history indicates or if there is evidence of generalized allergic response, arrange for immediate medical care._____

2. If there is no indication of allergic reaction:

   a) Remove stinger if in the wound.
   b) Wash thoroughly with soap and water.
   c) Apply cold packs.
   d) If indicated, arrange for medical care.

Additional Medical Directives and/or Specific Medications_____

Blisters (friction)

1. Clean area with antiseptic soap and water.
2. Apply a dry dressing.
3. Do not open routinely.
4. Seek cause and attempt to correct.

Blisters (friction) (Cont'd)

5. Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications_____

_____

_____

_____

Bruises (See Contusions)

Burns

Burns encountered in industry may be classified from the standpoint of etiology into:

Thermal
Chemical
Electrical
Radiation
Ultraviolet Ray

Thermal Burns

Thermal Burns-Minor

1. Immerse in cold or ice water or apply ice packs immediately, until burning sensation does not reoccur on exposure to air.

2. Wash gently with surgical soap and water.
3. If, after above car, burn appear to be minor and suprficial, care for as follows:_____

_____

_____

Thermal Burns (Cont'd)

Thermal Burns-Minor (Cont'd)

4. Determine individual's tetanus immunization status and follow procedure as outlined under wounds.

5. Arrange for follow-up care.
6. If blisters appear as the result of a minor thermal burn, they may be care for by the nusre as follows:_____

_____

_____

Thermal Burns- Major

1. Cover burned area with sterile or clean material so that entire burned area and immediate surrounding skin is enclosed. Use Aseptic technique.

2. Do not remove clothing which adheres to burned tissue.
3. Apply cold wet packs to the covered burned area.
4. Prevent shock.
5. Arrange for emergency transportation and medical care.
6. Notify physician of employee's tetanus immunization status.

Additional Medical Directives and/or Specific Medication_____

_____

_____

_____

_____

Burns (Cont'd)

Chemical Burns of the Eye (See Eye Care)

Chemical Burns of the Skin

Acid and alkali burns can be very deceptive and often result in third degree burns due to continuing action of the chemical long after exposure. Chemical burns may be very deep and tend to heal slowly.

In industries having potential exposures to chemcial burns, emergency procedures and facilities should be planned and their use clearly understood by the employees who may be exposed to chemical burns.

1. Immediate and continuous irrigation with large quantities of water is the first and most important emergency treatment for both minor and major chemical burns. It may be necessary to have showers located so that only a few seconds are spent in getting a burned person under a shower. Large scissors should be provided for the rapid removal of clothing soaked with the chemical.

2. After copious irrigation, the area may be neutralized as follows:

   a) For acid burns _____

   _____

   b) For alkali burns _____

   _____

Burns (Cont'd)

Major Chemical Burns of the Skin

3. After copious irrigation and neutralization, cover with sterile dressing and arrange for employee to be treated by a physician.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Minor Chemical Burns of the Skin

4. If, after the above procedures have been carrier out, the chemical burn on the skin appears to be small in area and superficial, care for as follows:_____

Electrical Burns

Electrical burns may follow contact with a charged electric wire or electric apparatus, or may result from lightning. Electrical burns vary tremendously in type; some are diffuse and shallow, whereas others are localized and deep. It is impossible to determine from the appearance of the burn just how serious it is. First aid treatment of the burned area is usually of secondary importance to possible serious damage to the hear and same way as outlined under thermal burns.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Burns (Cont'd)

Radiation Burns

Atomic Radiation-Burns caused by exposure to atomic radiation are thermal burns and may be cared for in an emergency as outlined under thermal burns except that decontamination (i.e. removal of clothing and washing the body free of irradiate particles with water, etc.) must be accomplished without delay to prevent a sever or fatal burn.

X-Ray Radiation Burns-Radiation burns due to overexposure to x-ray are slow in developing. Prevention and control, rather than emergency care, are the important factors here.

Ultraviolet Ray Burns

1. If extensive and/or severe, advise the employee to see his physician.
2. If burn is minor, care for as follows:_____

_____

_____

Additional Medical Directives and/or Specific Medications_____

_____

_____

Cardiac Emergencies

Emergencies which could be caused by cardiac disorders present a wide range of signs and symptoms. Many of these stimulate other conditions. Signs and symptoms of possible cardiac disorders may range from mild to severe, and may appear gradually or suddenly.

Signs and Symptoms Which May Indicate Cardiac Disorders:

1. Pain, originating in the chest, or behind the sternum, and radiating into the left shoulder, down the left arm, up the neck or to the back. This pain is steady and is not changed by movement of the body, by breathing, breath holding or swallowing. This pain is frequently described by the individual as "pressing", "squeezing" or "choking".

2. Indigestion.
3. Cyanosis or pallor.
4. Difficulty in breathing, often aggravated upon lying down.
5. Palpitations or some indefinable complaint in the chest.
6. Weak, rapid, unusually slow, or irregular pulse.
7. Weakness, faintness, pallor, cold clammy skin, or shock.

Severe Cardiac Emergencies Requiring Immediate Action Are:

1. Cardiac arrest.
2. Serious respiratory distress.
3. Sudden severe and/or persistent chest pain.
4. Shock and coma of possible cardiac origin.

Cardiac Emergencies (Cont'd)

Preparation for Meeting Cardiac Emergencies in the Occupational Setting

1. Care of Employee with Known Cardiac Disorders Which Could Produce An Emergency at Work

   a) With employee's permission, confer with his physician about care in an emergency and obtain specific written anticipatory orders.

   b) Interpret to the employee the facilities and resources available in case he becomes ill at work.

   c) Offer assistance to the employee and his physician in carrying out the physician's recommendation at all times, to prevent acute illness.

2. Emergency Equipment

   Maintain equipment for use in cardiac emergencies which can be readily transported. This should include equipment for:

   a) Maintaining an open airway.
   b) Aspirating mucous.
   c) Administration of oxygen.

Care of Cardiac Emergencies

Cardiac Arrest*

*See Item 11. Joint Position Statement of Wisconsin Nurses Association and State Medical Society of Wisconsin Regarding Closed Chest Cardiac Resuscitation.

Care of Cardiac Emergencies (Cont'd)

1. Arrange for contact with a physician and rescue squad.
2. Maintain open airway_____

_____

Additional Medical Directives and/or Specific Medications_____

Sudden, severe or persistent pain; Respiratory Distress; Shock and Coma

1. Allow the person to assume the most comfortable position and provide as much fresh air as possible.

2. Maintain open airway, aspirate mucous and administer oxygen.

3. Contact, or arrange for contact with, the employee's physician. If employee's physician is not available and the situation indicates the need for immediate medical care, contact_____

4. Be prepared to provide the physician with a concise report of the patient's condition, including the type of breathing, if pain is present, the site, intensity, radiation and duration, the pulse rate and blood pressure.

5. See that there is a minimum amount of handling and moving.
6. Reassure the patient and protect him as much as possible from the bustle and excitement which tend to converge on him in this type of critical situation.

Additional Medical Directives and/or Specific Medications

Mild or Suspected Cardiac Disorders

1. Obtain a careful history.
2. Check pulse, respiration and blood pressure.
3. Arrange for immediate medical care and transportation if indicated. If immediate medical care is not indicated, counsel employee on need for prompt medical evaluation.

Mild or Suspected Cardiac Disorders (Cont'd)

4. Arrange for follow-up care.

Additonal Medical Directives and/or Specific Medications._____

Cerebral Vascular Incidents

1. Keep the employee quiet.
2. Move as little as possible.
3. Elevate the head and shoulders.
4. Maintain open airway, aspirate mucous, if necessary.

Additional Medical Directives and/or Specific Medications_____

Chest Wall Injuries

Blow and compression injuries to the chest wall can result in conditions, such as rib fractures, traumatic asphyxia, hemothorax, massive atelectasis, and traumatic pneumothorax, as well as trauma to the heart muscle itself. The nurse should obtain an accurate history of how the injury occurred, in order to aid the physician in determing the treatment.

Chest Wall Injuries (Cont'd)

1. Arrange for employee who has sustained a chest wall injury to be seen by a physician as soon as possible.

2. See that individual is handled with extra care to prevent further injury.

3. Prevent and treat for shock.

4. Give oxygen if indicated. (Mask should be held in place with hand, rather than strapped on, to allow for quick removal if necessary.)

Open or Sucking Chest Wounds

In addition to above:

1. Cover wound immediately and make as air tight as possible with dressings and strappings.

2. Place individual on injured side in either a prone or semi-prone position.

Additional Medical Directives and/or Specific Medications_____

Common Cold (See Respiratory Irritation or Infection)

Communicable Diseases

1. Be alert for signs and symptoms.
2. Prevent exposure to other personnel.
3. If suspicious, refer to a physician.

Common Cold (See Respiratory Irritation or Infection) (Cont'd)

Communicable Diseases (Cont'd)

Additional Medical Directives and/or Specific Medications _____

_____

_____

Contusions

Minor Contusions

1. Apply cold compresses or ice packs immediately and advise employee to apply periodically during the first 24 hours or until swelling is relieved.

2. Place the injured part at rest. Pressure bandages may assist in minimizing the swelling.

3. After 24 hours, heat may be applied.

4. If soreness or disability persists, arrange for the employee to be seen by a physician.

Additional Medical Directives and/or Specific Medications _____

_____

_____

Contusions (Cont'd)

Major Contusions

1. Apply cold compresses or ice packs immediately.
2. Arrange to have employee seen by a physician.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Convulsive Disorders (Epileptic Seizures)

1. Employees known to have a history of convulsive seizures should be required to bring a statement regarding their emergency care from a physician.

2. Encourage and help the employee with convulsive disorders to interpret to his family and co-workers what to do if a convulsion occurs.

3. Interpret that emergency care consists essentially of protecting the person from self-injury. Attempts should be made to gently restrain the individual.

4. Provide a safe object to place between the teeth to prevent tongue injury, i.e., a padded tongue depressor.

5. Arrange for follow-up care.

Convulsive Disorders (Epileptic Seizures) (Cont'd)

Additional Medical Directives and/or Specific Medications_____

_____

_____

Cough (See Respiratory Irritation or Infection)

Critical Illness or Death

In case of critical illness or apparent death of an individual, while on the premises of the employer, the following steps are suggested:

1. If indicated, call the rescue squad.

2. Call the individual's personal physician, if possible, if not, use the company medical direct, physician on call, or hospital emergency call list.

3. Inform the personnel department to arrange for notifying the family.

4. Notify the family. If the family cannot be reached by phone, or in person, send a telegram of notification as evidence of your efforts to notify them.

5. Call the priest or minister.

6. If death appears certain:

   a. Leave the body as it was found.
   b. Notify the coroner's office at the request of the attending physician.

Critical Illness or Death (Cont'd)

c. Take statements from co-workers or others present at time of death and have these signed.

d. If it is necessary to make arrangements for the removal of the body, remove personal belongings in the presence of the witnesses and make a list of all items. Sign the list in the presence of witnesses and have the witnesses also sign or initial this list.

Additional Medical Directives _____

_____

_____

Dermatitis

Dermatitis related to occupational exposure are usually caused by:

Primary Chemical Irritants - including acids; alkalies; solvents, such as turpentine, gasoline, kerosene; and certain oils and mineral greases, all of which may cause dermatitis in any individual and after only one or a few contacts.

Sensitizing Agents- including various dyes, fabrics, rubber, insecticides, cosmetics, oils, resins, plants, woods, and sunlight, which may cause dermatitis in a few susceptible individuals following repeated contacts over a period of time.

1. Remove from source of irritation.

Dermatitis (Cont'd)

2. Obtain an accurate history of exposure; treatment, if any has been given; previous skin trouble; hobbies and work other than present employment.

3. Care for mild acute cases as follows: _____

_____

_____

_____

4. Refer (a) acute sever and (b) persistent mild cases to a physician for diagnosis and treatment and determination of cause. Send a detailed history to the physician.

5. In collaboration with the employee's physician and appropriate plant personnel, take steps to eliminate or reduce the exposure to irritants or sensitizing agents through:

a) Engineering controls.

b) Use of personal protective equipment.

c) Interpretation to employee the importance of good personal hygiene in the prevention of dermatitis.

d) Appropriate follow-up examination as recommended by employee's physician.

Dermatitis (Cont'd)

6. Confer with employee's physician and appropriate plant personnel regarding the employee's return to work. Some employees may have to be relocated for their protection against possible exposure to irritants.

Additional Medical Directives and/or Specific Medications_____

Diabetic Emergencies

1. Assist employees with known diabetes in following physician's orders and recommendations.

2. Obtain written orders from the employee's personal physician for giving emergency care to employees with known diabetes.

Insulin Reaction

Symptoms: headache, irratability, hunger, cold wet skin, trembling, blurring of vision, nervousness and fear, rapid pulse, pallor.

1. Call employee's physician immediately for orders.

2. Make arrangements for transportation to hospital, if indicated.

Insulin Reaction (Cont'd)

Additional Medical Directives and/or Specific Medications_____

_____

_____

_____

_____

Impending Diabetic Coma

Symptoms: Early-sugar in urine, excessive thirst, urinary frequency, craving food.

Late-Indigestion, vomiting, abdominal pain, extreme weakness, dry flushed skin, shortness of breath, sweet breath, rapid feeble pulse drowsiness to unconsciousness.

1. Call employee's physician.
2. Transport employee to hospital at once.

Additional Medical Directives and/or Specific Medications_____

_____

_____

_____

Diarrhea (See Gastro-Intestinal Complaints)

Dysmenorrhea

Simple dysmenorrhea not associated with unusual symptoms may be cared for as follows:

1. Bed rest.

2. Apply heat to lower abdomen.

3. Give analgesic _____

_____

_____

This may be repeated _____

If there is no relief, or if other signs and symptoms present themselves, refer employee to her physician.

Additional Medical Directives and/or Specific Medications _____

_____

_____

_____

_____

Earache

1. Obtain history of duration, symptoms, temperature, etc.

2. If earache appears mild and uncomplicated:

Earache (Cont'd)

a) Give analgesic _____

_____

b) Analgesic may be repeated _____

_____

3. If earache persists, even though mild, encourage the employee to see a physician.

4. If there is any drainage from either ear canal, with or without associated pain, refer to a physician.

Additional Medical Directives and/or Specific Medications _____

_____

_____

Ear Injuries (Also see Head Injuries)

Bleeding From One or Both Ears Following Injury

1. Consider as serious and see that individual is carefully handled.

2. Arrange for immediate medical care.

Ear Injuries (Also see Head Injuries) (Cont'd)

Additional Medical Directives and/or Specific Medications_____

_____

_____

Foreign Bodies in Ear Canal

Care for as follows:_____

_____

Injury to External Ear

Care for as any otherpart of body (See Wounds)

Additional Medical Directives and/or Specific Medications_____

_____

_____

_____

Electric Shock

Do not touch victim until he has first been removed from contact with the electric current. Shut off the current, if possible, or use a dry stick, rope, belt or other nonmetallic dry object to free the victim from contact. As soon as victim is free of contact from current:

1. Start Artificial Respiration

Electric Shock (Cont'd)

2. Arrange for Medical Care

Additional Medical Directives and/or Specific Medications_____

Epileptic Seizures (See Convulsive Disorders)

Eye Emergencies

Introductory Statement

Skill, precision, and extreme caution are essential in caring for eye injuries and eye conditions which come to the attention of the occupational health nurse. Many eye injuries, irritants and infections, which appear minor, may prove serious if not properly managed.

Use of Contact Lenses: The increased use of contact lenses has pointed up the need for the physician and nurse to help establish policies in regard to the wearing of contact lenses at work. (Also see Item 8)

Basic Principles of Safe Nursing Care of Eyes

1. Always try to obtain a history of injury to an eye (with the exception of chemical burns), before touching the eye(s). (See Perforating or Intraocular Foreign Body)

Basic Principles of Safe Nursing Care of Eyes (Cont'd)

2. Use aseptic technique throughout all nursing procedures.

Since viruses are often latent in tears and can be carried from one person to another via medicine droppers, medications or hands, aseptic technique is absolutely essential. Even antibiotic drops may carry serious infection since no single antibiotic is effective against all strains of bacteria.

3. Keep all equipment for eye care separate from that used for other emergencies.

Basic facilities, equipment, and supplies consist of:

a) An area or small room, separate from that used for other emergency care. (A small room in which the illumination can be controlled is desirable.

b) Equipment and Supplies.

1) A metal chair with headrest or a treatment table.

2) An adjustable light on a stand.

3) A magnifying lens on a binocular loupe, a lens on an adjustable fixture or a hand lens. (A binocular loupe is preferable.)

4) Flash light.

Basic Principles of Safe Nursing Care of Eyes (Cont'd)

b) Equipment and Supplies. (Cont'd)

5) A table or dressing tray large enough to hold the following:

A sterile lifter forceps in forceps container (If kept in antiseptic solution it should be relatively dry before using)

1 sterile eye irrigation bulb and bottle

1 kidney basin

Sterile cotton balls

Sterile applicators

Sterile 3 x 3 dressings and eye pads individually wrapped

Sterile medicine glasses, and medicin dropper for individual use

Small dressing towels

Scotch tape and white adhesive tape, 1/2 inch

6) Drugs and Solutions

Use only solutions and medications provided for in written medical directives unless ordered specifically for an individual employee.

Basic Principles of Safe Nursing Care of Eyes (Cont'd)

b) Equipment and Supplies. (Cont'd)

6) Drugs and Solutions (Cont'd)

Keep all solutions and medicines in glass-stoppered bottles without medicine droppers. All medications should be clearly labeled and dated, to provide for their systematic renewal replacement. Never use dropper bottles.

Pour solution to be used into a separate sterile medicine glass, and discard any unused portion; never return to supply bottle.

Medications ordered for individual employees should be marked with the employee's name and kept on a separate tray.

4. If the situation permits, test and record the visual acuity before any treatment is started. Test both eyes separately. Always check and record visual acuity after care is completed.

5. Assemble materials, and adjust light before touching the employee's eyes.

6. Wash hands thoroughly before touching the employee's affected eye(s), immediately after completion of treatment, and during treatmet if aseptic technique is broken.

Eye Injuries and Eye Conditions

Foreign Bodies

1. Corneal or Conjunctival Foreign Bodies

(a) Obtain an accurate history of the injury, including the type of work being performed and the tools being used. Save broken objects from which the offending particles may have come.

(b) If history and symptoms do not indicate the need for immediate medical care proceed as follows:

(See Performing or Intraocular Foreign Body)

1) If the situation permits, test the visual acuity before any treatment is given.

2) If there is foreign material on lids or around the eye, cleanse gently with warm sterile water. Do not rewipe with soiled cotton, because of the danger of abrasive particles causing injury.

3) Attempt to locate the foreign body by inspecting the eye with the aid of a magnifying lens. (When opening the eyelids to inspect or irrigate an eye, manipulate the eyelids with fingers placed over the boney rim of the orbit. Never exert pressure on the eyeball.)

Eye Injuries and Eye Conditions (Cont'd)

Foreign Bodies (Cont'd)

1. Corneal or Conjunctival Foreign Bodies (Cont'd)

(b) (Cont'd)

4) If the foreign body is on the cornea proceed as follows:

_____

_____

_____

5) If the foreign body appears to be superficially lodged in the eye, attempt to remove by either one or both of the following methods:

a) Irrigate the eye with sterile water or sterile normal saline. Direct the stream to one side of the foreign body.

b) If irrigation is not successful, use a small sterile applicator moistened in either one of the above solutions, rolling the applicator gently over the foreign body, away from the center of the pupil.

Eye Injuries and Eye Conditions (Cont'd)

Foreign Bodies (Cont'd)

1. Corneal or Conjunctival Foreign Bodies (Cont'd)

(b) (Cont'd)

5) (Cont'd)

b) (Cont'd)

If the foreign body does not float out easily by one or both of the above methods, do not atempt any other method of removal. Apply patch and refer to physician.

6) Following removal inspect for "rust ring", or injury to the cornea.

Eye Injuries and Eye Conditions (Cont'd)

Foreign Bodies (Cont'd)

1. Corneal or Conjunctival Foreign Bodies (Cont'd)

(b) (Cont'd)

7) If an eye anesthetic was used, before allowing the employee to return to work, make sure the employee is wearing safety glasses. Interpret to the employee that the eye may be insensitive for a period of time, until the anesthetic is worn off.

8) Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

2) Protruding Foreign Body

When a foreign body in the eye protrudes:

a) Do not attempt to pull the foreign body out.

Eye Injuries and Eye Conditions (Cont'd)

Foreign Bodies (Cont'd)

2) Protruding Foreign Body (Cont'd)

b) Have the employee lie flat and quiet and avoid any movement of the face, head or body.

c) Telephone physician immediately for orders.

d) Prevent pressure against the foreign boyd by supporting lids.

Additioal Medical Directives and/or Specific Medications

_____

_____

_____

3) Perforating or Intraocular Foreign Bodies

If history or symptoms indicate any of the followig, care for as a possible perforating or intraocular foreign body.

Symptoms

a) Employee reports that:

1) Something hit his eye.

Eye Injuries and Eye Conditions (Cont'd)

Foreign Bodies (Cont'd)

3) Perforating or Intraocular Foreign Bodies (Cont'd)

a) Employee reports that: (Cont'd)

2) He experienced a sudden impairment of vision.
3) He experienced a sudden gush of tears.

b) Change in the shape of the pupil.

c) Conjunctival hemorrhage.

Emergency Care

a) Do not attempt to handle the eye in any way, especially do not evert the upper lid.

b) Lightly patch both eyes to keep the lids closed and arrange for immediate care by an ophthalmologist. Delay can be exceedingly serious.

Eye Injuries and Eye Conditions (Cont'd)

Emergency Care (Cont'd

Additional Medical Directives and/or Specific Medications

Burns to the Eye

1) Chemical Eye Burns

Chemicals may be acid, alkali, irritant, detergent, or radioactive in nature. While acid burns are usually instantaneous, alkaline burns are always progressive and, therefore, require more diligent treatment. Irritants and detergents do not produce burns, but can damage the eyes by inflammation or drawing water from the tissues. Chemicals may be in the form of vapor, dust particles, or liquid.

Immediate care is essential:

a) Arrange for immediate irrigations of the eye with copious amounts of water at the scene of the accident. (Start within second, if possible, and continue for 10 minutes by the clock.)

Eye Injuries and Eye Conditions (Cont'd)

Emergency Care (Cont'd :

Immediate care is essential: (Cont'd)

b) Following thorough irrigation at the scene of the accident, arrange for employee to be brought to the employee health service and proceed as follows:

1) Instill topical anesthetic _____

_____

_____

2) Irrigate again with water for 20 minutes by the clock, making sure that all parts of the eye have been thoroughly irrigated.

c) Arrange for medical care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

Eye Injuries and Eye Conditions (Cont'd)

2. Flash Burns (Actinic Conjunctivitis)

Symptoms

Acute pain, photophobia inflammation, swelling and marked tearing. Involvement of only one eye is extremely infrequent.

a) Anesthetize by instilling_____

_____

_____

_____

_____

b) Apply ice compresses.
c) Inspect eye for a foreign body.
d) If indicated refer to physician.
e) See that employee wear adequate eye protective equipment.
f) Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

Eye Injuries and Eye Conditions (Cont'd)

Contusions to the Eye

A variety of non-penetrating ocular injuries can result from a blow directly to th eye, indirectly to the boney orbit, or from an air blast or explosion. A contusion can produce an insignificant subconjunctival hemorrhage, a simple "black eye", or a serious disruption of intracular contents with resulting loss of vision.

a) Obtain a history of injury.
b) Apply cold compresses.
c) If indicated, arrange for immediate medical care.
d) Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

Laceration of Eyelids

a) Obtain a history of injury.

b) Apply _____

_____

_____

Eye Injuries and Eye Conditions (Cont'd)

Laceration of Eyelids (Cont'd)

c) Carefully save all tags of skin. (Because of the rich blood supply to the eye, it may be possible for the physician to use this in repairing the eyelid.)

d) Arrange for medical care.

Additional Medical Directives and/or Specific Medications

Inflammation or Infection of Eyes

a) Obtain a history of the eye complaint.
b) Interpret to employee the danger of spreading the infection.
c) Interpret need for medical diagnosis and treatment.
d) Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications

Fainting

1. Have employee lie down with the head even with or lower than the body.

2. Provide as much fresh air as possible.

3. Loosen clothing.

4. Allow patient to inhale aromatic spirits of ammonia.

5. Check pulse and blood pressure.

6. If employee is unconscious longer than a few minutes or exhibits unusual symptoms, arrange for immediate medical care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

Fractures and Dislocations

1. Immobilize the part before moving the employee.

2. If a compound fracture, control the bleeding and prevent contamination.

3. Treat any shock.

Fractures and Dislocations (Cont'd)

4. Apply cold or ice packs to the area.

5. Arrange for immediate medical care.

Additional Medical Directives and/or Specific Medications

_____

_____

_____

_____

Frostbite

1. Restore circulation and temperature of the frozen part gradually by immersing the part in water which is close to body temperature. (Do not apply direct heat, such as hot water bottle, heat lamps, or direct cold, such as snow or ice.) Do not massage or rub vigorously.

2. When the part is rewarmed the person may be encouraged to exercise the affected part.

3. Following the above, care for as follows: _____

_____

_____

Gastro-Intestinal Complaints

Gastro-intestinal upsets and complaints can be an indication of serious illness. For example, indigestion could be related to cardiac disorder. Each case will need to be carefully evaluated. Employees who have recurrin gastro-intestinal symptoms should not be given repeated medication, they should be encouraged to see their personal physician.

Recognition should also be given to the fact that gastro-intestinal complaints could be related to exposure to toxic substances.

1. Obtain a careful history.

2. If history and symptoms indicate that this is a simple gastro-intestinal upset, for which a physician would not ordinarily be consulted, the following medication may be given to enable the employee to complete the days's work:

   a) Indigestion: Give _____

   _____

   _____

   This may be repeated _____

   _____

   b) Diarrhea: Give _____

   _____

Gastro-Intestinal Complaints (Cont'd)

b) Diarrhea: (Cont'd)

This may be repeated_____

_____

Headache

In industrial workers, headached may be caused by exposire to toxic substances on the job. List below substances which are being used which can cause headache:

_____

_____

1. Obtain careful history.

2. If indicated, take T.P.R. If temperature is_____or more, worker should be urged to go home and to consult his personal physician._____

_____

3. When history or symptoms indicate, take blood pressure. Compare with previous blood pressure readings on employee's health record and if indicated, counsel employee to check with his personal physician.

Headache (Cont'd)

4. When history and symptoms indicate that headache, as far as nurse can determine, is uncomplicated give _____

_____

_____

This may be repeated _____

_____

_____

5. The employee, who frequently complains of headache and comes to the nurse for palliative treatment, should be encouraged to talk out his problems. When medical care is indicated, he should be encouraged to see his personal physician.

Additional Medical Directives and/or Specific Medications _____

_____

_____

_____

Head Injuries

If unconsciousness occurs, even momentarily, consider the individual to have suffered a possible head injury.

1. Call or arrange to have a physician called.

Head Injuries (Cont'd)

2. See that the person is at absolute rest. Usually it is best to keep the injured person lying down with the head slightly elevated.

3. Maintain an open airway.

4. Observe whether or not there is bleeding from the ears, nose or mouth; the degree of consciousness; the color; pulse, respiration, blood pressure, the size, dilation and symmetry of pupils.

5. Control bleeding by direct pressure to wounds. Use caution when applying pressure over a possible skull fracture site.

6. Apply ice cap or cold compresses to the head.

7. Give no stimulants or sedatives.

8. Give oxygen if indicated.

9. Give physician as complete a history of injury as possible.

Additional Medical Directives and/or Specific Medications_____

Heart Emergencies (See Cardiac Emergencies)

Heat Emergencies (Heat Exhaustion, Heat Stroke, and Heat Cramps)

Heat Exhaustion

Symptoms: Pale clammy skin, rapid weak pulse, weakness, headache, nausea, dizziness and to the individual may have severe cramps in abdomen and legs.

1. Move to cool place, but protect from chilling.

2. Keep lying down.

3. Give fluids, as indicated.

4. Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications _____

_____

_____

Heat Stroke

Symptoms: Flushed hot skin, strong rapid pulse and unconsciousness.

_____

1. Move to a cool place.

2. Keep lying gown with head elevated.

3. Cold applications to head.

Heat Stroke (Cont'd)

4. Cool body by sponging with cool water.

5. Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Hernia Emergencies

Symptoms which could indicate a possible traumatic or strangulated hernia are:

1. Most hernias appear as a swelling in the groin.
2. The pain may be severe.
3. The swelling may disappear when the individual lies on his back.

Emergency Care

1. Lay the individual on his back.

2. Apply cold compresses on the hernia area.

3. Contact physician for orders.

4. Record details regarding the exact muscular effort the employee was performing when he first felt subjective symptoms. Record this in the employee's own words in quotation marks.

Hernia Emergencies (Cont'd)

Emergency Care (Cont'd)

Additional Medical Directives and/or Specific Medications_____

Lacerations (See Wounds)

Nosebleed

1. Spontaneous nosebleed may be cared for by the application of cold packs and pinching the sides of the nose against the septum, to apply pressure to the vessel.

2. Keep the person sitting erect and loosen the collar if it tends to constrict the neck.

3. Advise the person not to breathe or blow through the nose for an hour or two after bleeding has stopped.

4. Bear in mind that certain occupational exposures are manifested by nasal damage and bleeding.

5. If the bleeding does not stop within 10-15 minutes, arrange for medical care.

Lacerations (See Wounds) (Cont'd)

Nosebleed (Cont'd)

Additional Medical Directives and/or Specific Medications_____

_____

_____

Puncture Wounds (See Wounds)

Respiratory Irritation or Infection

1. Obtain history.

2. Tank T.P.R.

3. Check into the possibility of occupational exposure to substance which produce respiratory irritation.

4. If indicated, refer for immediate medical care.

5. If condition, as far as nurse can determine, is mild the following medication may be given.

a) Common cold symptoms_____

_____

This may be repeated_____

_____

Puncture Wounds (See Wounds) (Cont'd)

b) Cough _____

_____

This may be repeated _____

_____

c) Sore throat _____

_____

This may be repeated _____

_____

6. Advise employee on prevention of spread of infection to co-workers and family.

7. Counsel employee regarding rest, diet and fluids.

8. Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications _____

_____

_____

Resuscitation (See Asphyxiation)

Shock

Some degree of shock is present with every injury of any consequence and may follow even minor accidents. The same emergency measures apply to both the prevention and treatment.

Symptoms: Weakness and faintness

Pale, moist and cool skin
Rapid and weak pulse
Low blood pressure
Nausea and vomiting

Prevention and Emergency Care

1. Give emergency care for the underlying cause and maintain an open airway.

2. Keep the person lying down with feet elevated and head low. Do not lower head and elevate feet in cases of (a) head injury, (b) if breathing difficulty is thereby increased, or (c) if person complains of pain when it is attempted.

3. Maintain body warmth without overheating.

4. Give oxygen if indicated.

5. Offer fluids.

6. Arrange for medical care and transportation.

Resuscitation (See Asphyxiation) (Cont'd)

Shock (Cont'd)

Prevention and Emergency Care (Cont'd)

7. Be ready to inform physician of blood pressure readings, pulse, etc.

Additional Medical Directives and/or Specific Medications _____

_____

_____

Sore Throat (See Respiratory Irritation or Infection)

Splinters and Slivers

1. Cleanse area with surgical soap and water.

2. Inspect carefully to evaluate the depth imbedded, and size.

3. Determine tetanus immunization status in all cases of splinters & slivers the same as for puncture wounds. (See Puncture Wounds)

Small, Superficial splinters and slivers

a) If careful inspection indicates that sliver or splinter is small and lodged superficially under the ski, attempt to remove aseptically. _____

_____

Splinters and Slivers (Cont'd)

b) If unable to remove by simple procedures, refer to physician.

_____

_____

_____

Large, or Imbedded splinters and slivers

a) If sliver or splinter appears to be other than superficially lodged under the skin, refer to physician.

4. Arrange for follow-up care.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Sprains and Strains

1. Obtain careful history of injury.

2. Rest and/or elevate the injured part, and apply cold.

3. Arrange for medical evaluation.

Sprains and Strains (Cont'd)

Additional Medical Directives and/or Specifif Medications_____

Toothache

1. If there is a cavity, pack with oil of cloves.
2. Give_____

_____for temporary relief of pain.
3. Advise employee to see his dentist.

Additional Medical Directives and/or Specific Medications_____

Wounds

Wounds seen by the occupatioal health nurse can usually be classified as Severe, Moderately Severe or Superficial. Any break in the skin involves the risk of infection and contamination immunization status against tetanus. (See Tetanus Immunization.)

Wounds (Cont'd)

Severe or Moderately Severe Wounds

Refer immediately to a physician wounds with obvious or suspected involvement of deep structures (nerves, tendons and muscles) imbedded foreign material, wounds with jagged or torn edges, persistent bleeding, contaminated wounds, and wounds about the head and face.

1. If bleeding is severe, activate measures to control bleeding.

2. Apply sterile dressing, and protect the wound.

3. Arrange for immediate medical care and transportation.

4. Immobilize the damaged area, if indicated.

5. Notify physician of employee's tetanus immunization status.

Additional Medical Directives and/or Specific Medications_____

_____

_____

Tetanus Immunization Status in Relation to Care of Superficial Wounds

In caring for superficial wounds, determine individual's tetanus immunization status and proceed as follows:

Wounds (Cont'd)

1) Individuals without active immunization against Tetanus*

Refer to physician for evaluation all individuals with superficial wounds, who have never received basic tetanus immunization_____

_____

_____

_____

2) Previously Immunized Individuals*

a) Refer to, or consult with physician regarding all individuals with superficial wounds who have received basic tetanus immunization but have not had a tetanus toxoid booster during the past _____months.

_____

_____

_____

b) Individuals with superficial wounds who have received basic immunization against tetanus and have had a tetanus toxoid booster within the past _____months, generally need no booster shot as a part of the immediate handling of the wound.

* A statement, Prophylaxis Against Tetanus in Wound Management, prepared by the Committee on Trauma, American College of Surgeons is reprinted on the following pages. This includes information about basic immunization.

Wounds (Cont'd)

Care for these according to type of superficial wound as outlined below and on the following pages.

Superficial Wounds

Abrasion (Superficial)

1. Cleanse with antiseptic soap and water._____

_____

2. Apply_____

_____

3. Cover with dry or non-adherent type of dressing.

4. Counsel employee regarding care of wound on and off job, and arrange for follow-up care.

5. Recheck immunization status against tetanus, and proceed as outlined under "Tetanus Immunization in Relation to Care of Superficial Wounds".

Additional Medical Directives and/or Specific Medications_____

_____

_____

Wounds (Cont'd)

Contusions

Lacerations (Superficial)

1. Cleanse with antiseptic soap and water_____

_____

2. Apply_____

_____

3. If indicated, approximate edges of laceration with sterile "butterfly closure" type of dressing._____

_____

_____

4. Apply dry sterile dressing or non-adherent type of dressing and appropriate bandage.

5. Recheck immunization status against tetanus, and proceed as outlined under wounds.

6. Counsel employee regarding care of the wound on and off the job and arrange for follow-up care.

Wounds (Cont'd)

Contusions

Lacerations (Superficial) (Cont'd)

Additional Medical Directives and/or Specific Medications _____

_____

_____

_____

Puncture Wounds (Superficial) (Also see Splinters and Slivers)

1. Encourage bleeding to help cleanse wound.

2. Cleanse with antiseptic soap and water.

3. Apply _____

_____

_____

_____

4. Apply appropriate dressing.

5. Recheck immunization status against tetanus, and proceed as outlined under wounds.

6. Counsel employee regarding care of wound on and off the job and arrange for follow-up care.

Wounds (Cont'd)

Puncture Wounds (Superficial): (Also see Splinters and Slivers) (Cont'd)

Additional Medical Directives and/or Specific Medications _____

_____

_____

Infected Wounds (Superficial)

1. Refer to physician if there is any evidence of lymphangitis (red streak) and/or pain is present.

2. If wound shows only signs of early infection care for as follows:

   a) Soak or apply moist heat.

   b) Apply _____

   _____

   c) Check immunization status against tetanus and proceed as outlined under wounds.

   d) Arrange for follow-up care.

   e) If infection does not clear up, or show signs of responding to the above treatment within 24 hours, refer to a physician.

Wounds (Cont'd)

Infected Wounds (Superficial) (Cont'd)

Additional Medical Directives and/or Specific Medications_____

Exhibit 3.5

HARZA-EBASCO JOINT VENTURE

HOLD HARMLESS AGREEMENT

Whereas Harza-Ebasco Joint Venture (Contractor) has made available to _____

_____

(Subcontractor) its first aid facilities and the services of its nurse or attendant for the treatment of employees of Subcontractor who may be injured or become ill while engaged in the construction of the _____(Project),

Now, therefore, in consideration of Contractor's making such facilities and services available for the use of Subcontractor and its employees, Subcontractor hereby covenants and agrees that:

1. In the event any of Subcontractor's employees is transported to a physician or hospital by means of an ambulance (whether or not furnished by Contractor), Subcontractor will promptly pay for such services directly to the company or hospital rendering the service;

2. Should any of Subcontractor's employees require the services of a physician or hospital, Subcontractor will promptly pay all charges therefore directly to the attending physician and the hospital;

3. Subcontractor will defend, indemnify and save harmless _____(client,) Contractor, their authorized representatives, successors and assigns, and all of their officers and employees against any and all claims, demands or liabilities arising from Subcontractor's employees' use of first aid facilities and/or the receipt of such first aid and/or ambulance services, irrespective of whether it is alleged, claimed or proved that the negligence of any person indemnified hereunder caused or contributed to any such claim, demand or liability; and

4. Upon receipt of notice from Contractor that any such claim, demand or liability is being pursued against_____ (client), Contractor, any of their authorized representatives, successors or assigns or any of their officers or employees, Subcontractor will immediately undertake, at Subcontractor's sole expense, the defense of such claim, demand or liability and will upon entry of judgement make any and all payments necessary thereunder.

Nothing contained in or implied by this Agreement shall be construed to relieve Subcontractor of its primary responsibility for the health and safety of its employees, including the furnishing of additional first aid facilities if the Contractor's first aid facilities are not convenient to Subcontractor's work site, or if they should not be available for Subcontractor's employees' immediate use.

HARZA-EBASCO JOINT VENTURE _____

By_____
Title

Date:_____

By_____
Title

Date: _____

Witness:

_____ _____

Witness: _____

Date: _____

Date: _____

Exhibit 3.5

HARZA-EBASCO JOINT VENTURE

HOLD HARMLESS AGREEMENT

Whereas Harza-Ebasco Joint Venture (Contractor) has made available to the Subcontractor its first aid facility, and the services of its nurse or attendant for the treatment of employees of _____ (Subcontractor) who may be injured or become ill while engaged in the construction of the _____(Project).

Now, therefore, in consideration for the use of such facilities and the receipt of such services, the Subcontractor hereby covenants and agrees that:

1. In the event any of its employees is transported to a physician or hospital by means of ambulance service (not furnished by Contractor), it will promptly pay for such service direct to the company or hospital rendering the services;

2. Should any of its employees require the services of a physician or hospitalization, it will promptly pay all charges therefore direct to the attending physician and the admitting hospital;

3. It will defend and indemnify and save harmless _____ _____ (client), Harza-Ebasco Joint Venture, their authorized representatives, successors or assigns, and all of their officers and employees against any and all claims, demands or liabilities arising from the receipt of such services by its employees or the use by such employees of such dispensary; and

4. Upon receipt of notice from Harza-Ebasco Joint Venture of any such claim, demand or liability being pursued against _____ _____(client), Harza-Ebasco Services Incorporated, their authorized representatives, successors or assigns, or any of their officers and employees, it will undertake the defense of such claim, demand or liability and will upon entrance of judgement make any and all payments necessary thereunder.

Nothing contained in or implied by this Agreement shall be construed to relieve Subcontractor of his primary responsibility for the health and safety of his employees, including providing first aid facilities if the location of the

Contractor's first aid facility is not convenient to Subcontractor's work site, or if they should not be available for Subcontractor's immediate use because of use by others.

Witness:

_____ _____

Subcontractor

Date: _____ By

Title _____

AMBULANCE INSPECTION REPORT

EXHIBIT 3.6

Inspectors Signature _____ Date _____

Mileage/Start of Road Test _____ End of Road Test _____

Mark the following way: OK - Condition safisfactory & in working order.
UN - Condition unsatisfactory.
NA - Doesn't apply to this inspection.

Engine Compartment
Engine Oil Level ____
Transmission Oil Level ____
Radiator Coolant Level ____
Battery Charge Indicators ____
Battery Terminals ____
Hood Latch & Bar ____
General Engine Cleanliness ____

Tires & Wheels
Tire Pressure
LF ____
RF ____
LR ____
RR ____
Tire Press. Spare ____
Rubber & Tred Condition ____
Condition of all Wheels ____

Emergency Equipment
Fire Extinguisher ____
Flashlights (3) ____
Jack & Jackup Tool ____
Lug Wrench ____
Road Flares (4) ____

General Vehicle Condition
Exterior-Washed & Waxed ____
Windows-Clean & Intact ____
Body-Dents, Scratches, etc. ____
Rear Step-up Grate ____
Interior Clean Front ____
Interior Clean Rear ____
Upholstry Front ____
Upholstry Rear ____
Compartment separation door ____
Ashtray clean ____

Lights
Headlights Low ____
Headlights High ____
Parking Lights ____
Brake Lights ____
Back-up Lights ____
Hazard Lights ____
Turn Signals ____
Inst. & Panel Lights ____
Spotlights & Flashers left ____
Spotlights & Flashers right ____
Beacon & flashers ____
Roof Sign ____
Loading lights Side & Rear ____
Drivers Dome Light ____
Attendants Dome Lights ____

Siren & Horn
Horn ____
Siren/Horn Button ____
PA System ____
Siren-Wail & Yelp ____

Instruments
Speedometer/Odometer ____
Fuel Gauge ____
Oil Gauge ____
Temp. Gauge ____
Volt Gauge ____
Amperes Gauge ____

Mirrors
Rear View ____
Left front ____
Right front ____

Mechanical System
Windshield Wipers & Washers ____
Main Brakes ____
Emergency Brakes ____
Steering Response ____
Engine Performance ____
Transmission Performance ____

Climate Control Equipment
Windshield Defroster ____
Front Air Conditioner ____
Front Heater ____
Rear Air Conditioner ____
Rear Heater ____

Miscellaneous
Map of New Orleans ____
Map of St. Charles Parish ____

Unsatisfactory Conditions

_____

_____

_____

_____

5758/1-81

EXHIBIT 3.7

ATTENDANTS INSPECTION REPORT

ATTENDANTS SIGNATURE _____ DATE _____

Indicate in the column either OK, M – for missing, R – for missing and replaced; or X – for condition unsatisfactory. Explain fully all X's in the comments section below.

FIRST AID KIT		RESPIRATORY EQUIPMENT	
Oral Airway – Adult (1)		O_2 Cylinder Pressure (Minimun 600 PSI)	
Lg – Adult (1)		(Bleed off after checking)	
Gauze Pads – 4 x 4-(20)		Oral Airway – Adult (1)	
Sterile Eye Pads (4)		Lg – Adult (1)	
Surgipads, Sterile		S Tube	
5" x 9" (10)		Demand Valve, Oper and Clean	
8" x 10" (10)		Adult Mask (2)	
Kling Gauze – 3" (4)		Ambulance Bag, Oper and Clean	
– 4" (4)		Check Ambulance kit for:	
– 6" (4)		Lg and Med Mask	
Ace Bandage – 3" (4)		O_2 Pressure Reg Condition	
– 4" (4)		O_2 Key	
– 6" (2)		O_2 Connecting Tubing (3)	
Triangular Bandage (4)		O_2 Nasal Cannula (3)	
Bulb Syringe – (1)		O_2 Mask – Adult – (2)	
Epistik – (2)		**ORTHOPEDIC EQUIPMENT**	
Tongue Blades – (5)		Air Splint Kit (1)	
Tourniquet – (1)		Air Splint, Over the Shoe (2)	
Tape, Clear – 1/2" (2)		Air Splint, Full Leg, w/out ft	
– 1" (2)		(2)	
Tape, Adhesive – 3" (1)		Board Splints – Small Arm (2)	
Bandaids – (6)		– Large Arm (2)	
Sterile Gloves (2 pair)		Short Spineboard (1)	
Stethoscope – (1)		CPR Lifeboard (1)	
Sphgmomanometer – (1)		Cervical Collar – Small (2)	
Scissors, Heavy-Duty (1)		– Medium (2)	
Scissors, Bandage (1)		– Large (1)	
Scissors, Micro (1)		Frac Strap Pack (1)	
Hemostat, Straight (2)		Sand Bags – (4)	
Hemostat, Curved (2)		**MISCELLANEOUS EQUIPMENT**	
Ring Cutter (1)		Stretcher, Ambulance Cot (1)	
Forcep, Tongue Seizing (1)		Burn Kit – (1)	
Penlight, Diagnostic (1)		Burn Sheet – (2)	
Ammonia Inhalents (1 box)		Normal Saline 250 ml (2)	
Safety Pins, Large (6)		Cold Packs (6)	
Carrying Case Condition		Linen Packs (2 Sheets, least)	
SUCTION EQUIPMENT		Pillows – (2)	
Oper of apparatus		Blankets – (2)	
Suction Catheters – 16 F (3)		Flashlight (1)	
Suction Tubing (3)		Facial Tissue 1 box)	
Plastic Suction Bags (3)		Urinal, Male, Disp 1)	
Emesis Basin (2)		All purpose plastic bags (4)	
Cleanliness of Apparatus		Water Cooler (1,	
		Trash can clean and empty	
		Spray Can Disinfectant (1)	

COMMENTS _____

SECTION IV SECTION V SECTION VI SECTION VII SECTION VIII

SECTION 4

SPECIAL CONSTRUCTION PROCEDURES

SECTION 4

CONFINED WORKPLACE PROCEDURE

CONFINED WORKPLACE PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to establish standards for entry into and performance of work within confined or enclosed spaces.

2.0 SCOPE

This procedure shall apply to all project personnel, manual and non-manual, required to enter into confined or enclosed spaces. For purposes of this procedure, "confined or enclosed spaces" is defined as any space having a limited means of egress, which is subject to the accumulation of toxic, flammable or explosive contaminants or is subject to an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, ventilation or exhaust ducts, sewers, underground utility vaults and manholes, pipelines and open top spaces more than four (4) feet in depth such as pits, tubs, vaults and vessels. Tunnels and shafts, caissons, cofferdams and compressed air workplaces shall be exempt from this procedure. Compliance with Occupational Safety and Health Regulation for Construction 29CFR 1926 Sub-Part C (21) is required for these conditions.

3.0 REFERENCES

3.1 Occupational Safety and Health Regulations for Construction
29 CFR Part 1926 Sub-part C (21)
29 CFR Part 1926 Sub-part D (55)
20 CFR Part 1926 Sub-part J
20 CFR Part 1926 Sub-part V (956)

3.2 Safety Tags -OSHA Regulation 1926 Sub-part G
29 CFR Part 1926 Sub-part V (956)

4.0 ATTACHMENTS

4.1 Confined Space Entry Permit

5.0 PREREQUISITES :

5.1 Instruction available on the nature of hazards involved, necessary precautions to take, and use of protective and emergency equipment for work in confined spaces.

5.2 Have available on site:

5.2.1 Equipment for toxic, flammable, explosive and oxygen deficiency survey tests.

5.2.2 Low voltage or ground fault equipment and flash lights for work subject to Section 7.6 of this procedure.

5.2.3 Airline respirators, gloves, boots, goggles and fire extinguishers as required.

5.2.4 Rescue gear as required.

6.0 RESPONSIBILITIES

6.1 The Safety Representative shall be responsible for the following:

6.1.1 Determination and designation of confined spaces.

6.1.2 Establish requirements for a safe working environment in confined spaces.

6.1.3 Furnish Confined Space Entry Permits to personnel required to work in confined spaces.

6.1.4 Assure Confined Space Entry Permits are posted when proper conditions for entry are verified and maintain a record of their issuance.

6.1.5 Perform flammable and toxic surveys and check for oxygen deficient atmospheres.

6.1.6 Prescribe safety and health measures to be instituted to ensure a safe workplace.

6.1.7 Perform pre-established number of environment checks while work is in progress in confined spaces.

6.1.8 Provide training for the correct use of life support equipment and emergency rescue requirements.

6.2 The Supervisors shall be responsible for the following:

6.2.1 Monitor confined spaces to determine if ventilation is adequate and consult with the Safety Representative where doubt exists as to a safe working environment.

6.2.2 Assure positive measures are taken to prevent introduction of hazardous materials and equipment is de-energized and tagged out.

6.2.3 Inform employees of the hazards involved, precautions to be taken and proper use of personal protective equipment before and during wo in confined spaces.

7.0 PROCEDURE

7.1 Before entry of personnel into a possible confined space, a review of the work area must be obtained from the responsible Supervisor. If there is doubt as to whether or not a particular area constitutes a "confined space", the responsible Supervisor shall consult with the site Safety Representative for resolution of such doubt.

7.2 Prior to personnel entry into a confined space, positive measures shall be taken to:

7.2.1 Prevent introduction of hazardous materials into the confined space through inter-connecting equipment such as piping, ducts, vents, drains or other means.

7.2.2 De-energize and tagout or lockout, or both, machinery, valves, fans or other potentially hazardous equipment that directly connect to or are in the confined space other than those items required for the work to be performed in the confined space.

7.2.3 Assure that confined space is adequately ventilated befcre and during occupancy of the confined space.

7.3 For work in confined spaces that may contain toxic, flammable or explosive contaminants or be subject to oxygen deficiency, a Confined Space Entry Permit shall be obtained from the site Safety Department (Attachment 4.1).

7.3.1 Tests shall be conducted to determine the nature and extent of any such hazard prior to issuance of a Confined Space Entry Permit.

7.3.2 Confined Space Entry Permit shall be posted exterior to the confined space adjacent to the primary point of entry during occupancy of the subject confined space and a record kept of their issuance.

7.3.3 Appropriate measures shall be taken to eliminate or to control the noted contaminants within acceptable limits as defined by OSHA Construction Regulations Part 1926.

7.3.4 When controls are not feasible to achieve full OSHA compliance, protective equipment shall be used to keep personnel exposure within acceptable limits.

7.4 Employees required to enter confined spaces shall be informed of the hazards thereof, precautions to be taken and proper use of any required personal protective equipment before entry into any confined space which has flammable, explosive or toxic contaminants or an oxygen deficient atmosphere (less than 19.5% oxygen by volume).

7.5 A safe means of personnel entry and exit shall be available at all times during occupancy of a confined space.

7.5.1 An attendant properly instructed in applicable emergency procedures shall be present exterior to and immediately at the exit of the confined space at all times when personnel are entering, within or exiting the confined space. The attendant shall maintain communication with those working within the confined space and provide aid in emergency.

7.5.2 Safety harnesses and lifelines shall be used by personnel within confined spaces unless such use itself

constitutes an unacceptable additional hazard to personnel as confirmed by the responsible Supervisor and the site Safety Representative concurrently. In such cases, alternate means for safe removal of personnel in an emergency, shall be determined and stipulated by the responsible Supervisor and the site Safety Representative.

7.6 Low voltage (12 volts maximum) electrical devices or circuits with ground fault circuit interrupters shall be used in confined spaces where moisture or surfaces that pose an electrical shock hazard are present. Where the confined space contains a flammable or explosive atmosphere not removable by ventilation, only explosion-proof electrical items and non-sparking tools, clothing and equipment may be used within the enclosed space or closely adjacent to openings therein.

7.7 Hot work, including, but not limited to welding, heating or thermal cutting, shall not be initiated in a confined space until an initial oxygen, flammable and explosive atmosphere test is made and the test results indicate an acceptable atmosphere as defined by OSHA.

7.7.1 All hot work in confined spaces shall require a Confined Space Entry Permit (Exhibit 4.1)

7.7.2 Ventilation must be established to and maintained in confined spaces during hot work.

7.7.3 No hot work is permitted in flammable or explosive atmosphere.

7.7.4 Cylinders containing oxygen or acetylene or other fuel gases shall not be taken into confined spaces.

7.7.5 Atmospheric oxygen testing of the confined space shall be repeated at predetermined intervals during hot work within the confined space. Test results must indicate an acceptable atmosphere for work to continue.

7.7.6 When sufficient ventilation cannot be obtained without blocking the means of access, personnel shall be protected by air line respirators.

7.7.7 Upon completion or suspension of hot work in confined space, all gas supply hoses and associated tools shall be removed from the confined space. The gas supply to the torches shall be shut off at some point outside the enclosed space whenever the torches are left unattended for a substantial period of time such as during lunch period.

8.0 INSPECTION

None.

CRANE HOISTED WORK PLATFORMS

1.0 Purpose

The purpose of this procedure is to provide a means to accomplish access to work otherwise unaccessible in a crane hoisted work platform.

2.0 Scope

This procedure is used in unique work situations for the safe use of a crane hoisted work platform. The crane hoisted work platform is allowed to be used only where there is no other accepted means of access to a work place.

3.0 References

3.1 29 CFR Part 1925.500(f) - standard specifications.

3.2 American National Standards Institute B 30.5 1968.

4.0 Attachments

4.1 Drawing for safety work platform.

5.0 Prerequisites

ANSI B30.5 standard and knowledge of acceptable means of access to workplaces.

6.0 Responsibilities

6.1 The site Safety Representative shall be responsible for:

6.1.1 The determination that the initial work platform load test is accomplished.

6.1.2 The use of work platform where there is no other accepted means of work place access.

7.0 Procedure

7.1 The work platform shall:

7.1.1 Be of welded steel construction with a minimum design safety factor of 5 times the maximum intended load. See attachment 4.1 (drawing for Safety Work Platform).

7.1.2 Have steel guardrails and toe boards. A door will be a steel door hinged to open into the platform. The guardrail shall conform to OSHA construction standard 1926-500(f) standard specifications.

7.1.3 Have a floor of wood planking or steel plate which is bolted or welded to insure against displacement.

7.1.4 Have a four point suspension capable of maintaining the work platform in a level position regardless of load placement.

7.1.5 Be connected to the crane safety hook, or the hook shall be moused. A secondary safety wire rope capable of carrying twice the intended platform load shall be secured to the platform rigging and above the headache ball with screw pin shackles.

7.1.6 Have overhead protection with steel plate or expanded metal.

7.1.7 Be limited to a capacity of four (4) persons and the maximum live load of 1,000 lbs. posted on the platform.

7.1.8 Be load tested before initial use and visually inspected before every use. Any structural modification to the work platform shall require a load test before a return to service.

7.2 Employees using the platform shall:

7.2.1 Be required to wear safety belts with a lanyard affixed to the work platform.

7.2.2 Not leave a suspended work platform except a structural steel connector.

7.2.3 Have only hand tools on the work platform. Flammable or combustible liquids or gases shall not be permitted on the work platform.

7.2.4 Be prohibited during high winds, electrical storms, snow, ice or other adverse weather conditions which could affect the safety of the employees.

7.2.5 Be in continuous sight of the operator of the crane. A designated employee not on the platform shall be the signal person when the work platform is not in continuous sight.

7.1.6 Where visual hand signals are not possible, other positive means of communications shall be maintained.

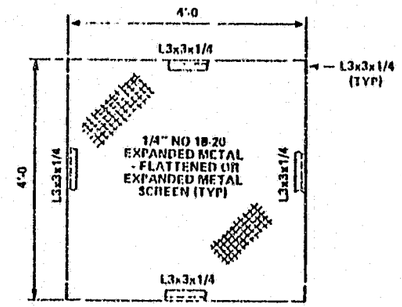
7.3 Crane requirements when used to hoist work and suspend platforms:

7.3.1 The crane shall be inspected immediately prior to hoisting and or suspending a work platform. Any structural or functional defect which would adversely affect the safe operation of the crane shall be corrected before suspending a work platform. The ANSI B30.5 1969 inspection section shall be followed.

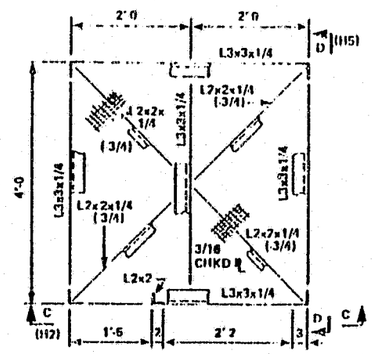
7.3.2 The maximum rate of hoist shall be 150 feet per minute. Raising and lowering the work platform shall be power operated in both up and down directions.

7.3.3 The crane must be in a level and stationary condition when lifting or suspending personnel in a work platform.

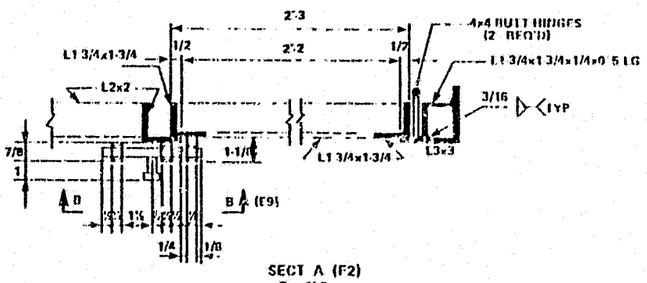
SAFETY WORK PLATFORM FOR PERSONNEL LIFT



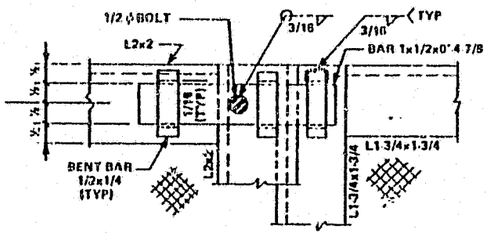
ROOF PLAN



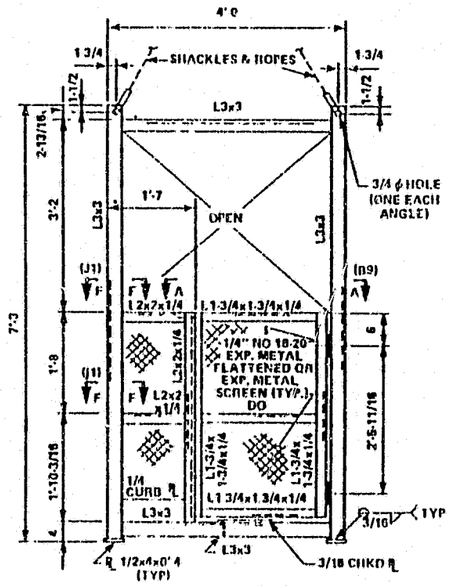
FLOOR PLAN
TOTAL LIVE LOAD = 1,000 LB.



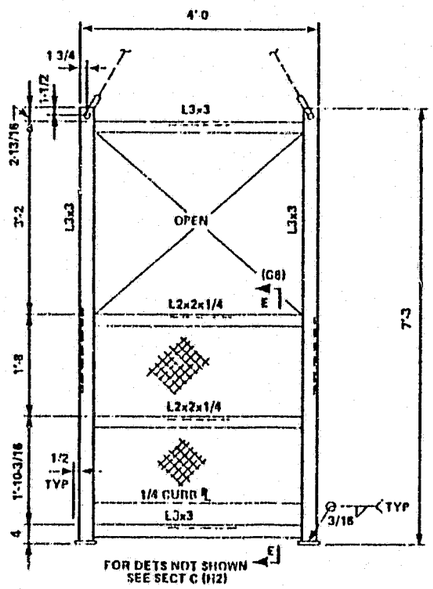
SECT A (F2)
3 = 1'-0



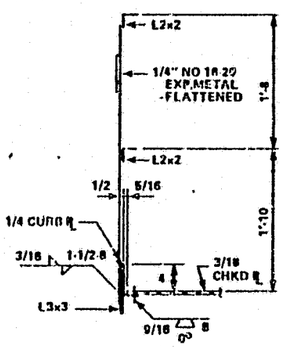
SECT B (B8)
6 = 1'-0



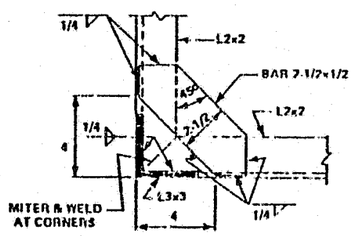
SECT C (C5)



SECT D (B6)
(3 SIDES)



SECT E (G5)
1 = 1'-0



SECT F (F1, G1)
3 = 1'-0
(2 PLACES ONLY)

NOTES:

DESIGN, FABRICATION AND ERECTION OF MATERIAL SHALL BE IN ACCORDANCE WITH AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS, ADOPTED FEBRUARY 12, 1969.

STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM SPECIFICATION A 36.

ALL CONNECTIONS SHALL BE WELDED.

ALL WELDING WHERE APPROVED SHALL BE IN ACCORDANCE WITH THE AISC SPEC. WELDS SHALL BE MADE WITH ASTM A233 CLASS E70 SERIES ELECTRODES, OR SUBMERGED ARC WELDING WITH F7 E SERIES FLUX ELECTRODE COMBINATION.

AFTER SURFACE PREPARATION IN ACCORDANCE WITH STEEL STRUCTURES PAINTING COUNCIL SPECIFICATION SSPC SP 6 "COMMERCIAL BLAST CLEANING", ALL STEEL SHALL BE PAINTED WITH TWO (2) COATS OF PAINT.

ALL CHECKERED PLATES, CURB PLATES AND ANGLES SHALL BE NEATLY FINISHED AT CORNERS AND END.

7.3.4 Crane equipped with outriggers shall be fully extended for maximum stability and substantial floats used when there is any question of ground stability.

7.3.5 The operator of the crane shall remain at the controls when the work platform is suspended.

HARZA-EBASCO JOINT VENTURE

CONSTRUCTION PROCEDURE

TAGGING AND CLEARANCE

1.0 Scope

1.1 This procedure establishes practices which shall be employed for the protection of personnel, equipment, and identify jurisdictional control of systems (establishment of equipment operating responsibility).

1.2 This procedure shall provide for safe and orderly tagging to protect men and equipment while work is being performed on systems and/or equipment. Contractors are required to coordinate their tagging program with this procedure.

1.3 This procedure shall define the tagging practices to be employed for both construction and/or safety during the construction phase of work.

2.0 References

2.1 None

3.0 Attachments

3.1 Sample of Orange (Danger-Do Not Operate) Tag-Attachment "A"

3.2 Sample of White (Danger-Testing) Tag-Attachment "B"

3.3 Sample of Yellow (Caution) Tag-Attachment "C"

3.4 Sample of (Construction Safety) Do Not Operate Tag-Attachment "D"

3.5 Sample of (Construction Safety) Do Not Use Tag-Attachment "E"

4.0 Prequisites

4.1 Have available, on site the proper tags, as specified by this procedure.

4.2 Have a list issued of those persons authorized to hang tags.

4.3 Have a list issued of those persons authorized to request clearances.

5.0 Responsibility

5.1 The Harza-Ebasco Joint Venture Construction Superintendent shall administer the tagging procedure as the tagging authority.

5.1.1 The tagging authority shall appoint assistant tagging authorities in each department to coordinate the tagging for that department. The assistant tagging authorities shall be responsible for issuing and recording all tags used by his department.

5.1.2 The Construction Superintendent shall coordinate this tagging procedure between the project contractors and Ebasco and Client at the start of construction.

5.1.3 The Harza-Ebasco Joint Venture Construction Superintendent shall coordinate the construction tagging system with the start up procedures and Client requirements.

6.0 Procedure

6.1 ORANGE TAG (Danger-Do Not Operate) - Tag Conditions & Descriptions

6.1.1 Orange tags designate that construction or repair work is in progress on the equipment or system, that safety conditions have been established, and that operation of the device or equipment could result in injury to personnel. Devices displaying such a tag are not to be operated in any manner or under any conditions until the tag has been removed by the person authorized to remove the tag, and only when that person is in possession of the detached properly numbered tag stub. The person removing the tag will write in the date and time of removal and sign his name.

6.1.2 The tag will read - "Danger Do Not Operate" in black print on an orange tag.

6.1.3 The following information shall be printed on both the tag and the stub - date, time, name of equipment, and the man responsible for the work, with a blank line for filling in by the person using the tag.

6.1.4 The tags will be available from the Project site office supply.

6.1.5 For a sample of an orange tag, refer to attachment "A".

6.2 WHITE TAG (Danger-Testing) - Tag Conditions & Description

6.2.1 A white tag shall be used to indicate that the device being tagged is under-going a pre-turnover test which involves a potentially dangerous condition.

6.2.1.1 When a white, Testing in Progress, tag is hung on any electrical switch or device shall not be closed to complete an electrical circuit, until the tag is removed.

6.3.2 The yellow tag is an information tag, to indicate a possibly hazardous condition. For example, the condition description may indicate: "Terminal block is energized - Do not terminate cables on this block". The tag is not intended to prevent work, but is to notify that caution is necessary before proceeding with the work. The tag is to be removed prior to proceeding with work directly related to the conditions noted on the tag; for example, remove the tag before terminating on the above mentioned terminal blocks.

6.3.3 The size of the tag shall be 1-7/8" X 3-3/4", with no stub. The tag shall have a cotton string with two (2) free ends, extending from the reinforced eyelet for five (5) inches.

6.3.4 For a sample of a yellow tag, refer to attachment "C".

6.4 Construction Safety Tag - Do Not Operate

6.4.1 The tag shall read on the front side, "Danger", in white print on a red square, with a black border, and the words, "DO NOT OPERATE" in black print. The back side shall have "Danger", in white print on a red square with a black border and the words "DO NOT REMOVE THIS TAG". The color of the tag shall be white.

6.4.2 The size of this tag shall be 3" wide by 5½" long, with no stub. The tag shall have an eyelet for attaching with a cotton string as required.

6.4.3 For a sample of a white tag, refer to attachment "D".

6.4.4 Construction safety tagging is the standard safety tag utilized on a project for temporary construction items.

6.4.5 This "DANGER DO NOT OPERATE TAG" is employed on temporary construction energy sources in the forms of electricity, liquids, compressed gases, or any other energy source under control of construction personnel. This tag shall not be used on any permanent plant item requiring tagging by construction, but shall be used on temporary items only.

6.5 Construction Safety Tag - Do Not Use Or Operate Tag

6.5.1 The tag shall read - "OUT OF SERVICE " - DO NOT USE OR OPERATE", in black print on a red tag.

6.5.2 The actual size of the tag shall be 3½" wide by 6¼" long, with a 1-3/4" stub, perforated for easy removal. The tag shall have a cotton string with two (2) free ends extending from the reinforced eye-let for five (5) inches.

6.5.3 The following information shall be printed on the tag portions: The words "Date" and"Signed", with blank lines for filling in. On the stub shall be printed the words "DATE" and "INITIAL", with blank lines for filling in.

6.5.4 For a sample of a red tag, refer to attachment "E".

6.5.5 The "OUT OF SERVICE - DO NOT USE OR OPERATE" tag shall be attached by safety department personnel to unsafe items, i.e., defective or improperly installed ladders, defective or unsafe power tools, unsafe scaffolds, barricades around unsafe areas, etc.

When unsafe tools or conditions are corrected, the tag shall be signed and dated by the foreman and/or supervisor who made the correction, and shall then be returned to the safety department.

7.0 Inspection

7.1 This procedure does not require Harza-Ebasco Joint Venture Quality Control Department inspections.

7.2 All Harza-Ebasco Joint Venture and Contractor Construction Supervisors in charge or overseeing of work operations shall conduct inspections as necessary to ensure that all requirements of this procedure are strictly followed when such work requires the placement or removal of tags.

7.3 All Harza-Ebasco Joint Venture and Contractor test personnel shall conduct inspections as necessary to ensure that all requirements of this procedure are strictly followed when performing tests requiring the placement or removal of tags.

CONSTRUCTION CAMPS

GUIDE

1 GENERAL REQUIREMENTS

a. Camps shall be located on well drained ground, as far away from swamps and wet areas as possible.

b. Roads shall be laid out to allow safe vehicular and personnel traffic movement and of adequate width to allow for passing of vehicles. Necessary street drainage and facilities shall be planned for adequacy, commensurate with local conditions.

c. Every shelter in the camp shall be constructed in a manner which will provide protection against the elements.

d. Effective insect, vermin and rodent control will be followed throughout the camp housing and mess hall areas.

e. It shall be the duty of the camp manager to report immediately to the local health officer the name and address of any individual in the camp known to have or suspected of having a communicable disease.

f. Whenever there shall occur in any camp case of suspected food poisoning or an unusual prevalence of any illness in which fever, diarrhea, sore throat, vomiting, or jaundice is a prominent symptom, it shall be the duty of the camp manager to report immediately the existence of the outbreak to the health authority by telegram or telephone.

g. The principal camp area in which food is prepared and served and where sleeping quarters are located, should be at least 500 feet from any area in which livestock is kept.

h. all heating, cooking and water heating equipment shall be installed in accordance with State and local ordinances, codes and regulations governing such installations. If a camp is used during cold weather, adequate heating equipment shall be provided.

2 LAUNDRY, HAND WASHING AND BATHING

a. Laundry, hand washing and bathing facilities are recommended in the following ratio:

(1) One hand wash basin per family shelter or per six persons in shared facilities.

(2) One shower head for every 30 persons.

(3) There should be at least one shower for each 30 employees in construction camps. The use of a common towel shall be prohibited.

(4) Each washing facility shall be maintained in a sanitary condition and should be provided with adequate water, soap, individual towels of cloth or paper, and covered receptacles for disposal of waste.

(5) Slop sink in each building used for laundry, hand washing and bathing.

b. Floors shall be of smooth finish but not slippery materials; they shall be impervious to moisture. Floor drains shall be provided in all shower baths, shower rooms, or laundry rooms to remove waste-water and facilitate cleaning. All junctions of the curbing and the floor shall be covered. The walls and partitions of shower rooms shall be smooth and impervious to the height of splash.

c. An adequate supply of hot and cold running water shall be provided for bathing and laundry purposes. Facilities for heating water shall be provided.

d. Every service building shall be provided with equipment capable of maintaining a temperature of at least 68°F during cold weather.

e. All service buildings shall be kept clean.

f. Facilities for drying clothes shall be provided.

3 SANITATION

a. Suitable domestic sewage disposal facilities shall be provided to conform with prevailing health codes. Untreated sewage shall never be discharged into bodies of water or streams or left on open ground. Properly planned and adequately drained leaching areas will provide aid in sewage and sanitation controls.

b. Location of septic tanks shall provide for good drainage away from dwellings or other occupied building areas. Disposal areas shall be isolated and remote from water supply, mess halls and dwellings.

c. Mess hall garbage will be collected in closed containers within screened areas. Controls shall provide for continuous automatic closure of screen doors. Cleanliness and good sanitary practices shall be followed.

d. Fly-tight, rodent-tight, impervious, cleanable or single service containers shall be provided for the storage of garbage. Garbage containers shall be kept clean. Garbage containers shall be emptied when full, but not less than twice a week.

e. In camps where public sewers are available, all sewer lines and floor drains from buildings shall be connected thereto.

4 EATING FACILITIES

a. A properly constructed kicchen and dining hall adequate in size, separate from the sleeping quarters of any of the workers or their families, shall be provided in connection with all food handling facilities.

b. No person with any communicable disease shall be employed or permitted to work in the preparation, cooking, serving or other handling of food, foodstuffs, or materials used therein, in any kitchen or dining room operated in connection with a camp or regularly used by persons living in a camp.

c. Ample supply of hot and cold water shall be available at all times at all mess halls. Domestic water line risers shall be installed and equipped with a garden hose maintained in service at all times for sanitation washing of floors of garbage area and use as supplemental fire protection.

d. All areas where food is stored, prepared or served should be of fly-proof construction, well lighted and ventilated and will be kept clean and sanitary at all times. Positive control measures will be taken for health protection against insects and rodents.

e. Absolute cleanliness must be insisted on. In the employment of food handlers, cooks, waiters, and helpers, all shall be required to submit to periodic health certification examinations and furnish certificates of health that verify their physical competency.

5 FIRST AID

a. Adequate first aid facilities shall be maintained and made available in every camp for the emergency treatment of injured persons.

b. Such facilities shall be in charge of a person trained to administer first aid and shall be readily accessible for use at all times.

6 FIRE FIGHTING

a. Sufficient fire fighting equipment, in the form of fire extinguishers, stand pipes, hydrants and hoses will be available for all buildings and areas affording fire hazard. (Standards of selection, layout, equipment and maintenance shall follow NFPA codes.)

b. All fire protection equipment, hydrants and hose should be appropriately marked and placed in designated areas and shall conform to "National Standard Fire Hose Coupling Thread Standards."

c. An adequate alarm system shall be installed to warn of the occurrence of fires. Fire warning procedures shall be placed in each building.

d. An adequate number of employees will be instructed in the use of fire fighting equipment and methods of fire control.

e. Qualified project personnel will make periodic fire inspections of the entire work and camp area and maintain permanent records of such inspections.

7 LIVING QUARTERS

a. All construction camps shall be built and maintained to conform to good occupancy regulations, fire prevention/protection standards and shall conform to accepted sanitary regulations (State and Federal Health Department should be contacted for detailed sanitary standards and information).

b. Each room used for sleeping purposes should contain at least 50 square feet of floor space for each occupant. At least a 7 foot ceiling shall be provided.

c. Beds, cots or bunks and suitable storage facilities such as wall lockers for clothing and personal articles shall be provided in every room used for sleeping purposes.

d. The floors of each shelter shall be constructed of wood, asphalt, or concrete. Wooden floors shall be of smooth and tight construction. The floors shall be kept in good repair.

e. All wooden floors shall be elevated not less than 1 foot above the ground level at all points to prevent dampness and to permit free circulation of air beneath.

f. All exterior openings shall be effectively screened with 16 mesh material. All screen doors shall be equipped with self-closing devices.

8 WATER SUPPLY

a. Water for domestic service shall be periodically tested for purity and must be provided in sufficient quantity to service the entire camp area for domestic and fire protection needs. Records of testing reports and results shall be maintained.

b. Adequate safeguards will be installed for water systems to provide purification treatment and filtration if necessary. All necessary steps shall be taken to prohibit contamination.

9 TOILET FACILITIES

a. Toilet facilities adequate for the capacity of the camp shall be provided.

b. Each toilet room shall be located so as to be accessible without any individual passing through any other sleeping room. All outside openings shall be screened with 16 mesh material.

c. Urinals should be provided on the basis of at least one unit or two linear feet of urinal trough for each 20 employees.

d. Each toilet room shall be lighted naturally, or artificially by a safe type of lighting at all hours of the day and night.

e. An adequate supply of toilet paper shall be provided in each privy, water closet or chemical toilet compartment.

f. Privies and toilet rooms shall be kept in a sanitary condition.

g. All abandoned privy pits shall be filled with earth and the grounds and buildings left in a clean and sanitary condition. If privy buildings remain, they shall be locked or otherwise secured to prevent entrance.

SECTION 6

OCCUPATIONAL HEALTH

Section 6

6.0 Occupational Health

6.1 Chemical & Physical Agents

6.2 Particulates (Dust Fumes, Mists)

Particulates are usually divided into several classes. The most commonly used terms for solids are dust, fumes and smoke; for liquids there are mists and fogs. In general dust are coarser than fumes, and fumes have somewhat larger particulates than most smokes. Mists are generally larger than fogs.

Particulates may range in size from less than one micron (u) to 10 ten or more microns in diameter.

6.3 Gases and Vapors

A vapor is the gaseous state of a substance which is ordinarily a liquid or solid at normal room temperature. Carbon monoxide is a true gas because it is never found as a liquid at room temperature while benzene, a liquid at room temperature, evaporates to form a vapor. All gases can be drawn into the lungs where they may either be absorbed into the blood or exhaled, depending upon their solubility and other properties. A major source of gases in the construction industry is welding.

Air contaminants can affect the body in various physiological ways, i.e. as irritants, asphyxiants, anesthetics, narcotics and systemic poisons. Many of the physiologic responses to gases depend upon airborn concentration levels and time of exposure.

Effects of over-exposure to air contaminants may be acute or chronic, local or systemic. The effect of a chemical hazard exposure is considered acute when the reaction appears with little time lag, usually within minutes or hours. On the other hand, chronic effects generally result from repetitive or continuous exposure over a period of months or years. The lung disease, known as silicosis, is a good example of a chronic effect. The inhalation of silica dust over a period of years can, if the concentrations are high enough, cause silicosis which can not be cured. It must be prevented through the use of masks, ventilation, etc.

Occupational dermatitis is another common physiological response to irritants. This is most common in the construction industry and results from the use of chemical compounds. The skin irritant and the sensitizing potential of the environment influences the severity of the skin reaction. The level of personal hygiene practiced by employees is the major determinant of the frequency with which dermatitis occurs.

Dermatitis has three principal causes: (1) primary irritants such as solvents oils, greases and acids; (2) sensitizers such as petroleum, coal tar solvent, and epoxy formulations; (3) mechanical and physical agents, such as abnormal heat or cold, friction, and trauma.

6.4 The Safe Limits of Exposure to Airborne Contaminants and Harmful Physical Agents.

The practice of occupational hygiene is based on the concept that for each substance there is a safe or tolerable lower level of exposure below which significant injury or illness will not occur. Whether or not any ill effects occur depends on the properties of the substance, the dose, the route by which the substance enters the body, and the susceptibility of the exposed employee.

The substance has four routes of entry or means by which it may act on the body: (1) inhalation; (2) ingestion; (3) injection and (4) contact or absorption through the skin. Contact with the skin is the most frequent; but inhalation is the most serious.

The American Conference of Governmental Industrial Hygienists (ACGIH) began developing safe concentration limits in 1945. Today the present list of chemicals for which the ACGIH has Threshold Limit Values (TLV's) is over 500.

The bases on which the TLV's are set may differ from substance to substance. For some, the guiding factor is protection against impairment of health such as the silica dust TLV level. For some others it is the freedom from irritation or other forms of stress such as the TLV for sulfur dioxide.

The TLV list is reviewed annually, resulting in some revisions as well as additions to the list.

It is most important that TLV data be correctly used. It should be remembered that there is a wide variation in individual susceptibility to substances. Therefore, the TLV's were intended to be used only as guides in the control of health hazards. Basically, a TLV refers to a time weighted 8 hour average and a 40 hour work week. It is a level directed toward chronic or long term exposure. To date, very limited data has been published for acute exposures.

The US Department of Labor under the Occupational Safety and Health Act (OSHA) of 1970 promulgated the (ACGIH) threshold limit values quidelines as statutory limits.

6.5 Strategy of Air Sampling

In construction occupational environments, the true sampling of airborne particulates is usually hampered by various causes. Among these are the fact that there is continual change in concentration with respect to time and location, changes are less pronounced with gases and vapors, mobility and turn-over of employees further complicate the situation.

Thus, a single specific sampling strategy cannot be applicable for all air monitoring; general principles are presented that can be incorporated into a monitoring strategy.

The most effective procedure involves the use of a personal sampling device worn by the employee during his working hours or any portion thereof that may be under inquiry. It is important to recognize that such personal sampling devices are not perfect instruments and require periodic observation since the work situation, instrument malfunction and enviromental condition can readily change. The periodic observations then are used to record the changes in sampling data for proper evaluation of the sampling results. This personal sampling generally consists of breathing zone samples.

A reliable estimate of a employee's exposure requires replicate samples irrespective of their duration - This is basic to all good sampling techniques and a minimum of three samples should be obtained.

The duration of the collected sample should represent some identifiable time period, usually a complete work operation or a specified numer of minutes out of each hour. This will enable the employee's exposure on a time weighted average to be calculated.

The preparation of sampling requires that one be knowledgeable of the work process involved, and be able to recognize the potentially hazardous work conditions.

A basic knowledge of the physical and chemical charactistics of the air contaminant under inquiry is one of the most important factors in selection of an air sampling method. For instance a filter media such as paper may be the correct choice for collecting dust and welding flame particulates but would be a poor choice for collecting solvent vapors. Similarly combustible gas indicator or detector tubes are good selection for sampling gases and vapors but unsuitabe for sampling particulates.

6.6 Sampling for Gases

Sampling for gases and vapors can be conveniently obtained in most cases with direct reading devices like the Colorimetric indicating tubes in which a color change indicates the presence of the contaminant in the air passed through the tube.

There are instruments for the direct reading of carbon monoxide, oxygen and combustion gas indicators as well as a number of other instruments too specialized for discussion in this manual.

All instruments for sampling gases or vapors must be calibrated before use with their limitations and possible sources of error fully understood.

As has been already noted, one must remember that no device is completely specific for the substances of interest, and care must be taken that interferences do not invalidate the sampling results. Manufacturer's data for the before-mentioned colorimetric indicating tubes lists those substances which interfere with the substance of interest.

Sampling gaseous air contaminants may use one of the following methods. The first involves passing air through a direct reading instrument which indicates without further analysis the actual concentration of the substance at the time the sample is taken. (example: the combustible gas indicators and oxygen indicators) The second method involves passing a known volume of air through an absorbing medium for analysis in a laboratory. (example: activated charcoal sealed in a glass tube) In the third method an air sample at known temperature and pressure is collected in a container which is resealed immediately to prevent sample loss.

The indicator or colorimetric tube is a deceptively simple device to use in determining the presence of a gas. While only minimal skills are required to operate the instrument, far greater knowledge and skill are required to recognize its limitations and obtain a representative sampling data. Experience has shown that the following measures help to minimize some errors:

1) Test each batch of tubes with a known gas concentration if possible;

2) Read the length of stain in a well lighted area;

3) Read the longest length of stain if stain development is not even or sharp;

4) Observe the manufacturer's expiration date closely; discard outdated tubes.

5 Keep detector tubes in your shirt pocket or other warm place until time to start the test;

6 Refer to the manufacturer's data for a list of interfering substances.

6.7 Sampling for Particulates

There are several viable methods to be used in sampling for particulates; however, since the employee's actual exposure is our primary concern, a personal sampler should be the first choice. This sampling system consists of a pump, a flow indicating device with a valve for controlling the amount of air sampled, and a device for collecting the particulates. (A filter is the most widely used collecting device because it allows for full or partial shift samples to be taken for laboratory analysis.)

Sampling systems offer a variety of pumps, but the best pumps for personal monitoring for particulates should have a volume capacity from 1 to 3 liters per minute capable of at least eight hour battery operation. The pump should have a rotameter or airflow indicating meter with an ajustable valve. The airflow should be checked hourly and adjusted if necessary to maintain the required airflow when used in sampling. Filters can be made of widely different substances such as paper or a variety of synthetic materials. The type of filter material required will be determined by the use to which it will be put. When sampling with filters it is advisable to always take a blank or unused filter for analysis along with the exposed filters. The blank filter should be taken from the same sample lot as the used filters.

A filter is often described by the material from which it is made with the average size of the filter pore openings. For example a VM-1 filter is a vinyl filter membrane with a 5 micrometer pore size.

In preparation for sampling the following steps should be taken.

1) The pump should be fully charged;

2) The pump air flow should be calibrated to the required volume;

3) For respirable dust sampling, the operator must ensure that the filter cyclone assembly does not leak;

4) Assemble the entire sampling system, turn on the pump, and seal the inlet opening. The pump should not operate unless there is a leak in the system;

5) After sampling, inspect the filter for loose material or large particles on the filter. This is a sign of tampering and contamination, and that sample should be rejected.

6.8 Record Keeping

The OSH Act and the various standards promulgated thereunder require the collection and long term retention of our employees' health exposure records. To be of value sampling records must be accurate, complete, appropriate, and as concise as possible. These records in addition to meeting OSHA requirements are beneficial in workman's compensation and liability cases.

Field monitoring requires certain information or data from the sampling operation. A suggested form for obtaining this information is attacted (exhibit 1).

6.9 Toxic Effects of Welding Fumes

A. General

The inhalation of welding fume air contaminants may be eventually harmful to the lungs or other organs of the human body. The ultimate toxicity of these substances depends primarily upon their concentration and the physiological response of the body.

Exhibit 6.9 is a representation of some of the possible constituents present in welding fumes, and it shows how they can be characterized into various toxicological subgroups. Both gases and particulates can be resolved into two general groups - those which produce pneumoconiosis and those which can be classified as pulmonary irritants or toxic inhalants.

It should be noted that the toxicity of the individual elements and compounds that comprise the fumes and gases produced during welding varies widely, depending on the effect of these contaminants on the organs of the human body. For example, the prolonged inhalation of even small quantities of cadmium-oxide or lead fumes can produce fatal consequences. In contrast, the metal fume fever caused by the inhalation of zinc-oxide fumes is of short duration and generally produces no lasting effects. The major types of ailments associated with welding fume contaminants are described in this section.

6.9 B. Iron Oxide

Iron oxide may produce siderosis with pigmentation of the lungs (black in welders and red in iron ore miners) without disability. The x-ray shadows reproduced by the iron oxide in the lungs are somewhat similar to the shadows from silicosis. Because of this similarity, differential diagnosis is often 99fficult, and heavy exposures to iron oxide dust and fume may lead to medicolegal problems. It is therefore, important to control iron oxide exposures even though siderosis is not disabling. the condition commonly occurs in electric arc welders after years of exposure, but may occur in silver polishers or rouge users.

6.9 C. Copper

Inhalation of copper fumes has been reported to produce fibrosis in animal studies as well as signs and symptoms of metal fume fever or copperosis in welders. In addition, it can produce congestion of the nasal mucous membranes, ulceration with perforation of the nasal septum on occasion, and sometimes pharyngeal congestion. Copper metal fumes or salts leave a sweetish, metallic taste, and cause salivation, nausea, vomiting, gastric pain, hemorrhagic gastritis, diarrhea, cramps in the calves, and terminally, muscular rigor and prostration. In chronic exposures the liver, kidneys, spleen may be injured and anemia may develop. Contact of the skin with copper salts may result in an itching exzema which may be due to sensitization; contact of the eye with copper salts will result in conjunctivitis, edema of the eyelids, and ulceration and turbidity of the cornea.

6.9 D. Beryllium

Inhalation of beryllium dust or fume may result in the production of an acute or chronic systematic disease called berylliosis, depending upon the extent of exposure and the nature of the beryllium compound involved.

Both the acute and the chronic forms of beryllium poisoning have some similar signs and symptoms. These include a relatively non-productive cough, progressive difficulty in breathing, loss of appetite, and loss of weight. The chief differences between the two forms are seen in the suddenness of onset and in the rate of progression.

The earliest radiographic evidence of pulmonary involvement may appear within a few weeks of the first symptoms of the disease. The most significant feature of the radiograph is uniform distribution of fine granulation, with variation from a ground glass appearance, through a diffuse reticular pattern, to distinct nodulation superimposed on a granular background.

Additional aid in the diagnosis of chronic beryllium poisoning may be gained through the study of pulmonary function, by use of the beryllium patch test, and through determinations of the beryllium study of the surgical lung biopsy.

6.9 E. Cadmium

Inhalation of these fumes may cause respiratory irritation with attendant sore, dry throat and a metallic taste followed by cough, chest pain, and difficulty in breathing. Bronchitis, pneumonitis, and pulmonary edema may occur as a result of irritative action of fume. Additional complaints of headache, dizziness, loss of appetite, and weight loss may be pronounced. The liver, kidneys, and bone marrow may be injured by the presence of the metal.

A single exposure to cadmium fumes can cause severe lung irritation which may be fatal. Most acute intoxications have been caused by the inhalation of cadmium fumes at concentrations which did not produce warning symptoms of irritation. Continued exposure to lower levels of cadmium in air has resulted in chronic poisoning characterized by irreversible lung injury (emphysema) with abnormal lung function and urinary excretion of a specific low-molecular-weight protein which may be associated with evidence of kidney impairment. Clinical evidence of the cumulative effects of cadmium may appear after exposure has terminated and the disease tends to be progressive.

6.9 F. Chromium

The oxidation of chromium alloys can produce chromium trioxide fume which is often referred to as chromic acid. These fumes react with water vapor to form chromic and dichromic acid. Contact with these fumes can produce small, painless, cutaneous ulcers as well as dermatitis from primary irritation or allergic hypersensitivity. Inhalation of these fumes will produce bronchospasm, edema and hypersecretion, bronchitis, and a hyperreaction of the trachea bronchial tree similar to asthma.

6.9 G. Lead

Lead poisoning in industry almost always results from inhalation of lead fumes. Signs and symptoms of lead poisoning may include abdominal pain with tenderness, constipation, headache, weakness, muscular aches or cramps, loss of appetite, nausea, vomiting, weight loss, anemia with pallor, and a dark lead line of the gums. The lungs act as a portal of entry for lead, but in themselves show no reaction to the lead.

6.9 H. Magnesium

The oxide fumes from magnesium can produce metal fume fever which may result in irritation to mucous membranes. Experimental work with animals has failed to show any detrimetal response in the lungs.

6.9 I. Manganese

The fumes from manganese are highly toxic and they can produce total disablement even after exposures as short as a few months to high fume concentrations. Disablement is more likely, however, after prolonged and repeated exposures above 30 mg/m^3. Exposure to manganese dioxide may

result in a neurological lesion involving the basal ganglia, the frontal cortex, and occasionally the pyramidal system. Symptoms are similar to Parkinson's syndrome and include "weakness of the legs," difficulty in walking downhill, instability, and weakness while doing heavy work. Disturbances in gait follow. These may vary from an accelerating to a shuffling gait with retropulsion. The mobility of facial expression may become diminished, and the person may develop a so-called manganese mask or may have a permanent grin. Speech becomes monotonous, low in volume, indistinct and thick, and there may be sudden blocks in speech. Spasmodic laughter may be provoked easily, may become uncontrollable, and may be accompanied by drooling. There may be absentmindedness, mental confusion, aggressiveness or hallucinations. There is a feeling of increased tiredness, cramps, and tremors, and there may be somnolence (drowsiness), insomnia, or restless sleep. Coordination becomes impaired. Other aspects of health of the patient and his longevity are usually unaffected.

6.9 J. Nickel

Certain nickel compounds are carcinogenic and toxic. A significant increase in cancer of the lung and sinuses has occurred among employees in nickel smelting and refining plants. Few other effects have been reported among users of nickel, and invariably these have been clouded with accompanying exposure to other materials. In the case of exposure during welding, however, the slow recovery and persistance of residual symptoms were characteristic of the symptoms following acute exposure to nickel carbonyl. Nickel fumes have been known to cause severe pneumonitis with an exposure believed to be as low as 0.26 mg/m^3 of air for six hours.

6.9 K. Molybdenum

Little information is known concerning the exposure of humans to molybdenum or its compounds. Animal studies indicate a low order of toxicity. The main indications from exposure were bronchial and alveolar irritation along with moderate fatty changes in liver and kidneys.

6.9 L. Vanadium

Vanadium is present in some welding filler wires and may also be found as a contaminant from combustion of coal and certain oils. Vanadium pentoxide is moderately hazardous for both acute and chronic exposures. Effects of exposure are chiefly severe irritation of the eyes, throat, and respiratory tract resulting in conjunctivitis, nasal catarrh, irritation of throat (pharyngitis), bronchopneumonia, and mild chronic bronchitis.

Exzematous lesions of the skin and discoloration of the tongue my occur. Prognosis is favorable. The chief complications are pneumonitis, allergy, and slight to moderate chronic changes in the mucous membranes of the respiratory tract (pharnyx). Questionable fibrosis and emphysema have been reported after exposure of several years.

6.9 M. Zinc

Zinc-oxide fumes are formed during welding, brazing, or cutting of galvanized metals. The inhalation of reshly formed fumes may produce a brief, self-limiting illness known variously as zinc chills, metal fume fever, brass chills, and brass founder's fever. This condition is characterized by chills,

fever, nausea, vomiting, muscular pain, dryness of mouth and throat, headache, fatigue, and weakness. There may also be a slight leukocytosis. These signs and symptoms usually abate in 12 to 24 hours with complete recovery following. Immunity from this condition is rapidly acquired if exposure occurs daily, but it is quickly lost during holidays or over weekends. Because of this behavior, metal fume fever is sometimes known as "Monday morning sickness."

6.9 N. Fluorides

The use of electrodes with coatings containing fluorides offers a definite hazard. The inhalation of fluoride fumes or gases may produce respiratory tract irritation manifested by chills, fever, dyspnea, and cough. The particles are readily absorbed, and promplty produce an increase in urinary fluoride excretion. When excessive amounts are inhaled, this excretion lags behind the daily intake resulting in a build-up of fluoride in the bones. If storage of fluorides continues over a sufficiently long period, the bones may show an increased radiographic density and structural abnormalities may eventually develop.

6.9 O. Carbon Monoxide

In some welding processes, carbon dioxide is reduced to carbon monoxide. In the case of carbon dioxide-shielded metal-arc welding, carbon monoxide concentrations exceeding recommended levels have been detected in the fumes near the arc; however, the concentration decreased rapidly with distance from the arc. Because of its great affinity for hemoglobin, the concentration of 200 ppm of carbon monoxide may produce the characteristic primary symptoms, headache, and mental dullness, with a few hours. Exposure to a concentration of 600 pm may produce headaches in less than an hour, may cause unconsciousness in little more than an hour, and may prove fatal in four hours. The toxic effects of carbon monoxide are similar to those of hypoxia (oxygen deficiency) and are largely due to the decreased oxygen content of the blood; carbon monoxide combines with hemoglobin to form the very stable carboxyhemoglobin which decreases the oxygen-carrying capacity.

6.9 P. Ozone

Ozone is formed by electrical arcs and corona discharges in air or by ultraviolet photochemical reactions. The inhalation of 1 to 2 ppm of ozone for two hours produces headache, pain in the chest, and dryness of the upper respiratory tract. Welders who have had a severe acute exposure at an estimated 9 ppm of ozone plus other air pollutants developed pulmonary edema. Chest x-rays were normal within two to three weeks after exposure. However, nine months later the welders still complained of fatigue, and exertional dyspnea. Chronic exposure of animals at 1 ppm has produced chronic bronchitis, emphysema, and an acceleration of the development of lung adenomas in a susceptible strain of mice. Recent work has shown that three hours' exposure at 0.5 ppm ozone enhances the susceptibility to respiratory infections.

6.9 Q. Nitrogen Dioxide

Nitrogen dioxide is very irritating to the eyes and mucous membranes. Exposure to high concentrations may produce immediate coughing and chest pain. When lower concentrations are inhaled, there may be only mild signs of bronchial irritation followed by a 5 to 12 hour symptom-free period. Subsequently, the onset of signs and symptoms of acute pulmonary edema may be noted. Death often results within 24 hours. If the acute episode is survived, emphysema may develop.

Exposure to nitrogen dioxide is followed almost immediately by discomfort, cough, difficulty in breathing, chest pain, chills, fever, nausea, and vomiting. These signs and symptoms may last from several days to several weeks.

The chest radiograph may reveal a picture varying from one of a diffuse, patchy, confluent infiltration to one of numerous, uniformly scattered, nodular densities ranging in size from 1 to 5 mm in diameter.

Pulmonary function studies performed after recovery from the initial acute episode may reveal striking variations from the expected normal values. Findings indicative of obstructive pulmonary disease have been reported.

6.9 R. Phosgene

Phosgene is produced when metals which have been cleaned with chlorinated hydrocarbons are heated to the temperatures used in welding. The gas will produce contact dermatitis from primary irritation. Inhalation of high concentrations of the gas will produce pulmonary edema frequently preceded by a latent period of several hours' duration. Death may result from respiratory or cardiac arret.

6.9 S. Phosphine

Phosphine or hydrogen phosphide is generated when steel which has been coated with a phosphate rustproofing is welded. High concentrations of the gas are irritating to the eyes, nose, and skin.

The acute effects of phosphine are secondary-to-central nervous system depression irritation of the lungs, and damage to the kidneys and other organs; also included are weakness, fatigue, hypotension, bradycardia, headache, dizziness, fainting, drowsiness, thirst, abdominal pain, nausea, vomiting, diarrhea, dyspnea, bronchitis, pulmonary edema, albuminuria, hematuria, tremors, staggering gait, convulsions, coma, and death. In chronic poisoning there may be disturbances in sight, speech, and motor functions as well as effects seen in chronic phosphorus poisoning such a nonhemolytic anemia, brittle teeth, and necrosis of the lower jaw.

GUIDE TO PHYSIOLOGICAL CLASSIFICATION OF CONSTITUENTS OF WELDING FUMES (CLASSIFIED BY EFFECT)

CLASS A ACUTE RESPIRATORY	CLASS B CHRONIC RESPIRATORY	CLASS C ACUTE SYSTEMIC	CLASS D CHRONIC SYSTEMIC	CLASS E IRRITANT TO SKIN, EYES	CLASS F RELATIVELY INERT
CHROMIUM	NICKEL (LUNG CANCER)	COPPER (LIVER, KIDNEYS)	LEAD (BLOOD)	CHROMIUM	IRON
COPPER		LEAD (BLOOD)	MANGANESE (NERVOUS SYSTEM)	NICKEL (DERMATITIS)	ALUMIUM
NICKEL		MANGANESE (NERVOUS SYSTEM)	CADIUM (LIVER, KIDNEYS)	VANADIUM	TIN
MANGANESE		NICKEL (NERVOUS SYSTEM)	FLUORIDES (LIVER, KIDNEYS)	FLUORIDES	
NITROGEN DIOXIDE		ZINC (INTESTINES, NERVOUS SYSTEM)			
OZONE					
VANADIUM		CARBON MONOXIDE (HEART, NERVOUS SYSTEM)			
ZINC					
CADMIUM					
FLUORIDES					
COBALT					

TABLE 2

WELDING FUME CONTAMINANTS

Substance	Source	TLV (mg/m^3)
Iron Oxide (Fe_2O_3	Parent Metal (SS), (AS), (TS), electrode	5.0
Manganese Dioxide (MnO_2)	Parent Metal (SS), electrode	5.0
Fluoride (F)	Electrode	2.5
Nickel (Ni)	Parent Metal (SS), electrode	1.0
Chromium (Cr)	Parent Metal (SS), electrode	0.5
Copper (Cu)	Parent Metal (AS), electrode	0.2
Lead (Pb)	Paint Coating	0.15
Zinc Oxide (ZnO)	Galvanized or Paint Coating	5.0
Tin Oxide (SnO)	Electrode, Wire (Soldering)	15.0
Molybdenum (Mo)	Parent Metal (AS), electrode	5.0
Titanium Oxide (TiO)	Electrode	15.0
Magnesium Oxide (MgO)	Parent Metal (AS)	10.0
Cadmium Oxide (CdO)	Parent Metal Coating, electrtode	0.05
Vanadium Oxide (V_2O_5)	Parent Metal (TS), electrode, Contaminant	0.05
Carbon Monoxide (CO)	CO_2 shield Gas	50.0 (PPM)
Nitrogen Dioxide (NO_2)	Nitrogen Shield Gas, Air	5.0 (PPM)
Zirconium (Zr)	Parent Metal (AS)	5.0
Tungsten (W)	Parent Metal (AS)	0.1

(SS) Stainless Steel
(AS) Alloy Steel
(TS) Tool Steel

TABLE 2 (Cont'd)

WELDING FUME CONTAMINANTS

Substance	Source	TLV (mg/m^3)
Cobalt (Co)	Parent Metal (AS)	0.1
Phosgene ($COCl_2$	Chlorinated Solvents from cleaning (Perchloroethylene, Chloroform, etc.) and Oils	10 (PPM)
Beryllium (Be)	Beryllium (AS), electrode	0.002
Mercury (Hg)	Paint Coating	0.05
Ozone (O_3)	Ultraviolet Radiation Breakdown of Oxygen in Air	0.1 (PPM)
Sulfur Dioxide (SO_2)	Contaminant on Parent Metal	5.0 (PPM)
Phosphine (PH_3)	Phosphate Coating	0.3 (PPM)

Exhibit 6.1

Air Sampling Data Sheet

Project: _____ area: _____

Sample no.: _____ Sampling Date: _____

Evaluation of: _____

_____

Process (source) sample: _____

Area sample: _____

Breathing zone: Handheld: _____ Personal sample: ____

Name: _____ Height: _____

Job classification or title: _____

Sampling materials used: _____

_____

_____

Pump No.____ Dial Position (Sipin): _____ Detector Tube Lot No. _____

Start sampling: Time _____ Rotameter or pump counter reading: _____

Stop sampling: Time _____ Rotameter or pump counter reading: _____

Instrument reading (s) _____

Sampling location: _____

_____

_____

Sampling conditions: Temp. of: _____ Humidity (%) _____ Air Velocity: _____

Downwind: _____ Upwind: _____ Barometric pressure: _____

_____

_____

Industrial hygiene controls:

Ventilation: _____ Warning signs posted: _____

Protective apparel: _____

Respirator: _____

_____

Job/process description: _____

_____

_____

Sampled by: _____ Date sample sent to laboratory: _____

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SECTION 5

FIRE PROTECTION AND PREVENTION

SECTION 5

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SECTION 5

FIRE PROTECTION AND PREVENTION

5.1 GENERAL

5.1.1 The development of a fire protection and prevention program requires detailed planning by construction management. These plans shall be followed throughout all phases of construction.

5.1.2 Fire Protection embraces all measures relating to safeguarding human life and preservation of property in the prevention, detection and extinguishment of fires. It is principally a matter of physical arrangements, such as sprinkler systems, water supplies, and fire extinguishers.

5.1.3 Fire Prevention should not be considered as being synonymous with fire protection but, instead, a term to indicate measures specifically directed toward preventing the inception of fires.

5.1.4 Fire protection is usually understood to include fire prevention procedures. Both aim to protect employee, property, and continuity of operations. The information contained herein will provide the basis for an efficient fire prevention and control program.

5.1.5 An effective fire loss control program must include these objectives:

5.1.5.1 Prevent loss of life and personal injury.

5.1.5.2 Protect property.

5.1.5.3 Provide adequate equipment and material to insure continued construction activity.

5.1.5.4 Prevent inception of fire.

5.1.6 Reports

5.1.6.1 The site Safety Representative shall ensure that appropriate records such as those required within the section and by Federal, State and Local Agencies, are maintained on site. He shall also ensure implementation and compliance with the applicable and current fire protection requirements of OSHA, NFPA and other Federal, State and Local requirements.

5.1.6.2 A report shall be prepared by the Site Safety Representative or his designee whenever a fire occurs or fire protection deficiencies are observed. The Project Superintendent shall be immediately notified of all serious fires or deficiencies whether or not they involve property damage or bodily injury. A copy of the report shall be forwarded to the Joint Venture Office Safety Manager.

5.1.6.3 The Site Safety Representative shall maintain on site a current file of all fire protection related deficiency reports and of all incident reports related to fires.

5.1.6.4 An incident or deficiency requiring further action for correction shall be pursued by the Site Safety Representative no less frequently than every 3 days until corrective action has been taken to eliminate the deficiency. A supplemental report shall be prepared each time additional action is taken and a copy of the supplemental report shall be attached to or made a part of the initial report.

5.1.7 Inspections

5.1.7.1 The Site Safety Representative shall conduct a fire Protection Inspection no less than once every 30 days to

ensure compliance with applicable and current fire protection requirements of OSHA, NFPA, and other Federal, State and Local requirements.

5.1.7.2 Corrective action required as a result of the inspection shall be initiated by the Site Safety Representative through a work request together with a copy of the investigation submitted to the Project Superintendent. If the existing deficiency is not corrected within 3 days of reporting such deficiency, the Site Safety Representative shall furnish the Project Superintendent with a copy of the deficiency report and work request.

5.1.8 Recordkeeping

5.1.8.1 Records of all the inspections which are required in Section #5 of this manual shall be maintained in the safety office.

5.1.9 Construction Priorities & Fire Access

5.1.9.1 Fire walls and exit stairways, if required for the completed building, shall be given construction priority. Fire doors, with approved closing devices and hardware, shall be hung on openings as soon as practicable and before combustible material is introduced. Fire doors, after installation, shall not be obstructed from closing.

5.1.9.2 For demolition projects, fire cutoffs shall be retained as such until razing operations necessitate their removal.

5.1.9.3 Water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates. There shall be no delay in the installation of fire protection equipment.

5.1.9.4 Access for use of heavy fire fighting equipment shall be provided to the immediate job site at the start of construction and maintained until all construction is completed.

5.1.9.5 Free access from the roadway to fire hydrants and to outside connections for standpipes, sprinklers, or other fire extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times. No material or construction shall interfere with access to hydrants, siamese connections, or fire extinguishing equipment.

5.1.9.6 During construction or demolition operations, free access to permanent, temporary, or portable first aid fire equipment shall be maintained at all times.

5.1.9.7 In all buildings over one story in height, at least one stairway shall be provided in usable condition at all times for fire fighting purposes. This stairway shall be extended upward as each floor is installed in new construction. This stairway shall be lighted and enclosed if the building exterior walls are in place.

5.1.9.8 Hoists and elevators provide the only efficient means of transporting hose and other cumbersome fire fighting equipment to upper floors in tall construction or demolition projects. They should be available to the fire department whenever necessary.

5.2 DEFINITIONS

5.2.1 Classes of Fires

5.2.1.1 Class A fires are fires in ordinary combustible materials, such as wood, cloth, paper and rubber.

5.2.1.2 Class B fires are fires in flammable liquids, gases and greases.

5.2.1.3 Class C fires involve energized electrical equipment where the electrical conductivity of the extinguishing media is a safety hazard. (When electrical equipment is deenergized, extinguishers for Class A or B fires may be used safely.)

5.2.1.4 Class D fires are fires in combustible metals, such as magnesium titanium, zirconium, sodium, and potassium.

5.2.2 Degree of Hazard

5.2.2.1 A light hazard is a situation where the amount of combustible or flammable liquids present is such that fires of small size may be expected These may include field office, change buildings, administrative offices, control room complex, etc.

5.2.2.2 An ordinary hazard is a situation where the amount of combustibles or flammable liquids present is such that fires of moderate size may be expected. These may include storage areas, garages, warehouses not classified as extra hazard, machie shop area, normal controlled areas, etc.

5.2.2.3 An extra hazard is a situation where the amount of combustible or flammable liquids present is such that fires of severe magnitude may be expected. These may include woodworking, vehicle repair, reactor building, generator hydrogen cooling system and oil storage, warehouses with high-piled (14 feet or higher) combustibles, and processes such as flammable liquid handling, painting, etc.

5.2.3 Approved

5.2.3.1 Approved means listed or approved by:

5.2.3.1.1 At least one of the following nationally recognized testing laboratories: Factory Mutual Engineering Corp.; Underwriters Laboratories, Inc., or

5.2.3.1.2 Federal agencies such as Bureau of Mines, Department of the Interior; Department of Transportation; or U.S. Coast Guard, which issue approvals for such equipment.

5.2.3.2 Aerosol shall mean a material which dispensed from its container as a mist, spray, or foam by a propellant under pressure.

5.2.3.3 Atmospheric tank shall mean a storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig.

5.2.3.4 Automotive service station shall mean that portion of the station where flammable or combustible liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and shall include facilities available for the service of tires, batteries, and accessories, and for minor automotive maintenance work.

5.2.3.5 Boiling point shall mean the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (psia) (760 mm). Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this section the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D-86-77, may be used as the boiling point of the liquid.

5.2.3.6 Boil over shall mean the expulsion of crude oil (or certain other liquids) from a burning tank. The light fractions of the crude oil burnoff producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of froth.

5.2.3.7 Closed container shall mean a container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

5.2.3.8 Crude petroleum shall mean hydrocarbon mixtures that have a flash point below 150°F (66°C) and which have not been processed in a refinery.

5.2.3.9 Fire area shall mean an area of a building separated from the remainder of the building by a barrier having a fire resistance of at least 1 hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1 hour.

5.2.3.10 Flammable aerosol shall mean an aerosol which is required to be labeled "Flammable" under the Federal Hazardous Substances Labeling Act (15 U.S.C. 1261). For the purpose of paragraph 5.2.3.14 of this section, such aerosols are considered Class 1A liquids.

5.2.3.11 Flashpoint of liquid shall mean the temperature at which it gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid or within the vessel used as determined by appropriate test procedures and apparatus as specified below.

5.2.3.11.1 The flashpoint of liquids having a viscosity less than 45 SUS at 100°F (37.8°C) and a flashpoint below 175 F (79.4°C) shall be determined in accordance

with the Standard Method of Test for Flashpoint by the Tag Closed Tester, ASTM D-56-77.

5.2.3.11.2 The flashpoint of liquids having a viscosity of 45 SUS or more at 100°F (37.8°C) or a flashpoint of 175°F (79.4°C) or higher shall be determined in accordance with the Standard Method of Test for Flashpoint by the Pensky Martens Closed Tester, ASTM D93-77.

5.2.3.12 Liquid shall mean, for the purpose of this section, any material which has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM Test for Penetration for Bituminous Materials, D-5-73. When not otherwise identified, the term liquid shall include both flammable and combustible liquids.

5.2.3.13 Combustible liquid means any liquid having a flashpoint at or above 100°F (37.8°C). Combustible liquids are divided into two classes as follows:

5.2.3.13.1 Class II liquids shall include those with flashpoint at or above 100°F (37.8°C) and below 140°F (60°C), except any mixture having components with a flashpoint of 200°F (93.3°C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

5.2.3.13.2 Class III liquids shall include those with flashpoints at or above 140°F (60°C).

1. Class III "A" liquids cover those with flashpoints from 140°F (60°C) to 200°F (93.3°C).

2. Class III "B" liquids have flashpoints at or above 200°F (93.3°C)

5.2.3.14 Flammable liquid means any liquid having a flashpoint below 100°F (37.8°C) except any mixture having components with a flashpoint of 100°F (37.8°C) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids are known as Class I liquids. Class I liquids are divided into three classes as follows:

5.2.3.14.1 Class IA shall include liquids having flashpoints below 73°F (22.8°C) and havig a boiling point below 100°F (37.8°C).

5.2.3.14.2 Class IB shall include liquids having flashpoints below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C).

5.2.3.14.3 Class IC shall include liquids having flashpoint at or above 73°F (22.8°C) and below 100°F (37.8°C).

5.2.3.15 Unstable (reactive) liquid shall mean a liquid which in the pure state or as commercially produced or transported will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure, or temperature.

5.2.3.16 Low-pressure tank shall mean a storage tank which has been designed to operate at pressures above 0.5 psig but not more than 15 psig.

5.2.3.17 Portable tank shall mean a closed contaier having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

5.2.3.18 Pressure vessel shall mean any fire or unfired vessel within the scope of the applicable section of the ASME Boiler and Pressure Vessel Code.

5.2.3.19 Protection from exposure shall mean fire protection for structures on property adjacent to liquid storage. Fire protection shall be acceptable to the authority having jurisdiction, when such structures are located:

1. Within the jurisdiction of any public fire department

2. Within or adjacent to plants having private fire brigades considered as having adequate protection for exposures.

5.2.3.20 Safety can/shall mean an approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

5.2.3.21 Vapor pressure shall mean the pressure, measured in pounds per square inch (absolute) exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)," American Society for Testing and Materials ASTM D323-68.

5.2.3.22 Ventilation as specified in this section is for the prevention of fire and explosion. It is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentrations over one-fourth of the lower flammable limit.

5.3 HOUSEKEEPING

5.3.1 Combustible trash such as wooden forms, scaffolding, scrap lumber, packig materials, cardboard cartons, packing crates, empty cable spools, and other refuse which accumulates on construction sites requires that housekeeping must be a daily effort.

5.3.2 Construction materials are to be stored in an orderly manner so they do not block fire protection equipment and fire access ways.

5.3.3 Combustible construction materials should not be stored inside permanent structures unless absolutely necessary.

5.3.3.1 If combustible materials are stored inside permanent buildings consideration is to be given to the following:

1. The total combustible loading of the building.
2. Fire protection systems available in the building.
3. Ignition sources within the building.

5.4 FLAMMABLE AND COMBUSTIBLE LIQUIDS

5.4.1 General Requirements

5.4.1.1 Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. Approved metal safety cans shall be used for the handling and use of flammable liquids in quantities greater than 1 gallon, except that this shall not apply to those flammable liquid materials which are highly viscid (extremely hard to pour), which may be used and handled in original shipping containers. For quantities of 1 gallon or less, only the original container or approved metal safety can shall be used for storage, use, and handling of flammable liquids.

5.4.1.2 Flammable or combustible liquids shall not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

5.4.2 Indoor Storage of Flammable and Combustible Liquids

5.4.2.1 No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet.

5.4.2.2 Quantities of flammable and combustible liquids in excess of 25 gallons shall be stored in an acceptable or approved cabinet meeting the followig requirements:

1. Approved metal storage cabinets are acceptable.

2. Cabinets shall be labeled in conspicuous lettering, "Flammable - Keep Fire Away."

5.4.2.3 No more than 60 gallons of flammmable or 120 gallons of combustible liquids shall be stored in any one storage cabinet. Not more than three such cabinets may be located in a single storage area. Quantities in excess of this shall be stored in an inside storage room.

1. Inside storage rooms shall be constructed to meet the required fire resistive rating for their use.

2. Where an automatic extinguishing system is provided, the system shall be designed and installed in an approved manner. Openigs to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. Openings shall be provided with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor. A permissible alternate to the sill or ramp is an open-grated trench; inside of the room, which drains to

a safe location. Where other portions of the buildig or other buildings are exposed, windows shall be protected as set forth in the standard for Fire Doors and Windows, NFPA No. 80-1970, for Class E or F openings. Wood of at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlax, and similar installations.

5.4.2.4 Materials which will react with water and create a fire hazard shall not be stored in the same room with flammable or combustible liquids.

5.4.2.5 Storage of combustible liquids in inside storage rooms shall comply with Table 5.1.

TABLE 5.1

Fire protection provided	Barrier fire resistance	Maximum size	Total allowable quantities of combustible liquids gals/sq ft/ floor area
Yes	2 hrs	500 sq ft	10
No	2 hrs	500 sq ft	4
Yes	1 hr	150 sq ft	5
No	1 hr	150 sq ft	2

Note: Fire protection systems shall be sprinkler, water spray, carbon dioxide or other systems approved by a nationally recognized testing laboratory for this purpose.

5.4.2.6 Electrical wiring and equipment located in inside storage rooms shall be approved for Class 1, Division 1, Hazardous Locations.

5.4.2.7 Every inside storage room shall be provided with either a gravity or mechanical exhausting system. Such system shall commence not more than 1 inch above the floor and be designed to provide for a complete change of air within the room at least 6 times per hour. If a mechanical exhausting system is used, it shall be controlled by a switch located outside the door. The ventilating equipment and any lighting fixtures shall be operated by the same switch. An electric pilot light shall be installed adjacent to the switch if flammable liquids are dispensed within the room. Where gravity ventilation is provided, the fresh air intake, as well a the exhausting outlet from the room, shall be on the exterior of the building in which the room is located.

5.4.2.8 In every inside storage room there shall be maintained at least one clear aisle at least 3 feet wide. Flammable or combustible liquid containers over 30 gallons capacity shall not be stacked one upon the other.

5.4.2.9 Flammable and combustible liquids, in excess of that permitted inside storage rooms, shall be stored outside of buildings in accordance with paragraph (c) of this section.

5.4.3 Storage Outside Buildings

5.4.3.1 Storage of containers (not more than 60 gallons each) shall not exceed 1,100 gallons in any one pile or area. Piles or groups of containers shall be separated by a 5-foot clearance wherever practicable. Piles or groups of containers shall not be nearer than 50 feet to a building.

5.4.3.2 Within 200 feet of each pile of containers, there shall be a 12 foot wide access way to permit approach of fire control apparatus.

5.4.3.3 The storage area shall be graded in a manner to divert possible spills away from buildings or other exposure, or shall be surrounded by a curb or earth dike at least 12 inches high. When curbs or dikes are used, provisions shall be made for draining off accumulatios of ground or rainwater, or spills of flammable or combustible liquids. Drains shall terminate at a safe location and shall be accessible for operation uder fire conditions.

5.4.3.4 Outdoor portable tank storage.

5.4.3.4.1 Portable tanks shall not be nearer than 20 feet from any building. Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons shall be separated by a 5-fcot-clear area. Individual portable tanks exceeding 1,100 gallons shall be separated by a 5-foot clear area.

5.4.3.4.2 Within 200 feet of each portable tank, there shall be a 12 foot wide accessway to permit approach of fire control apparatus.

5.4.3.5 Storage areas shall be as free as practicable of weeds, debris, and other combustible material not necessary to storage.

5.4.3.6 Portable tanks shall be provided with emergency venting.

5.4.4 Fire control for flammable or combustible liquid storage

5.4.4.1 At least one portable fire extinguisher, having a rating of not less than 20-B units, shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage or more than 60 gallons of flammable or combustible liquids.

5.4.4.2 At least one portable fire extinguisher having a rating of not less than 20-B units shall be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

5.4.4.3 When sprinklers are provided, they shall be installed in accordance with the Standard for the Installation of Sprinkler System, NFPA 13-1975.

5.4.4.4 At least one portable fire extinguisher having a rating of not less than 20-B:C units shall be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.

5.4.5 Dispensing liquids

5.4.5.1 Areas in which flammable or combustible liquids are transferred simultaneously, in quantities greater than 5 gallons from one tank or container to another tank or container, shall be separated from other operations by 25 feet distance or by construction having a fire resistance of at least 1 hour. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.

5.4.5.2 Transfer of flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded).

5.4.5.3 Flammable or combustible liquids shall be drawn from or transferred into vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or

from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.

5.4.5.4 The dispensing units shall be protected against collision damage.

5.4.5.5 Dispensing devices and nozzles for flammable liquids shall be of an approved type.

5.4.6 Handling Liquids at point of Final Use

5.4.6.1 Flammable liquids shall be kept in closed containers when not actually in use.

5.4.6.2 Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.

5.4.6.3 Flammable liquids may be used only where there are no open flames or ther sources of ignition within 50 feet of the operation unless conditions warrant greater clearance.

5.4.6.4 The dispensing units shall be protected against collision damage.

5.4.6.5 Dispensing devices and nozzles for flammable liquids shall be of an approved type.

5.4.7 Service and Refueling Areas

5.4.7.1 Flammable or combustible liquids shall be stored in approved closed containers, in tanks located underground, or in aboveground portable tanks.

5.4.7.2 The tank trucks shall comply with the requirements covered in the standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 285-1966.

5.4.7.3 The dispensing hose shall be an approved type.

5.4.7.4 The dispensing nozzle shall be an approved automatic-closing type without a latch-ope device.

5.4.7.5 Underground tanks shall be clearly marked so as to prevent or permit safe passage of heavy equipment over tanks. Tanks shall not be abandoned but removed and disposed to scrap or othe use.

5.4.7.6 Clearly identified and easily accessible switch(es) shall be provide at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency.

5.4.7.7 Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical contact and damage.

5.4.7.8 Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, shall be of an approved type for garages, and shall be installed at least 8 feet above the floor.

5.4.7.9 There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids.

5.4.7.10 Conspicuous and legible signs prohibiting smoking shall be posted.

5.4.7.11 The motors of all equipment being fueled shall be shut off during the fueling operation.

5.4.7.12 Each service or fueling area shall be provided with at least one fire extinguisher having a rating of not less than 20-B:C located so that the extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.

5.5 LIQUIFIED PETROLEUM GAS (LP-GAS)

5.5.1 General

1. LP gas cylinders have only a limited ability to furnish adequate fuel to the heating device being used. It should be remembered that a large LP gas cylinder (100 pounds) can furnish only 90,000 BTU per hour to a heating device. The smaller cylinder, known as a 20-pound cylinder, can only furnish 20,000 BTU per hour to a heating device.

2. The use of more than one cylinder to supply the heating device will not result in any overconsumption of fuel, inasmuch as a drilled orifice in the heating device controls the amout of fuel which can be supplied to the burning element of the device.

3. The manifold use of more than one cylinder only guarantees that sufficient fuel is being fed to the heating device for efficient operation. In adjusting the flame of an LP heating device, care should be taken to be sure the flame is blue in color. Any indication of a yellow flame implies an inefficient use of the LP gas fuel.

4. LP gas cylinders shall be secured to a permanent vertical member when in use. In no case should the LP gas cylinder be allowed to lay down so that the valve of this cylinder is lower than the bottom end. To install a cylinder in this fashion causes the liquid petroleum gas to be furnished to the heating element of the heating device and can result in a serious explosion. If no vertical permanent member is conveniently available to which to secure the LP Cylinders, they should be stood up in groups of three and wired together. The group of three cylinders presents a broader base to the cyliders and reduces the possibility of their being knocked over during the construction operations.

5.5.2 LPG Safety Requirements

5.5.2.1 Container Valves and Container Accessories

1. Valves, fittings, and accessories connected directly to the container, including primary shutoff valves, shall have a rated working pressure of at least 250 psig and shall be of a material and design suitable for LP-Gas service.

2. Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, shall have shutoff valves located as close to the container as practicable.

5.5.2.2 Safety Devices

1. Every container and every vaporizer shall be provided with one or more approved safety relief valves or devices. These valves shall be arranged to afford free vent to the outer air with discharge not less than 5 feet horizontally away from any openings into a building which is below such discharge.

2. Shutoff valves shall not be installed between the safety relief device and the container, or the equipment or piping to which the safety relief device is connected, except that a shutoff valve may be used where the arrangement of this valve is such that full required capacity flow through the safety relief device is always afforded.

3. Container safety relief devices and regulator relief vents shall be located not less than 5 feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

5.5.2.3 Dispensing

1. Filling of fuel containers for trucks or motor vehicles from bulk storage containers shall be performed not less than 10 feet from the nearest masonry-walled building, or not less than 25 feet from the nearest building or other construction and, in any event, not less than 25 feet from any building opening.

2. Filling of portale containers or containers mounted on skids from storage containers shall be performed not less than 50 feet from the nearest building.

5.5.2.4 Requirements for appliances

1. LP-Gas conuming appliances shall be approved types.

2. Any appliance that was originally manufactured for operation with a gaseous fuel othr than LP-Gas and is in good condition, may be used with LP-Gas only after it is properly converted, adapted, and tested for performance with LP-Gas before the appliance is placed in use.

5.5.2.5 Containers and Regulating Equipment Installed Outside of Building or Structures

Containers shall be upright upon firm foundations or otherwise firmly secured. The possible effect on the outlet piping of settling shall be guarded against by a flexible connection or special fitting.

5.5.2.6 Containers and Equipment Used Inside of Buildings or Structures

1. When operational requirements make portable use of containers necessary, and their location outside of buildings or structures is impracticable, containers and equipment shall be permitted to be used inside of buildings or structures in accordance with subparagraphs (2) through (10) of this paragraph.

2. Containers in use means connected for use.

3.. Systems utilizing containers having a water capacity greater than 12 1/2 pounds (nominal 1 pound LP-Gas capacity) shall be equipped with excess flow valves. Such excess flow valves shall be either integral with the container valves or in the connection to the container valve outlets.

4. Regulators shall be either directly connected to the container valves or to manifolds connected to the container valves. The regulator shall be suitable for use with LP-Gas. Manifolds and fittings connecting containers to pressure regulator inlets shall be designed for at least 250 psig service pressure.

5. Valves on containers having water capacity greater than 50 pounds (nominal 20 pounds LP-Gas capacity) shall be protected from damage while in use or storage.

6. Aluminum piping or tubing shall not be used.

7. Hose shall be designed for a working pressure of at least 250 psig. Design, construction, and performance of hose, ad hose connections shall have their suitability determined by listing a nationally recognized testing agency. The hose length shall be as short as practicable. Hoses shall be long enough to permit compliance with spacing provisions without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat.

8. Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas to the main burner and pilot, if used, in the event of flame failure. Such heaters, having input above 50,000 Btu per hour, shall be equipped with either a pilot, which must be lighted and proved before the main burner can be turned on, or an electrical ignition system.

   Note: The provisions of this subparagraph do not apply to portable heaters under 7,500 Btu per hour input wh.. used with containers having a maximum water capacity of 2-1/2 pounds.

9. Container valves, connectors, regulators, manifolds, pipe, tubing, and hose shall be located to minimize exposure to high temperatures or physical damage.

10. Containers, regulating equipment, manifolds, pipe, tubing and hose shall be located to minimize exposure to high temperatures or physical damage.

11. Containers having a water capacity greater than 2-1/2 pounds (nominal 1 pound LP-Gas capacity) connected for use shall stand on a firm and substantially level surface and, when necessary, shall be secured in an upright position.

12. The maximum water capacity of individual containers shall be 245 pounds (nominal 100 pounds LP-Gas capacity).

13. For temporary heating, heaters (other than integral heater-container units) shall be located at least 6 feet from any LP-Gas container. This shall not prohibit the use of heaters specifically designed for attachment to the container or to a supporting standard, provided they are designed and installed so as to prevent direct or radiant heat application from the heater onto the containers. Blower and radiant type heaters shall not be directed toward an LP-Gas container within 20 feet.

14. If two or more heater-container units, of either the integral or nonintegral type, are located in an unpartitioned area on the same floor, the container or containers of each unit shall be separated from the container or containers of any other unit by at least 20 feet.

15. When heaters are connected to containers for use in an unpartitioned area on the same floor, the total water capacity of containers, manifolded together for connection to a heater or heaters shall not be greater than 735 pounds (nominal 300 pounds LP-Gas capacity). Such manifolds shall be separated by at least 20 feet.

5.5.2.7 Multiple Container Systems

1. Valves in the assembly of multiple container systems shall be arranged so that replacement of containers can be made without shutting off the flow of gas in the system. This provision is not to be construed as requiring an automatic changeover device.

2. Heaters shall be equipped with an approved regulator in the supply line between the fuel cylinder and the heater unit. Cylinder connectors shall be provided with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured.

3. Regulators and low-pressure relief devices shall be rigidly attached to the cylinder valves, cylinder, supporting standards, the building walls, or otherwise rigidly secured, and shall be so installed or protected from the elements.

5.5.2.8 Storage of LP-Gas Containers

1. Storage of LP-Gas within buildings is prohibited.

5.5.2.9 Storage Outside of Buildings

1. Storage outside of buildings, for containers awaiting use, shall be located from the nearest building or group of buildings, in accordance with the following:

TABLE 5.2

Quantity of LP-Gas Stored:	Distance (feet)
500 lbs or less	0
501 to 6,000 lbs	10
6,001 to 10,000 lbs	20
Over 10,000 lbs	25

2. Containers shall be in a suitable ventilated enclosure or otherwise protected against tampering.

5.5.2.10 Fire Protection

Storage location shall be provided with at least one approved portable fire extinguisher having a rating of not less than 20-B:C.

5.6 TEMPORARY CONSTRUCTION EQUIPMENT AND STRUCTURES

5.6.1 GENERAL

This section shall apply to construction equipment used during construction, alteration or demolition operations.

5.6.2 CONSTRUCTION OFFICES AND SHEDS

1. Construction offices, trailers, sheds and other facilities for the storage of tools and materials, when located within a building, shall be of noncombustible construction.

2. Only safely installed approved heating devices shall be used in construction offices and sheds. Ample clearance shall be provided around stoves and heaters and all chimney and vent connectors to prevent ignition of adjacent combustible materials. When temporary heating equipment is used, refer to Section F.

5.6.3 TEMPORARY ENCLOSURES

1. Only flame resistant tarpaulins or materials of equivalent fire retardant characteristics shall be used.

2. When used to enclose buildings temporarily, the enclosing material shall be fastened securely or guarded by construction so it cannot be blown against heaters or other sources of ignition by the wind.

5.6.4 TEMPORARY BUILDINGS

1. No temporary buildings shall be erected where it will adversely effect any means of exit.

2. Temporary buildings, located within permanent buildings or structures, should be prohibited to the fullest extent possible. However, when temporary buildings inside permanent structures cannot be avoided they shall be of non-combustible construction.

3. Temporary buildings, located other than inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, shall of a non-combustible construction or be located at a distance of not less than 25 feet from any permanent buildings or structures.

4. Storage of combustible item such as scaffolding, shoring, formwork, etc. shall not be inside permanent buildings unless specified permission has been obtained from the Project Superintendent. Extraordinary fire protection measures such as a 24 hour fire watch, restricted hot work, and proper fire fighting equipment should be considered when combustibles are stored inside a permanent building.

5. During forming and stripping operations adequate fire extinguishing equipment shall be provided. Operable fire hose stations shall be available in the area.

5.6.5 Internal Combustion Engines

1. Internal combustion engine-powered air compressors, hoists, derricks, pumps, etc., shall be so located that the exhausts discharge well away from combustible materials. When the exhausts are piped to outside the building under construction, a clearance of at least 6 inches shll be maintained between such piping and combustible material.

2. Internal combustion equipment shall be shut down prior to refueling.

3. Service areas for construction equipment shall not be located within buildings.

4. Fuel for internal combustion equipment shall not be stored within the building.

5. Suitable fire extinguishers should be provided on manned construction equipment utilizing liquid fuel.

5.6.6 Demolition

1. In demolition projects electric service shall be reduced to a minimum and identified to leave no uncertainty as to which circuits are energized.

2. Gas - Prior to demolition, gas supplies shall be turned off at a point outside the building and the outlet capped.

3. Drain flammable liquids and combustible oils from tanks and machinery reservoirs and a safe manner, with particular attention to removal of residue and sludge accumulations. Remove from the building immediately.

5.6.7 Use of Flammable Liquids

1. Flammable liquid storage shall be in accordance with the Section 5.4 of this manual and in accordance with the "Flammable and Combustible Liquid Code" (NFPA 30-1973).

2. Exterior flammable liquids storage facilities should be provided to prevent fire exposure to the new construction.

3. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

4. Potential sources of ignition shall be identified and safeguarded whenever such operations are being conducted.

5. A fire class "B" fire extinguisher shall be immediately available wherever flammable liquids are being used.

6. Asphalt and tar kettles shall be located in a safe place outside of the building or on a finished roof at a point where they avoid danger of ignition of combustible material below and avoid the possibility of any material falling to a lower level. Continuous supervision shall be maintained while kettles are in operation, and metal covers shall be provided for all kettles to smother out flames in case of fire. Suitable fire extinguishers shall be provided.

7. Used roofing mops shall be stored away from the building and combustible materials.

5.6.8 Temporary Heating Equipment

5.6.8.1 General

1. The permanent heating equipment for a new building shall be installed and put into operation as soon as practicable. In cold weather demolition operations, building heat shall be maintained to permit sprinklers, hose, and extinguishers to be maintained on lower floors, or within enclosed areas without danger of freezing.

2. Only steam heaters, approved electric heaters, approved gas and oil-fired space heaters shall be used.

3. Oil-fired heaters shall comply in design and installation features with the "Standard for the Installation of Oil Burning Equipment" (NFPA 31 - 1974).

4. Fuel supplies for liquefied petroleum gas-fired heaters shall comply with the "Standard for the Storage and Handling of Liquefied Petroleum Gases" (NFPA 58 -1974), and the "National Fuel Gas Code" (NFPA 54 - 1974).

5. Refueling operations for oil burning equipment and liquefied petroleum gas burning equipment shall be safely conducted, waiting for it to cool prior to refueling.

6. Temporary heating equipment, when utilized, shall be maintained by competent personnel.

7. There shall be no open fires in building or outside on the project site.

5.6.8.2 Ventilation

5.6.8.2.1 LP Gases are non-toxic. However, in common with other gases when used as fuel, the products of combustion may contain poisonous quantities of Carbon Monoxide Gas. Any deficiency of air in the combustion process increases the carbon monoxide content in the waste gases, thereby rendering them more toxic. Hence, small rooms, trailers, or construction shanties may become lethal chambers when the doors and windows are closed and the heater is in operation continuously for an extended period.

5.6.8.2.2 The precautions for venting the products of combustion shall be strickly adhered to.

1. Fresh air shall be supplied in sufficient quantities to maintain the health and safety of workmen. Where natural means of fresh air is inadequate, mechanical ventilation shall be provided.

2. When heaters are used in confined spaces, mechanical ventilation shall be powered for sufficient ventilation in order to ensure proper combustion, maitain the health and safety of workmen and limit temperature rise in the area.

5.6.8.3 Clearance and Mounting

1. Temporary heating devices shall be installed to provide clearance to combustible material not less than the amount shown in Table 5.3.

5.6.8.4 Stability

1. Heaters, when in use, shall be set horizontally level, unless otherwise permitted by the manufacturer's markings.

2. Heating devices shall be situated so they are not likely to overturn and shall be otherwise installed in accordance with their listing, including clearance to combustible material, equipment, or construction.

5.6.8.5 Oil-fired Heaters

1. Flammable or combustible liquid-fired heaters shall be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed shall not be considered a primary safety control.

2. Heaters designed for barometric or gravity oil feed shall be used only with integral tanks.

3. Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.

5.6.9 TRASH DISPOSAL

1. Combustible waste material and rubbish shall not be stored or allowed to accumulate within the building or in the immediate vicinity, but shall be removed from the premises as rapidly as practicable.

2. Rubbish shall not be burned on the premises without first obtaining a permit from the local fire department. Enviromental protection requirements should be reviewed.

2. Temporary heating devices, which are listed for installation with lesser clearances than specified in Table 5.3 may be installed in accordance with their approval.

3. Heaters not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such heaters are used, they shall rest on suitable heat insulating material or at least 1-inch concrete, or equivalent. The insulating material shall extend beyond the heater 2 feet or more in all directions.

4. Heaters used in the vicinity of combustible tarpaulins, canvas, or similar coverings shall be located at least 10 feet from the coverings. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.

5. Chimney or vent connectors, where required from direct-fired heaters, shall be maintained at least 18 inches from combustibles unless the vent connectors are approved for a lesser clearance.

Table 5.3

Heating appliances	Minimum clearance (inches)		
	Sides	Rear	Chimney connector
Room heater, circulating type	12	12	18
Room heater, radiant type	36	36	18

5.6.10 SMOKING

1. Smoking shall be prohibited at or in the vicinity of hazardous operations or materials.

2. Where smoking is permitted, safe receptacles shall be provided for smoking materials.

5.6.11 UTILITIES

1. Electrical wiring and equipment for light, heat, or power purposes shall be installed in compliance with the requiremens of the "National Electrical Code" (NFPA 70).

5.7 PORTABLE FIRE EXTINGUISHERS

5.7.1 Classifications

5.7.1.1 Portable fire extinguishers are classified for use on certain classes of fires and rated for a relative extinguishing effectiveness at a temperature of 70°F by nationally recognized testing laboratories.

5.7.1.2 This is based upon the preceding classification of fires and the fire extinguishment potentials as determined by fire tests.

5.7.1.3 The classification and rating system described in this section is that used by Underwriters Laboratories, Inc., and Underwriters Laboratories of Canada and is based on extinguishing preplanned fires of determined size and description as follows:

(1) Class A rating - Wood and excelsior fires excluding deepseated conditions..

(2) Class B rating - Two-inch depth gasoline fires in square pans.

(3) Class C rating - No fire test. Agent must be a non-conductor of electricity.

(4) Class D rating - Special tests on specific combustible metal fires.

5.7.2 Selection of Locations

5.7.2.1 Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall be located along normal paths of travel, including exits from an area.

5.7.2.2 The number of fire extinguishers needed to protect a property should be determined by considering the area and arrangement of the building or occupancy, the severity of the hazard, the anticipated classes of fires, and the distances to be traveled to reach extinguishers.

5.7.2.3 In every building operation, wherever a toolhouse, a storeroom, or other shanty is located in or adjacent to the building under construction, or a room or space within that building is used for storage, dressing room, or workshop, at least one approved extinguisher shall be provided and maintained in an accessible location.

5.7.2.4 Exception: This requirement may be waived if structures do not exceed 150 sq. ft. floor area or are equipped with automatic sprinklers or other approved protection.

5.7.2.5 At least one approved fire extinguisher shall also be provided on each floor at each usable stairway in plain sight as soon as combustible material accumulates.

5.7.2.6 During demolition, suitable fire extinguishers shall be available.

5.7.2.7 The suitability, distribution and maintenance of extinguishers shall be in accordance with the "Standard for the Installation of Portable Fire Extinguishers" (NFPA 10 - 1974) and Part IV.

5.7.2.8 Vibrating Location - Extinguishers installed under conditions where they are subject to severe vibration must be installed in brackets specifically designed to cope with this vibration.

5.7.2.9 Unless the extinguisher is specifically designed for out-door placement, all units which are exposed to weather shall be covered with flexible weather hoods or mounted in weatherproof cabinets. The weather protection shall be externally identified; specifying it as a fire station, designating the size and class of extinguisher that it contains in accordance with the current OSHA and NFPA Standards.

5.7.2.10 Extreme Temperature Exposure - Extinguishers installed in locations subject to temperature below 40°F and above 120°F shall be of a type approved or listed for the temperature to which they will be exposed, or placed in an enclosure capable of maintaining the temperature within the range of 40°F to 120°F.

5.7.2.11 Distribution of Portable Fire Extinguishers

(1) Fire extinguisher size and placement for Class A hazard (see Table 5.4).

TAELE 5.4

Basic Minimum Extinguisher Rating for Area Specified	Maximum Travel Distances to Extinguishers	Areas to be Protected per Extinguisher: Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
1A	75 ft.	3000 sq. ft.	Not Permitted Except as Specified in (ii) below	Not Permitted Except as Specified in (ii) below
2A	75 ft.	6000 sq. ft.	3000 sq. ft	Not Permitted Except as Specified in (ii) below
3A	75 ft.	9000 sq. ft.	4500 sq. ft.	3000 sq. ft.
4A	75 ft.	11,250 sq. ft.	6000 sq. ft.	4000 sq. ft.
6A	75 ft.	11,250 sq. ft.	9000 sq. ft.	6000 sq. ft.

(2) Fire extinguisher size and placement for Class B fires other than for fires in flammable liquids of appreciable depth (more than 1/4 inch). (See Table 5.5)

TABLE 5.5

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distances to Extinguishers
Light	4B	50 ft.
Ordinary	8B	50 ft.
Extra	12B	50 ft.

(3) Fire extinguisher size and placement for Class C hazards:

Extinguishers with Class "C" ratings shall be required where energized electrical equipment may be encountered which would require a nonconducting extinguishing media. This will include fire either directly involving or surrounding electrical equipment. Since the fire itself is a Class A or Class B hazard, the extinguishers

must be sized and located on the basis of the anticipated Class A or B hazard.

5.7.3 Mounting

5.7.3.1 Extinguishers shall be installed on the hangers or in the brackets supplied, mounted in cabinets, or set on shelves unless the extiguishers are of the wheeled types.

5.7.3.2 Extinguishers having a gross weight not exceeding 40 pounds shall be installed so that the top of the extinguisher is not more than 5 feet above the floor. Extinguishers having a gross weight greater than 40 pounds (except wheeled types) shall be installed so that the top of the extinguishers is not more than 3-1/2 feet above the floor. Where they may be used by women, consideration should be given to mounting the extinguishers at a lower height. In no case shall clearance between the bottom of the extinguisher and the floor be less than 4".

5.7.3.3 In situations where extinguishers must be temporarily provided, a good practice is to provide portable stands, consisting of a horizontal bar on uprights with feet, unless the extinguishers are of the wheeled types.

5.7.3.4 Extinguishers, carried in construction class vehicles, shall have a red bracket specifically designed to cope with vibrations within a designated compartment; in accordance with current OSHA and NFPA Standards. The door of the compartment containing the unit shall have external identification specifying the fire extinguisher that is located inside the compartment.

5.7.4 Identification

5.7.4.1 All fire extinguisher locations shall be identified with a number which is affixed at the location. The numbers should also be included on an inspection sheet to assure that no locations are missed during inspections.

5.7.4.2 All fire extinguishers are to have a number which identifies it. Usually the extinguishers serial number is sufficient. This number should be used for maintaining testing records for the extinguisher.

5.7.4.3 All portable fire extinguishers shall bear clear identification, as to the class of fire for which they are designated.

5.7.5 Markings

5.7.5.1 All markings on fire extinguishers shall conform to the current OSHA and NFPA recommendatios to indicate suitability.

5.7.5.2 Marking of Location - Extinguishers must not be obstructed or obscured from view.

5.7.5.3 Marking or Extinguishers - If extinguishers intended for different classes of fire are grouped, their intended use must be marked conspicuously to insure choice of the proper extinguisher at the time of a fire.

5.7.5.4 Where markings are applied to the extinguisher, they shall be located on the front of the shell above the extinguisher nameplate. Markings shall be of a size and form to give easy legibility at a distance of 3 feet.

5.7.5.5 Where markings are applied to wall panels, etc., in the vicinity of extinguishers, they shall be of a size and form to give easy legibility at a distance of 25 feet.

5.7.5.6 Extinguishers mounted in cabinets, wall recesses or placed on shelves shall be positioned so that the extinguisher operating instructions face outward. The extinguisher location shall be marked conspicuously.

5.7.6 Inspection

5.7.6.1 Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used. A monthly inspection shall be conducted with the inspector determining the following:

1. That the access route to the extinguisher located in the fire station is clear and unobstructed.

2. That all fire stations shall have the specified extinguishers in its locations.

3. That the extinguisher is in its proper place.

4. That no evidence of unauthorized tampering with the unit has been found.

5. That no physical damage to the unit has been found.

6. That the extinguisher has not been discharged.

7. If the unit is found to be in order, the inspector will note by initialing and dating the inspection card which

is attached to the extinguisher bearing the same number and he will indicate on the fire extinguisher sheet that the extinguisher bas been inspected.

8. When it is necessary to remove a unit from a fire station for maintenance, the Site Safety Engineer must insure that an equivalent unit is located at that location during the absence of the assigned unit. If it is to be a permanent replacement, the Site Safety Engineer shall assure that the station identification is updated and that proper changes are initialed on the Inspection Tag.

5.7.7 Maintenance

5.7.7.1 Maintenance - At regular intervals of not more than 1 year, or when specifically indicated by the monthly inspection, extinguishers must be thoroughly examined and/or recharged or repaired to insure operability and safety; or replaced as needed.

1. Extinguishers removed from the premises to be recharged or repaired must be replaced by spare extinguishers during the period they are gone.

2. Each extinguisher must have a durable tag securely attached to show the maintenance or recharge date and the initials or signature of the person who performs this service.

5.7.8 Hydrostatic Testing

5.7.8.1 Hydrostatic Tests - If, at any time an extinguisher shows evidence of corrosion or mechanical injury, it must be subjected to a hydrostatic pressure test, or replaced.

1. For evaluating the condition of extinguisher cylinders made to Department of Transportation specifications, review the standard for visual inspection of Compressed Gas Cylinders (CGS C-6), published by the Compressed Gas Association.

2. Extinguishers must be hydrostatically tested at intervals not exceeding those specified in Table 5.6.

TABLE 5.6

	Test Inverval Year
Cartridge-Operated Water and/or Antifreeze	5
Storage-Pressure Water and/or Antifreeze	5
Wetting Agent	5
Foam	5
Loaded Stream	
Dry Chemical Extinguishers with Stainless Steel Shells, or Soldered-Brass Shells	5
Carbon Dioxide Extinguishers	5
Dry Chemical Extinguishers with Brazed-Brass Shells, or Mild-Steel Shells	12
Bromotrifluoromethane	12
Dry Powder Extinguishers for Metal Fires	12

For detail information concerning types of hyrdostatic test to be applied, contact the Site Safety Representative.

5.7.8.2 When a portable fire extinguisher fails a hydrostatic test, is damaged beyond repair, becomes obsolete or for any other reason connot be restored to operable condition, it shall be replaced.

5.7.9 Recordkeeping

5.7.9.1 Each fire extinguisher shall have a tag securely attached to it which has spares for an inspector to put the data he inspected the extinguisher and his initials. This record shall be maintained on the extinguisher indicating the date of the last inspection and the inspectors initials. When the blank spaces on the tag are filled the tag shall be discarded on the next inspection and a new tag attached to the extinguisher.

5.7.9.2 A form having the following information shall be maintained in the safety office indicating the required information for each fire extinguisher inspection.

1. A list of all fire extinguisher locations.

2. The type of fire extinguisher required at each location.

3. A space to indicate the date of the extinguisher inspection.

4. The name of the inspector.

5. A space to indicate that each location has been inspected.

6. A space to indicate any problems found at each location.

5.8 FIXED FIRE PROTECTION SYSTEMS

5.8.1 General

1. "The design and installation of water supply facilities such as gravity tanks, fire pumps, reservoirs, or pressure tanks

and underground piping are to be in accordance with NFPA Standards No. 22-1970, 'Water Tanks for Private Fire Protection'; No. 20-1970, 'Installation of Centrifugal Fire Pumps' and No. 24-1970, 'Outside Protection."

2. Fittings or transition couplings are to be provided to ensure proper connections to equipment and fittings used by the local fire department.

5.8.2 Temporary Systems

1. All inspection and recordkeeping requirements of Section 5.9. "Fixed Fire Protection Systems" apply to temporary fixed fire systems as well as permanent systems.

5.8.3 Yard Piping

5.8.3.1 A temporary or permanent water supply, of sufficient volume, duration reliability and pressure required to properly operate the combustible materials accumulate.

5.8.3.2 Where underground water mains are to be provided, they shall be installed, completed and in service with hydrants or standpipes, as soon as practicable.

5.8.3.3 All valves or controls in the yard piping which could affect the operation of the fire system shall be:

1. Tagged with a tag reading, "Danger - Fire Valve - Do Not Operate - Contact Harza-Ebasco Safety"

2. Sealed in their proper position.

3. Inspected at monthly intervals (minimum), to assure that they have not/been tampered with.

5.8.3.4 The Site Safety Representative shall be notified prior to any valves or controls in the fire system being operated.

5.8.4 Hose Houses & Hydrants

5.8.4.1 Hose houses shall be located throughout the construction area to be utilized for the storage of additional hose to supplement the site apparatus. These houses shall be checked on a monthly basis, and records maintained in the Site Safety Representative's Office.

5.8.4.2 Hose houses shall contain a minimum of:

1. 4 - 50' length of 2 1/2" hose
2. 4 - 50' length of 1 1/2" hose
3. 2 - Gated Wyes
4. 4 - 1 1/2" Nozzles
5. 6 - spanner wrenches
6. 2 - Hydrant wrenches
7. 1 - 2 1/2" ball valve (attached to one hydrant outlet)
8. 1 - Fire Ax
9. 1 - Prybar
10. Additional equipment may be needed depending on the circumstances

5.8.4.3 Hose houses shall be maintained free of obstructions which could prevent the doors opening their full swing and which could restrict the use of the equipment in the hose house.

5.8.4.4 Inspections of hose houses shall be at monthly intervals (minimum) and shall include the items discussed in paragraphs 5.9.4.1, 5.9.4.2, and 5.9.4.3.

5.8.4.5 Inspections of fire hydrants shall be at monthly intervals (minimum) and shall include the following items:

1. Main valve operated properly.
2. Siamese valves are tight, no leaks.
3. Adequate pressure.
4. The barrel drains properly.
5. The hydrant is protected from traffic, is accessible, and free from trash, grass, etc.

5.8.5 Sprinkler Systems

5.8.5.1 Sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineerig standards. The system includes a suitable water supply, such as gravity tank, fire pump, reservoir, or pressure tank and/or connection by underground piping to a city main. The portion of the sprinkler system above ground is a network of specially sized or hydraulically designed piping installed in a building or area, generally overhead, and to which sprinklers are connected in a systematic pattern. The system includes a controlling valve and a device for actuating an alarm when the system is in operation. The system is usually activated by heat from a fire and discharges water over the fire area.

5.8.5.2 If automatic sprinkler protection is to be provided, the installation shall be placed in service as soon as possible. Details of installation shall be in accordance with the "Standard for the Installation of Sprinkler Systems" (NFPA 13 - 1975).

5.8.5.3 Where sprinklers are required for safety to life, the building shall not be occupied until the sprinkler installation has been entirely completed and tested such that the protection is not susceptible to frequent impairment attributable to testing and corrections.

5.8.5.4 Every automatic sprinkler system must have at least one automatic water supply of adequate pressure, capacity and reliability.

5.8.5.5 A connection through which a fire department can pump water into the sprinkler system makes a desirable auxiliary supply. For this purpose, one or more fire department connections should be provided in all cases.

5.8.5.6 When a building, equipped with sprinklers by requirement, is to be demolished, the sprinkler protection shall be retained in service as long as the condition requiring sprinklers continues to exist.

5.8.5.7 Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

5.8.5.8 The Site Safety Representative shall be notified prior to any controls on valves being operated on an inservice sprinkler system.

5.8.5.9 All valves or controls which could affect the operation of an inservice sprinkler system shall be:

1. Tagged with a tag which reads "Danger - Fire Valve - Do Not Operate - Contact Harza-Ebasco Safety"

2. Sealed in their proper position.

3. Inspected at monthly intervals (minimum) to assure that they have not been tampered with.

5.8.5.10 The following clearances shall be maintained between sprinkler heads and storage:

1. Type I storage:

   A clearance of at least 36 inches maintained between sprinkler deflectors and top of storage.

2. Type II storage:

   A clearance of at least 18 inches maintained between sprinkler deflectors and top of storage.

3. Type III storage:

   A clearance of at least 18 inches maintained between top of storage and sprinkler deflectors.

   NFPA recommendation. An increased clearance up to 36 inches should be provided over large, closely packed piles of combustible cases, bales, cartons or other closely packed commodities. (NFPA No. 13, #3691)

5.8.5.11 Storage Category:

1. Type I storage: "Type I storage" is that in which combustible commodities or noncombustible commodities

involving combustible packaging or storage are stored over 15 feet but not more than 21 feet high in solid piles or over 12 feet but not more than 21 feeet in piles that contain horizontal channels. Minor quantities of commodities of hazard greater than ordinary combustibles may be included without affecting this general classification.

2. Type II storage: That in which combustible commodities or noncombustible commodities involving combustible packaging or storage aids are stored not over 15 feet high in solid piles or not over 12 feet high in piles that contain horizontal channels. Minor quantities of commodities of hazards greater than ordinary combustibles may be included without affecting this general classification.

3. Type III storage: This is where the stored commodities, packaging, and storage aids are noncombustible or contain only a small concentration of combustibles which are incapable of producing a fire that would cause appreciable damage to the commodities stores or to noncombustible wall, floor or roof constructions. Ordinary combustible commodities in completely sealed noncombustible containers may qualify in this classification. General commodity storage that is subject to frequent changing and storage of combustible packaging and storage aids is excluded from this category.

5.8.6 Standpipes

5.8.6.1 In all structures in which standpipes are required, or where standpipes exist in structures being altered, they shall be brought up as soon as applicable laws permit, and shall be

maintained as construction progresses in such a manner that they are always ready for fire protection use. The standpipes shall be provided with Siamese fire department connections on the outside of the structure, at the street level, which shall be conspicuously marked. There shall be at least one standard hose outlet at each floor.

5.8.6.2 The standpipes shall be provided with conspicuously marked siamese fire department connections on the outside of the building at the street level.

5.8.6.3 Pipe sizes, hose valves, hose, water supply, and other details for new construction shall be in accordance with the "Standad for Installation of Standpipe and Hose Systems" (NFPA 14 - 1974).

5.8.6.4 Standpipes shall be securely supported at each alternate floor.

5.8.6.5 At each floor level, there shall be provided at least one approved hose valve for attaching fire department hose. Valves shall be kept closed at all times during nonfire emergency conditions, and guarded against mechanical injury.

5.8.6.6 All threads on hose connections shall conform to the local fire department hose thread.

5.8.6.7 Temporary standpipes shall remain in service until the permanent standpipe installation is complete.

5.8.7 Fire Hose Stations

5.8.7.1 Hose and nozzles shall be provided and made ready for use as soon as either the temporary or permanent water supply is available on new construction.

5.8.7.2 Signs or distinctive markings, as may be required to designate the location of first aid fire equipment and standpipe connections, shall be conspicuously displayed.

5.8.7.3 For inside use, hoses are kept on racks or reels, approximately 5 feet above the floor. The hose should be so arranged that it will not kink or tangle when pulled out. The hose should not be preconnected to the hose station valve because a leaking valve could fill the hose with water making it difficult to remove from the rack or reel. The hoses shall be provided with combination spray-solid stream nozzles. To prevent excessive pressure drop not more than 100 ft. of hose should be placed at each standpipe outlet.

1. CAUTION: Solid stream nozzles <u>shall not</u> be used in an area containing energized electrical conductors and/or equipment.

5.8.7.4 Hose connections shall be of the approved type and shall be equipped with standard caps, properly secured and arranged for easy removal by fire departments.

5.8.7.5 Fire hose connections must be compatible with local firefighting equipment.

5.8.7.6 Where standpipe and hose systems are provided, they must meet the design requirements of the NFPA standards for the Installation of Standpipe and Hose System NFPA 14-1970.

5.8.7.7 Hose lines shall be available for immediate use, and should not be obstructed. The equipment should be visible and conspicuously identified, and employee should know how it operates.

5.8.7.8 Fire Hose must be rugged and dependable, capable of carrying water under substantial pressures, yet flexible and sufficiently easy to handle.

5.8.7.9 Unlined linen hose shall not be used. Outer jackets of lined hose shall be of synthetic fiber.

5.8.8 Carbon Dioxide and Dry Chemical Extinguishing Systems

5.8.8.1 When these systems have been installed and charged before construction activities have been completed and there is a possibility that construction personnel may be exposed to a carbon dioxide or dry chemical discharge, suitable safeguards must be provided to insure prompt evacuation of such location. Means for prompt rescue of any trapped personnel must also be provided. Such safety items as personnel training, warning signs, discharge alarms, predischarge alarms, and breathing apparatus must be considered.

5.8.9 Fire Cutoffs

5.8.9.1 Fire walls and exit stairways, required for the completed buildings, must be given construction priority. Fire doors, with automatic closing devices, must be hung on openings as soon as practicable.

5.8.9.2 Fire cutoffs must be retained in buildings undergoing alterations or demolition until operations necesitate their removal.

5.9 SITE FIRE BRIGADE

5.9.1 General Requirements

1. As warranted by the project, a firefighting organization (fire brigade) should be established, trained and equipped to assure adequate protection to life and property.

2. Firefighting equipment must be conspicuously located and access to all firefighting equipment must be maintained at all times.

3. Fire alarms are very important in the success or failure of extinguishing a fire; therefore, an alarm system, e.g., telephone system, siren, etc., must be established whereby employees on the site and the local fire department can be alerted during an emergency.

   (1) The alarm code and reporting instructions must be conspicuously posted at phones and at employee entrances.

4. All firefighting equipment must be inspected on a monthly basis and a record of inspection must be maintained at the jobsite. Defective equipment must be immediately replaced.

5. All employees must be instructed to familiarize themselves with the location and proper use of all firefighting equipment, fire alarm boxes and exits in the immediate vicinity of their work.

6. The local fire department should be requested to visit and review project hose line compatibility and to coordinate efforts for site protection.

7. Applicable parts of NFPA Vols. 2 and 12, Sections 10, 30, 40 and 50, shall be used as a guide for the organization and trainig of the Site Fire Brigade.

8. The responsibility for training the Site Fire Brigade shall be under the direction of the Site Safety Representative.

9. During normal working hours, the Fire Brigade shall have a minimum of 5 members.

10. The Site Safety Representative shall maintain a current list of Fire Brigade members.

11. Each Fire Brigade member shall wear a fire brigade emblem on his hard hat. (See Exhibit 5.1)

12. Training shall consits of classroom sessions and actual practical fire extinguishing methods and procedures.

13. To maintain proficiency in the use of on-site fire protection equipment and to keep abreast of changes as they occur, Fire Brigade Training Sessions will be established under the supervision of the Site Safety Representative.

5.9.2 Training Outline

5.9.2.1 Classwork

1. Discussion of the fire brigades responsibilities;
2. Portable air pack training information;
3. Use of portable extinguishers and agents;
4. Use of water and handline for fire extinguishing.

Practical Work (Field Training)

1. Orientation to fire equipment

2. Indoctrination - Explanation of course and its objectives.

3. Smoke Drill - With self-contained breathing apparatus

4. Fire Extinguishers - Use of portable extinguishers, application and maintenance.

5.9.3 CLASSROOM SESSION

5.9.3.1 Introduction

The reason for the program and how it will be accomplished through classroom and practical fire training experience.

1. <u>The Fire Brigade</u>

Why and how fire brigades must be prepared to function as a coordinated unit for fire prevention and protection.

2. <u>Fire Brigade Responsibility</u>

The protection of life and property and how it is accomplished by training and pre-fire planning.

3. <u>Fire Brigade Backup</u>

The availability of twon and/or city fire units and coordination required between the fire brigade and those units during operations.

4. <u>Fire Brigade Equipment</u>

Knowledge of equipment on hand and the location of fire stations.

5.9.3.2 NATURE OF FIRE

1. Explanation of fire and properties necessary for combustion. Discussion - Question and Answer Period.

5.9.3.3 KNOW YOUR FIRE HAZARDS

1. Explanation of fire hazards and contributing factors to the start of fires.

2. Discussion - Question and Answer Period.

3. Association of fire hazards with areas in the plant complex and during certain operations.

5.9.3.4 FIRES IN CONFINED AREAS

1. Introduction to the portable air pack and how it should be used.

2. Use of self contained breathing apparatus.

3. Demonstration and practical exercise donning and using the portable air pack by all present.

5.9.3.5 TYPES OF FIRE EXTINGUISHERS

1. Fire extinguishers used on the construction site property and their uses and purposes.

2. Hose station and fire equipment available and its uses.

3. Demonstrate the use of the fire extinguishers and hose lines.

5.9.4 Field Sessions

5.9.4.1 Introduction to Field Training

1. Introduction to the program

2. Use of portable air pack

3. Use of fire extinguishers

   a. Water
   b. CO_2
   c. Others, if applicable

4. Use of foam, if applicable

5. Fire hose use

a. Introduction to handlines and water extinguishment.

b. Use of handlines (fog) for petroleum fires, open type.

c. Use of handlines (fog) for petroleum fires, in ground level confined areas.

d.. Use of handlines (fog) for petroleum fires, in an elevated confined area.

6. Conclusion - Constructive critique session

5.10 SITE FIRE TRUCK

5.10.1 Inspections

1. The engine shall be run a minimum of 5 minutes daily.

2. The truck will be serviced by the On-Site Operating Engineers on a monthly basis, and a log will be maintained by the Site Safety Representative.

3. The equipment on the pumper shall be checked on a weekly basis to assue the proper placement and that it is operational.

4. The electric generator shall be run at least 3 times a week, and the pump shall be run at least once a week.

5. Any malfunction shall be referred to the Site Safety Representative for immediate repair.

6. The equipment on the Truck (wrenches, hoses, nozzles, etc.) shall be checked on a weekly basis.

FIRE TRUCK

EQUIPMENT CHECKLIST

Date _____	O.K.	Remarks
GAS	___	_____
WATER TANK SUPPLY (LEVEL)	___	_____
PRIMARY OIL (LEVEL)	___	_____
CHECK ALL DISCHARGE VALVES (OPERATION)	___	_____
EQUIPMENT LIGHTS ALL FRONT & REAR (RED WARNING)	___	_____
ELECTRIC GENERATOR	___	_____
STARTING ROPE	___	_____
1" HIGH PRESSURE BOOSTER LINE W/STORAGE REEL GUN TYPE NOZZLE	___	_____
1 1/2" HOSE LINE WITH NOZZLE ATTACHED	___	_____
1 1/2" HOSE IN THE STORAGE RACK	___	_____
2 1/2" HOSE IN THE STORAGE RACK	___	_____
2 1/2" SPRAY NOZZLES	___	_____
2 SCOTT AIR RACKS	___	_____
1 CONTROL SPRAY NOZZLE	___	_____
1 2 1/2" CONTROL NOZZLE W/SPRAY CONTROL TIP	___	_____
HYDRANT WRENCHES (UNIVERSAL)	___	_____
SPANNER WRENCHES (QUICK ACTION)	___	_____
CUP TYPE WRENCHES	___	_____
1 PIPE WRENCH	___	_____
1 BOLT CUTTER - LARGE	___	_____
SECTIONS 10' HARD SUCTION HOSE	___	_____
PICK AXES (2 SM/1 LGE)	___	_____
3' PRY BARS	___	_____
5' PRY BARS	___	_____
4 HOSE STRAPS	___	_____
FLOOD LIGHTS (2 MOUNTED/2 PORTABLE)	___	_____
1 PORTABLE GENERATOR MOUNTED ON TRUCK (PLUS SAFETY CAN AND FUEL FOR THE GENERATOR)	___	_____

EQUIPMENT CHECKLIST (Cont'd)

Date _____	O.K.	Remarks
ROOF MOUNTED SPOT LIGHT/INTERNAL CONTROLS	___	_____
1 TRANSISTOR POWERED MEGAPHONE	___	_____
STEEL FIRE BROOMS	___	_____
PIERCING BAYONETS	___	_____
50' LIFELINES	___	_____
1 DRY POWDER EXTINGUISHER	___	_____
2 CO_2 EXTINGUISHERS	___	_____
FIRE FIGHTER BOOTS	___	_____
FIRE FIGHTER COAT	___	_____
FIRE FIGHTER GLOVES	___	_____
1 TRICKLE CHARGER FOR THE BATTERY	___	_____
EXTENSION LADDER	___	_____
REDUCERS (2 1/2" - 1 1/2")	___	_____
1 DOUBLE MALE ADAPTER (2 1/2")	___	_____
1 DOUBLE FEMALE ADAPTER (2 1/2")	___	_____
2 NOZZLES 1"	___	_____

5.11 NOTIFICATION AND ADMITTANCE OF OUTSIDE FIRE DEPARTMENTS

5.11.1 Request For Assistance

1. In the event of a fire which cannot be contained by Site Personnel, the Site Safety Representative shall notify the Site Security Officer at the Main Gate to request assistance from the Local Fire Department. The Site Security Officer shall notify the Fire Company as to the location and type of fire and the access route to be used.

2. When the fire company arrives at the site, the vehicles and the man aboard shall be passed through the gate without delay, and shall be directed to the fire scene by the Site Security Officer. Late arriving volunteer firemen reporting to the Main Gate shall be identified by their fire company badge or a fellow firemen. These late arrivals shall be taken to the scene of the fire by any available vehicle. Arrangements shall be made so that firemen will have immediate access to the premises when called.

3. Arrangements shall be made with the local fire authority to establish access ways of sufficient dimension to allow maneuvering of fire equipment.

5.12 WELDING AND CUTTING PROCEDURES

PURPOSE

This procedure covers recommendations for the safe use of gas and arc cutting and welding to prevent loss of life and property from fire as used throughout the construction site.

GENERAL REQUIREMENTS

The following welding and cutting safety procedures shall be established at each facility where welding and cutting is performed.

A. AREA PREPARATION

1. Areas where cutting and welding are required or in progress shall be kept clean and all accumulations of trash, rags, etc., shall be removed. Consideration shall be given to the distance that sparks or slag can travel.

2. All machinery, equipment, materials, cable in trays, or other items subject to damage or possible ignition by sparks from welding and cutting operations shall be covered with suitable noncombustible material. Special attention shall be directed toward welding gas hoses and cable in trays.

3. When cutting and welding operations are performed above grating decks, or near floor or wall openings, the deck or openings, the deck or openings below the operation shall be covered with suitable noncombustible material. Care shall be taken not to direct the slag stream from cutting operation through nearby openings. Particular care shall be taken that large pieces of hot slag are not allowed to remain on surfaces long enough to cause combustion or damage. Where practical, side curtains of noncombustible material shall be installed around welding and cutting areas for the protection of nearby personnel and property.

4. First-aid fire extinguishers of the appropriate variety shall be readily accessible to the work when cutting and welding operations are performed.

B. ENVIRONMENTAL PREPARATION

Special care shall be taken to ensure that the welding and cutting environment is considered and controlled to protect against injury or damage. All hollow spaces, cavities, tanks or other containers shall be vented, purged and tested for the presence of explosive and/or otherwise hazardous atmospheres.

C. FIRE PREVENTION INSPECTION

1. One or more construction workers in each welding or cutting work area shall be designated to watch for potential fires or smoldering sparks in the course of his regular duties. These individuals shall be trained in fire prevention and the use of first-aid fire protection equipment. They shall be familar with the facilities for sounding and alarm in the event of a fire. The individuals shall call hazards to the appropriate Supervisor's attention for correction. Upon completion of welding and cutting operations in a work area, an inspection shall be made to confirm that safe conditions exist.

Exhibit 5.1

FIRE BRIGADE HARD HAT EMBLEM

RESPIRATOR GUIDE

RESPIRATORY PROTECTION PROCEDURE

This guide sets forth respirator use, maintenance and training information through which Harza-Ebasco Joint Venture project will be able to develop a respiratory program.

The use of respirators implies that the wearer needs protection from and atmosphere that might threaten the employee's health or life. Therefore, it is imperative that the level of protection needed be determined and provided for both in normal and emergency conditions of use.

The selection of respirators, along with their correct fit, training, use and care, is an important part of an employee's protection when required to wear a respirator. In order to maintain a current program, a continual respirator inspection and overall program surveillance must be part of our Respiratory Protection Procedure.

RESPIRATOR SELECTION

The chemical and physical properties of the contaminant, as well as the toxicity and concentration of the hazardous material shall be considered in selecting the proper respirator. The following table lists the type of respirators required.

SELECTION OF RESPIRATORS

Hazard	Respirator (See Note)
Oxygen deficiency	Self-contained breathing apparatus. Hose mask with blower. Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.

Gas and vapor contaminants immediately dangerous to life and health.	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full facepiece respirator with chemical canister (gas mask). Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life and health.	Air-line respirator. Hose mask without blower. Air-purifying, half-mask or mouthpiece respirator with chemical cartridge.
Particulate contaminants immediately dangerous to life and health.	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full facepiece respirator with appropriate filter. Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life and health.	Air-purifying, half-mask or mouthpiece respirator with filter pad or cartridge. Air-line respirator. Air-line abrasive-blasting respirator. Hose mask without blower.

Combination gas, vapor and particulate contaminants immediately dangerous to life and health.	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full facepiece respirator with chemical canister and appropriate filter (gas mask with filter). Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or air-storage receiver with alarm.
Not immediately dangerous to life and health.	Air-line respirator. Hose mask without blower. Air-purifying, half mask or mouthpiece respirator with chemical cartridge and appropriate filter.

NOTE: For the purpose of this part, "immediately dangerous to life and health" is defined as a condition that either poses an immediate threat to life and health or an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse delayed effects on health.

PRESELECTION INFORMATION

Though not considered an "engineering control", respirators should be engineered for the environment in which they are to be used. It is essential that certain information be obtained before a respirator is chosen for protection. The information required to choose a respirator is no more and no less than that required for any other type of industrial hygiene control.

1. Is the contaminant a dust, mist, fume, vapor, or gas?

2. What is the concentration of the air contaminant?

3. What is the TLV?

4. Is the atmosphere oxygen deficient?

5. Is the material readily detectable below the TLV, and does it irritate the skin, nose, or eyes?

6. Does the concentration found approach that which is considered to be immediately dangerous to life?

See Appendix 1 for Overall Respiratory Protection factors.

TRAINING IN THE USE OF RESPIRATORS

General

The proper respirator will be of no value if the wearer is not fitted and trained to is use, respirators do not automatically fit the wearer. It is essential that the wearer's training start with a respirator fit test.

Respirator users may be divided into three classes: routine, occasional, and emergency. All wearers must be introduced to the respirator they will use, receiving information on how the respirator works, the periodic maintenance to be done by the wearer, and problems that can occur from neglect and misuse of the respirator. For example, the user of the air-supplied respirator should be aware of the air pressure necessary to provide the minimum required airflow. He must also be aware that the diameter and length of hose cannot be changed without seriously affecting his air supply.

The Routine User

The routine user, after his initial training, should be checked periodically to ensure that he is using and caring for the respirator properly. He should be given periodic refresher instruction in the proper use and care of the respirator.

The occasional user will require periodic training after the initial training, since he does not use the respirator routinely. The longer time between uses, the more important it is to have regular training sessions.

The Emergency User

The emergency user needs more training than the routine and occasional users. "Emergency" connotes hazardous exposures to toxic material during escape, during repair work, or during rescue efforts. Serious consequences will result for the user if the measures required by the emergency situation are not executed without mishap. Only persons whose services are necessary in the emergency should be trained in the use of emergency equipment. Such personnel are those who can repair or inactivate malfunctioning equipment, or can effect rescue of personnel in areas with hazardous atmospheric conditions. No one who does not fit into these categories should be allowed to wear emergency respiratory equipment. After the initial training for emergency personnel, it is imperative that there be retraining sessions. These periods should cover not only a checkout of the equipment, but wearing the equipment and performing exercises designed to simulate the actions necessary in an emergency.

An employee and his supervisor should be trained in basic respiratory protection practices. Also, each should be trained in the proper fit of the respirator.

In addition, training should be given in the:

1. Instruction in the nature of the hazard, whether acute, chronic, or both and an honest appraisal of what may happen if the respirator is not used.

2. Discussion of why this is the proper type of respirator for the particular purpose.

3. Discussion of the respirator's capabilities and limitations.

4. Instruction and training in actual use of the respirator (especially one for emergency use) and close, frequent supervision to ensure that it continues to be used properly.

   Every respirator wearer shall receive fitting instruction including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. The employees diligence in observing these factors shall be evaluated by periodic checks.

   The employee shall be trained to assure proper protection. The facepiece fit shall be checked by the wearer each time he puts on the respirator.

5. Training in recognizing and coping with emergencies.

6. Other special training as needed.

7. A major thrust is toward explaining as much as possible about the reasons for wearing a respirator. This, of course, is to motivate the user to

accept the fact that protection is necessary, and to install in him the desire to wear and maintain his respirator properly.

RESPIRATOR FITTING

Determination of facepiece fit could involve both qualitative and quantitative tests. A qualitative test relies on the wearer's subjective response. A quantitative test uses some other means of detecting facepiece leakage. The general advantages and disadvantages are as follows.

Qualitative Tests

Advantages

Usually, qualitative tests are fast, require no complicated, expensive equipment, and are easily performed in the field.

Disadvantages

Qualitative, tests rely on the wearer's subjective response, so they are not entirely reliable.

Quantitative Tests

Advantages

The greatest advantage of a quantitative test is that it indicates respirator fit numerically, and does not rely on a subjective response. The quantitative test is highly recommended when facepiece leakage must be minimized for work in highly toxic atmospheres or those immediately dangerous to life or health.

Disadvantages

Quantitative fitting tests require expensive equipment that can be operated only by highly trained personnel and is unsuitable for field use because of its complexity and bulk. Each test respirator must be equipped with a sampling probe to allow removal of a continuous air sample.

SECTION VII

RESPIRATOR FITTING PROCEDURES

One point must be kept in mind throughout the following discussions. The OSHA regulations require that workers be allowed to test the facepiece-to-face seal of the respirator.

QUALITATIVE FITTING TESTS

Negative Pressure Test. The wearer can perform this test by himself in the field. It consists merely of closing off the inlet of the canister, cartridges(s), or filter(s) by covering with the palm(s) or replacing the seal(s), or of squeezing the breathing tube so that it does not pass air; inhaling gently so that the facepiece collapses slightly; and holding the breath for 10 seconds. If the facepiece remains slightly collapsed and no inward leakage is detected, the respirator is probably tight enough.

This test, of course, can be used only on respirators with tight-fitting facepieces.

Although, this test is simple, it has severe drawbacks, primarily that the wearer must handle the respirator after it has supposedly been positioned on his face. This handling can modify the facepiece seal.

Positive Pressure Test. This test is very like the negative pressure test, and it has the same advantages and limitations. It is conducted by closing off the exhalation valve and exhaling gently into the facepiece. The fit is considered satisfactory if slight positive pressure can be built up inside the facepiece without any evidence of outward leakage.

Quantitative Fitting Test. All quantitative respirator performance tests involve placing the wearer in an atmosphere containing an easily detectable, relatively nontoxic gas, vapor, or aerosol. The atmosphere inside the

respirator is sampled continuously through a probe in the respiratory inlet covering. The leakage is expressed as a percentage of the challenge atmosphere outside the respirator, called "per cent of penetration," or simply "penetration".

CORRECTIVE LENSES

Spectacles. Temple bars on spectacles interfere with the seal of full facepiece respirators and are not acceptable. Full facepieces are required to provide interior appurtenances for mounting spectacles. It is necessary to obtain spectacles designed for this purpose, since it is not practicable to adapt conventional frames.

Half and quarter mask may interfere with proper sealing of spectacles. If spectacles are necessary, the respirator fit is not complete unless the spectacles are found to be compatible with the facepiece.

Contact Lenses. Contact lenses are not to be worn with full facepiece respirators. Donning a full facepiece tends to pull at the outer corner of the eyes, and this is the motion used to remove contact lenses. A lense dislodged while a worker is wearing a full facepiece necessitates a trip to an area where the mask can be removed with safety and such conditions may not always exist.

RESPIRATOR USE

Random Inspection

Respirators in use shall be randomly inspected frequently to ensure that those selected for the job are being used and they they are in good condition.

Respiratory protection is no better than the respirator in use. Periodic monitoring of respirator use should include:

- Determination that the proper respirators are being used.
- Determination that respirators are being worn properly.
- Consulation with wearers about:
  - Discomfort
  - Resistance to breathing
  - Fatigue
  - Interference with vision
  - Interference with communications
  - Restriction of movement
  - Interference with job performance
  - Confidence in the respirator

Problems discovered during the random inspections must be rectified.

Employee Responsibility

Proper supervision of respirator use should ensure that each worker understands that he has the following responsibilities.

- He shall use the respirator as instructed.
- He shall guard against damaging the respirator.
- He shall go immediately to an area having respirable air if the respirator fails to provide proper protection.
- He shall report any respirator malfunction to a person responsible for the respirator program or his supervisor.

WORK IN DANGEROUS ATMOSPHERES

All personnel supervising or entering in these area shall be familiar with these procedures.

Persons using air-line respirators in atmospheres immediately hazardous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous atmospheres shall be used. A standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

Before a person is permitted to wear an air-line respirator in a hazardous atmosphere, an industrial hygiene, or safety department representative or a qualified industrial hygienist shall be responsible for compliance with the following:

(1) Air-line hose from a compressor or cylinder air supply shall be protected from damage, including cutting, kinking, crushing, or burning. In some cases an armored hose shall be used. Hose couplings shall be protected against disconnection. Trailing air-line hose shall be arranged to minimize tripping and to permit ready escape.

(2) The cylinder containing the air supply for an air-line respirator shall be tested for oxygen concentration and carbon monoxide content and shall be respirable. All air shall meet the minimum specification for Type I, Grade D gaseous air of the Compressed Gas Association Commodity Specification for Air, F-7.1-1966. The air supply in the cylinder shall be adequate for completion of the work and escape. Oxygen must never be used with air-line respirators.

(3) The compressor for supplying air shall be equipped with necessary safety and standby devices. An air storage receiver shall also be provided to furnish the wear with an adequate supply of escape air if the compressor fails to operate. A compressor shutoff alarm and necessary aerosol and vapor and gas filters shall also be incorporated into the system.

If an oil-lubricated compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor shall be frequently tested for carbon monoxide to insure that it meets the specification in Part 2 of this part.

(4) The wearer shall be properly trained in the use of the air-line respirator and shall be well-informed of the hazard. A standard operating procedure shall be prepared for each situation in which air-line respirators are employed in atmospheres immediately hazardous to life or health, and air-line respirator users shall be thoroughly familiar with this procedure.

(5) Continuous-flow air-line respirators are designed for maximum comfort with a minimum airflow that will adequately protect the wearer in a non-hazardous atmosphere. However, they are capable of providing adequate airflow to protect the wearer in a hazardous atmosphere. This adequate airflow is obtained when the air-flow control valve is fully open.

The recommended minimum airflows for use of air-line respirators in hazardous atmospheres are five cubic feet per minute to tight fitting facepieces and seven cubic feet per minute to loose fitting hoods or helmets. Persons wearing supplied-air suits shall follow the manufacturer's instruction concerning minimum airflow.

For further information on furnishing compressed air to air-line respirators, refer to Compressed Gas Association Pamphlet G-7-1976.

SECTION VIII

RESPIRATOR INSPECTION, CLEANING, MAINTENANCE AND STORAGE

Respirator Inspection, Cleaning, Maintenance and Storage Program

Scrupulous respirator maintenance must be made an integral part of the overall respirator program. Wearing poorly maintained or malfunctioning respirators is, in one sense, more dangerous than not wearing a respirator at all. The worker wearing a defective device thinks he is protected when, in reality, he is not. Emergency escape and rescue devices are particularly vulnerable to poor maintenance as they generally are used infrequently, and then in the most hazardous and demanding circumstances. The possible consequences of wearing a defective emergency escape and rescue device are lethal.

The OSHA standards strongly emphasize the importance of an adequate maintenance program and include at least:

Inspection for defects (including a leak check),
Cleaning and disinfecting
Repair,
Storage.

A proper maintenance program ensures that the worker's respirator remains as effective as when it was new.

Frequency of Inspection

OSHA requires that "all respirators be inspected before and after each use," and that those not used routinely, i.e. emergency escape and rescue devices, "shall be inspected after each use and at least monthly..." In one case, the respirator is to be inspected both before and after each use, in the other case, only after use. However, it is highly unlikely that anyone needing a respirator in a hurry, as during an emergency, is going to inspect it. In fact, it could be dangerous to take time to do so.

Inspection Procedures

The OSHA standards state only that respirator inspection shall include:

A check of the tightness of the connections

A check of the facepiece, valves, connecting, tube and canisters.

The standards also state that the regulator and warning devices on Self Contained Breathing Apparatus shall be checked for proper functioning.

FIELD INSPECTION

Air-Purifying Respirators

Routinely used air-purifying respirators should be checked as follows before and after each use.

(a) Examine the facepiece for:
Excessive dirt, cracks, tears, holes, or distortion from improper storage,
Inflexibility (stretch and massage to restore flexibility),
Cracked or badly scratched lenses in full facepieces,
Incorrectly mounted full facepiece lens or broker or missing mounting clips,
Cracked or broken air-purifying element holder(s), badly worn threads, or missing fasket(s) (if required).

(b) Examine the headstraps or head harness for:
Breaks, Loss of elasticity,
Broken or malfunctioning buckles and attachments,
(Full facepieces only) Excessively worn serrations on the head harness which might permit slippage.

(c) Examine the exhalation valve for the following after removing its cover:
Foreign material, such as detergent residue, dust particles, or human hair under the valve seat,
Cracks, tears, or distortion in the valve material,
Improper insertion of the valve body in the facepiece,
Cracks, breaks, or chips in the valve body, particularly in the sealing surface,
Missing or defective valve cover,
Improper installation of the valve in the valve body.

(d) Examine the air-purifying elements for:
Incorrect cartridge, canister, or filter for the hazard,
Incorrect installation, loose connections, missing or worn gaskets, or cross-threading in holder,
Expired shelf-life date on cartridge or canister,
Cracks or dents in outside case of filter, cartridge, or canister,
Evidence of prior use of sorbent cartridge or canister, indicated by absence of sealing material, tape, foil, etc., over inlet.

(e) If the device has a corrugated breathing tube, examine it for:
Broken or missing end connectors,
Missing or loose hose clamps,
Deterioration, determined by stretching the tube and looking for cracks.

(f) Examine the harness of a front - or - back - mounted gas mask for:
Damage or wear to the canister holder which may prevent its being held securely in place,
Broken harness straps or fastenings.

Atmosphere-Supplying Respirators

For a routinely used atmosphere-supplying device, use the following procedures:

(a) If the device has a tight fitting facepiece, use the procedures outlined above for air-purifying respirators, except those pertaining to the air-purifying elements.

(b) If the device is a hood, helmet, blouse or full suit, use the following procedures.
Examine the hood, blouse, or full suit for rips and tears, seam integrity, etc.,
Examine the protective headgear, if required, for general condition with emphasis on the suspension inside the headgear,
Examine the protective faceshield, if any, for cracks or breaks or impaired vision due to rebounding abrasive particles,
Make sure that the protective screen is intact and secured correctly over the faceshield of abrasive blasting hoods and blouses.

(c) Examine the air supply system for:
Integrity and good condition of air supply lines and hoses, including attachments and end fittings,
Correct operation and condition of all regulators, valves, or other air-flow regulators.

On Self-Contained Breathing Apparatus determine that the high pressure cylinder of compressed air or oxygen is sufficiently charged for the intended use, preferably fully charged (mandatory on an emergency device). On closed-circuit SCBAs, make sure that a fresh canister of CO sorbent is installed before use, or that the total use time on the canister is known. On open-circuit SCBAs, recharge the cylinder if less than 25% of the useful service time remains. All these SCBAs are required to have a warning device

that indicates when this point is reached. However, it is much preferred that an open-circuit SCBA be fully charged before use.

When an air-purifying or atmosphere supplying device is used nonroutinely, all the above procedures should be followed after each use. OSHA requires that devices for emergency use be inspected once a month and that "a record shall be kept of inspection dates and findings for respirators maintained for emergency use."

If defects are found during any field inspection, two remedies are possible. If the defect is minor, repair and/or adjustment may be made on the spot. If it is major, the device should be removed from service until it can be repaired. Under no circumstances should a device that is known to be defective be used.

APPENDIX 1

RESPIRATORY PROTECTION FACTORS

Concentrations in Multiples of Permissible Exposure limits	Facepiece Pressure	Permissible Respirators
5 X	-	Single use dust
10 X	-	Quarter-mask dust
	-	Half-mask dust
	-	Half-or Quarter mask, fume
	-	Half-or Quarter mask, High Efficiency
	-	Half-mask Supplied air
50 X	-	Full facepiece, High Efficiency
	-	Full facepiece, supplied air
	-	Full facepiece
	-	Self-Contained Breathing Apparatus (SCBA)
1,000 X	+	Powered, High-Efficiency all enclosures
	0	Half-mask, supplied air
2,000 X	0	Supplied air with full facepiece, hood, helmet or suit

10,000 X	+	Full facepiece, open circuit SCBA Full facepiece supplied air and auxiliary Air Tank
Emergency entry into unknown Concentrations or firefighting	+	Full facepiece open circuit SCBA
Escape only*	±	Any SCBA with full face-piece Any self rescurer

Notes:

1. Half-mask respirators should not be used if the particulate matter causes eye irritation at the use concentration.

2. Full facepiece supplied air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air tank which can be operated in the positive pressure.

*In an atmosphere which is immediately dangerous to life or health.

RESPIRATORY PROTECTION FACTORS

Concentrations in Multiples of Permissible Exposure limits	Facepiece Pressure	Permissible Respirators
10 X	-	Half-mask chemical cartridge respirator with *Name** cartridges or cannister
	-	Half mask, supplied air
50 X	-	Full facepiece gas mask or chemical cartridge with **Name** cartridges or cannister
	-	Full facepiece SCBA
		Full facepiece supplied air
1,000 X	0	Half-mask supplied air
2,000 X	0	Supplied air with full facepiece, hood, helmet or suit
10,000 X	+	Full facepiece, open-circuit SCBA
		Full facepiece supplied air with
		Auxiliary air tank

Emergency entry into unknown concentration of firefighting	+	Full facepiece, open circuit SCBA
Escape only	±	Any full facepiece SCBA Gasmask with a **Name** cannister
	-	Any self rescurer

Notes:

1. The "Name" means approved chemical cannisters or cartridges against a specific contaminant or a combination of contaminants such as organic vapor, acid gases, organic vapor plus particulates or acid gases plus organic vapor.

2. Half-mask should not be used if eye irritation occurs at the use concentration.

3. Full facepiece supplied air respirator should not be used in any atmosphere which immediately dangerous to life or health unless it is equipped with an auxiliary air tank which can be operated in the positive pressure mode.

EVALUATION OF RESPIRATOR PROGRAM EFFECTIVENESS

OSHA 1910.134 and Sec. 3.5.9 of ANSI Z88.2 state that respirator program effectiveness shall be inspected and evaluated regularly. Periodic monitoring is necessary to ensure that workers are adequately protected. The program should be evaluated at least annually, and the written operating procedures should be modified to reflect the evaluation results if necessary.

Frequent inspection of respirator use will determine whether the correct respirators are being used and worn properly. Examination of respirators in use and in storage will indicate how well they are maintained. Wearers should be consulted periodically about their acceptance of respirators, including the discomfort, resistance to breathing, fatigue, interference with vision and communication, restriction of movement, and interference with job performance, and their confidence in the respirator's effectiveness.

The results of periodic inspection of respirator use, consultations with wearers, measurements of hazard levels in work areas, and medical surveillance of wearers should be reviewed, studied and analyzed to determine the effectiveness of the respirator program.

SECTION 7

INSPECTIONS, VIOLATIONS AND CONTEST ACTIONS

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SECTION 7 - INSPECTIONS, VIOLATIONS AND CONTEST ACTIONS

7.1 OSHA Overview

To assure, as far as possible, that every working employee has a safe and healthful working environment, the Occupational Safety and Health Act (OSHA) imposes on the employers certain penalties for not complying with the OSHA Standards.

These penalties escalate with the severity and frequency of the cited standards violations. In addition to the OSHA standard penalties, there are penalties for failure to furnish a workplace free from generally recognized hazards which could cause death or serious injuries.

Although, no penalties are imposed by OSHA on the employees, it is expected that the usual management prerogatives in dealing with employees will be used.

The states are encouraged by OSHA to assume responsibility for the administration and enforcement of their own occupational safety and health laws. Those states that have developed this capability have preempted the Federal Safety Administration within their areas.

The act covers all employees employed in a business which affects commerce. This is given a broad interpretation to afford protection to nearly all employees.

7.2 Administration of OSHA

Administration and enforcement of OSHA are vested primarily in the Secretary of Labor and in the Occupational Safety and Health Review Commission, a quasi-judicial board of three members appointed by the President. Research and related functions are vested in the Secretary of Health, Education, and Welfare and will, for the most part, be carried out by the National Institute for Occupational Safety and Health (NIOSH), established within HEW. The task

of compiling injury and illness statistical data is vested in the Bureau of Labor Statistics. The primary functions of each of these units are briefly described below.

7.2.2 - Occupational Safety and Health Administration (OSHA)

OSHA, headed by an Assistant Secretary of Labor, was created within the US Department of Labor to carry out the functions of the Secretary. The primary function of OSHA is to promulgate and enforce occupational safety and health standards.

Ten regional offices have been established within OSHA. The primary mission of the Regional Administrator is to supervise, coordinate, evaluate, and execute all programs of OSHA in the region.

Area offices have been established within each region. The mission of the Area Director is to carry out the compliance program of OSHA within designated geographic areas. The area office staff carries out its activities under the general supervision of the Area Director and the guidance of the Regional Administrator, using policy instructions received from the national headquarters.

7.2.3 - Occupational Safety and Health Review Commission (OSHRC)

The Occupational Safety and Health Review Commission is an independent establishment of the Executive Branch of the US Government. The principal function of the Commission is to adjudicate certain disputes between an employer and the Secretary, or between an employee and the Secretary.

Upon notification from OSHA, the Commission hears all appeals on actions by the Secretary concerning alleged violations, citations, proposed penalties, and abatement periods, and determines the appropriateness of such actions.

When necessary, the Commission may conduct its own investigation and may affirm, modify, or vacate the Secretary's findings. The Commission is the final administrative authority to rule on a particular case, but its findings and orders can be subject to further review by the civil courts.

7.2.4 - National Institute of Occupational Safety and Health (NIOSH)

The primary functions of NIOSH are to develop recommended occupational safety and health criteria for the Occupational Safety and Health Administration; to conduct research programs; to conduct educational programs which provide an adequate supply of qualified personnel to carry out the purpose of the Act; and to conduct informational programs on the proper use of adequate safety and health equipment.

7.2.5 - Bureau of Labor Statistics (BLS)

The responsibility of conducting statistical surveys and establishing methods used to acquire injury and illness data has been vested in the Bureau of Labor Statistics of the US Department of Labor.

7.3 - Employer and Employee Rights and Obligations

7.3.1 - Employer Rights and Obligations

- The employer has the general duty to furnish to his employees a place of employment that is free from recognized hazards that are causing or are likely to cause death or serious physical harm.

- The employer has the specific duty to comply with occupational safety and health standards promulgated under OSHA.

- Employers may request that the Secretary begin proceedings for adoption of a new standard or repeal of an existing one.

- Employers may submit written data or comments on proposed standards and may appear as an interested party at any hearing held by the Secretary.

- Employers may file written objections to a proposed standard and/or may appeal the final decision of the Secretary.

- Employers may apply to the Secretary for a temporary order granting a variance from a standard.

- Employers may contest a citation or proposed assessment of penalty with the Review Commission.

- Employers adversely affected by a commission order may obtain a review by the US Court of Appeals.

7.3.2 - Employee Rights and Obligations

- Employees have varied rights under the Act. Some of these affect labor negotiations and all superintendents should be aware of these provisions.

- Each employee covered by the Act shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to the Act which are applicable to his own actions and conduct.

7.3.3 - Employee Rights in the Standards

- Employees may request that the Secretary begin proceedings for adoption of a new standard or amend or revoke an existing one.

- Employees may submit written data or comments on proposed standards and may appear as an interested party at any hearing held by the Secretary.

- Employees may file written objections to a proposed Federal standard and/or may appeal the final decision of the Secretary.

- Employees must be informed when their employer applies for a variance from a promulgated standard.

- Employees must be afforded the opportunity to participate in a variance hearing as an interested party and have the right to appeal the Secretary's final decision.

7.3.4 - Employee's Rights to Access to Information

- Employees have the right to information from the contractor regarding employees' protection and their obligations under the Act.

- Affected employees have the right to information from the contractor regarding the toxic effects, conditions of exposure, and precautions for safe use of all hazardous materials in the establishment by means of labeling or other forms of warning where such information is prescribed by a standard.

- If employees are exposed to harmful materials in excess of levels set by the standards, the affected employees must be so informed by the contractor who must also inform the employees thus exposed of the corrective action being taken.

- If a compliance officer determines that an alleged imminent danger exists, he must inform the affected employees of the danger and further inform that he is recommending to the Secretary that relief be sought by court action.

- Upon request, employees must be given access to records of their history of exposure to toxic materials or harmful physical agents that must be monitored or measured and recorded.

- If a standard requires the monitoring or measuring of hazardous materials or harmful physical agents, employees must be given the opportunity to observe such monitoring or measuring and to have access to such records.

- Employees have the right of access to (a) the list of toxic materials published by NIOSH, (b) criteria developed by NIOSH describing the effects of toxic materials or harmful physical agents and, (c) industry-wide studies conducted by NIOSH regarding the effects of chronic, low-level exposure to hazardous materials.

- On written request to the Secretary of HEW, an employee has the right to obtain the determination of whether or not a substance found or used in the establishment is harmful.

7.3.5 - <u>Employee Rights in Enforcement</u>

- An employee has the right to confer with the compliance officer in connection with an inspection of a jobsite.

- An authorized employee representative must be given an opportunity to accompany the compliance officer during inspection for the purpose of aiding such inspection. (This is commonly known as a "walk-around" provision.)

- An employee has the right to make a written request to the Secretary for a special inspection if the employee believes a violation of a standard threatens physical harm.

- If an employee believes any violation of the Act exists, he has the right to notify the Secretary or the compliance officer in writing of the alleged violation, either before or during an inspection of the jobsite.

- Employees who file a complaint against Harza-Ebasco or who exercise any of their rights under OSHA are engaging a "protected activity" and must not be discriminated against on account of such protected activity.

- If an employee's request for a special inspection is denied by the Secretary, the Secretary must notify the employee in writing of this decision and must give reasons for it. The employee has the right to object to such a decision and may request a hearing by the Secretary.

- If a written complaint concerning an alleged violation is submitted to the Secretary and the compliance officer responding to the complaint fails to cite the contractor for the alleged violation, the Secretary must furnish the employee or his authorized representative a written statement setting forth the reasons for his final disposition.

- If the Secretary cites a contractor for a violation, employees have the right to review a copy of the citation, and this copy must be posted by the contractor at or near the place where the violation occurred.

- Employees have the right to appear as interested parties or to be called as witnesses in a contested enforcement matter before the Occupational Safety and Health Review Commission.

- If the Secretary or his representative arbitrarily, or capriciously fails to seek relief to counteract an imminent danger and an employee is injured as a result, that employee has the right to bring action against the Secretary for relief, as may be appropriate.

7.4 - OSHA Inspections

Compliance officers of the Department of Labor are authorized to enter without delay and at reasonable times any construction site to inspect and investigate in a reasonable manner all pertinent conditions, equipment and facilities.

They may also question privately any employer, employee or agent and to review records required under the Act.

When the compliance officer enters the project site, it is important that he be received with the proper attitude and respect.

Prior to the field inspection, the compliance officer should be introduced to the Project Superintendent. At this time, the compliance officer may request a meeting of all subcontractors on the site.

7.4.1 - Opening Conference

At this opening conference, the compliance officer will:

- Indicate the scope of the inspection.
- Indicate any records to be reviewed.
- Issue the employee complaint if this is his reason for inspecting site.
- Indicate who may accompany him on his inspection tour.
- Review his right to have a private conference with the employees.
- Answer questions of those in attendance.

At the beginning of the inspection, the compliance officer will review the safety program of each contractor to formulate an evaluation which may later be used to mitigate any money penalties for violations found.

7.4.2 - Inspection Tour

The compliance officer will determine whether anyone else will accompany him. A representative of the contractor and of the union will be given the opportunity to accompany the compliance officer on the inspection tour.

As the inspection moves from area to area, different contractor representatives may be asked to join. The compliance officer will be in charge of the inspection tour. The Harza-Ebasco Joint Venture Safety Representative will accompany the compliance officer unless the Project Superintendent determines otherwise.

Sometime during the inspection, the Project Office Safety Department shall be notified that an OSHA inspection is in progress.

The compliance officer will note any items he feels are apparent violations and may take pictures and any necessary instrument readings. These will serve as the bases for any alleged violation, which will be cited in the formal citation report. Ebasco should note any information which the compliance officer uses and should take similar pictures, so that if the violation is cited, we will have a record of the information that will be used against us.

During the tour, the employees may bring to the compliance officer's attention, any apparent OSHA standard violations.

If the compliance officer feels the need for hygiene tests, he will call in an OSHA hygienist to make the official survey and any tests required.

If the cause of the inspection is an employee's complaint, the compliance officer, after the opening conference, may go directly to the alleged violation in question. If the violation is determined to be valid, he will usually conduct a full site inspection. If it is not a valid complaint, he may leave the site without further inspection.

7.4.3 - Closing Conference

Upon completion of the inspection tour, the employees will be excused and the compliance officer will meet individually with all contractor employer representative in order:

- To review what alleged violations he has found

- To ask for responsible abatement times

- To explain appeal procedures

It is very important that you think carefully about what you say to the compliance officer. What you say can and will be used against Ebasco.

7.5 - Types of Violations and Penalties

7.5.1 - Imminent Danger

The Act defines imminent danger as "Any conditions or practices in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures otherwise provided by the Act." Therefore, for a condition or practice to constitute an imminent danger, there must be a reasonable certainty that immediately or within a short period of time such condition or practice could result in death or serious physical harm. Normally a health hazard would not

constitute an imminent danger except in extreme situations, such as the presence of potentially lethal concentrations of airborne toxic substances, which are immediate threat to the lives or health of employees.

If during the course of inspection the compliance officer determines that the existing set of conditions appears to constitute an imminent danger, he will attempt to have the danger corrected immediately through voluntary compliance. The employer or his representative will be advised that such a danger exists. Also, if any employees appear to be in imminent danger, they will be informed of the danger, and the employer will be requested to remove them from the area of the imminent danger.

An employer will be deemed to have eliminated the imminence of danger if he removes employees from the danger area and eliminates the conditions or practices that result in the imminent danger.

If abatement is refused, the compliance officer will immediately inform the affected employees of the danger involved and will inform the employer and affected employees that he is recommending a civil action (in the form of a court order) for appropriate relief (e.g., shutting down the operation). The compliance officer will personally post an imminent danger citation, OSHA-8 Form, at or near the area in which the exposed employees are working. The compliance officer has no authority either to order the closing down of the operation or to direct employees to leave the area of the alleged imminent danger or the workplace.

7.5.2 - Serious Violations

To determine if a violation is serious, the compliance officer must answer the following questions:

- Is there a substantial probability that death or serious physical harm could result?

- Does the employer know, or with the exercise of reasonable diligence, should he have known of the hazard?

If the answer to both is "yes" then a serious violation exists.

Penalty - up to $1,000 - for each violation

7.5.3 - Non-Serious Violations

If the more likely consequence of a violation is something less than death or serious physical harm, or if the employer did not know of the hazard, then the violation will be considered a non-serious violation. For example, a violation of housekeeping standards that might result in a tripping hazard would be classified as a non-serious violation since the more probable consequence of such a condition would be strains, or contusions, which are not classified as serious physical harm.

Penalty - up to $1,000 - for each violation

7.5.4 - De Minimis Violations

De minimis violations are those that have no immediate or direct relationship to safety or health.

7.5.5 - Willful Violations

A willful violation exists where evidence shows that:

- The employer has intentionally and knowingly violated the Act and knows that such action constitutes a violation, or

- Even though the employer did not consciously violate the Act, he was aware that a hazardous condition existed and made no reasonable effort to eliminate the condition.

- Penalty - up to $10,000 - for each violation. If violation caused death to an employee, the penalty is then not more than $10,000 and/or imprisonment of up to six months.

7.5.6 - Repeated Violations

A repeated violation occurs when a second citation is issued for a violation of a given standard or for a hazardous or unhealthful condition that violates the general duty clause. A repeated violation differs from a failure to abate in that repeated violations exist where the employer has abated an earlier violation, and upon later inspection, is found to have violated the same standard.

Penalty - no more than $10,000 for each violation

7.5.7 - Grouping of Violations

Multiple violations of a single standard which are disclosed during an inspection may be grouped to constitute one alleged violation. This principle is applicable to all classes of violations.

Multiple violations of non-serious standards may be considered as a serious violation if, in the opinion of the compliance officer, no real effort was made to comply with the standard.

In these cases, the proposed penalties may be increased substantially.

7.5.8 - Unabated Penalties

A citation not corrected within the abatement period affixed to the citation and not contested, may be assessed a civil penalty of not more than $1,000 - for each day during which such violation continues.

7.5.9 - Penalty Adjustments

A penalty can be adjusted 50 percent downward. In the adjustment, the employer's good faith, size of business, and past history of previous vi lations are considered.

A reduction of up to 20% may be given for good faith. Evidence of good faith is the employer's awareness of OSHA and any overt indications of the employer's activities to comply with the Act.

A reduction of up to 10% may be given for small businesses measured in terms of the number of employees.

A reduction of up to 20% may be given on the basis of the employer's past favorable history, primarily with OSHA citations.

Another adjustment of up to 50% can be gained by an abatement credit. This adjustment may be allowed if, upon recognition by the compliance officer during the inspection tour, items considered possible violations are promptly corrected and this fact is brought to his attention.

7.5.10 - Contesting OSHA Citations

Many contractors, upon receipt of citations for violations of the Construction Safety Standards, OSHA, have routinely paid assessed fines simply because the feeling existed that, "we got by pretty good with only a couple of hundred dollars fine."

This approach may be detrimental in the long run. In several situations citations have been improperly recorded by inspectors, the wrong set of standards has been used to determine a safety violation, or there has been a construction procedure which prohibits compliance with the safety requirements. Each of the above may be sufficient grounds for dismissal of

the citation and proposed penalty upon appeal. An automatic payment of this kind acknowledges this violation and admits guilt on the part of the employer. It is conceivable that eventually these so-called minor infractions will become repeated violations with serious consequences for the employer. Records are kept listing violations of all firms. It is therefore conceivable to assume that OSHA attorneys, in future cases involving your firm, will produce these records showing a historical violation of regulations.

OSHA inspections are on the increase. If a compliance inspection results in a citation, your knowledge of procedures to contest such citations becomes increasingly important.

A citation alleging violations will refer to a specific section of the safety standards. Your first reaction to a citation should be to carefully evaluate the conditions or exposure existing at the time the inspection was made.

Compare your evaluation with the requirements of the standard you are alleged to have violated. If in your judgement there is a discrepancy either in design, materials or procedures between the cited standard and the conditions or exposure which existed when the inspection was made, you should request an informal conference with the OSHA Area Director.

One criterion for designating a violation as a serious violation is "substantial probability" of serious physical harm or death occurring from that condition.

Prior to either an informal hearing or initiation of a contest action, notification of intent to initiate such action shall be given to the Project Office Safety Department.

An informal conference may also be requested if your citation alleges a serious violation over which your own and the OSHA interpretation of substantial probability are not in agreement.

At an informal conference you should provide to the Area Director only that information which supports your position on the point in question. If the informal conference does not obtain the desired results, do not present witnesses or other evidence. Your next step in contesting the citation is a formal hearing.

An employer has the right to contest a citation, a proposed penalty, notice of failure to correct a violation or the time allotted for abatement of a violation or any combination of these. In such proceedings the affected employees or the authorized employee representative are deemed parties to the proceeding. In contesting an OSHA Administration enforcement action, the project must comply with the following:

1. Notify the OSHA Administration Area Office which initiated action that he is contesting. This must be done within 15 working days from receipt of the Administration's notice of proposed penalty, sent by certified mail. If the employer does not contest within 15 working days after receipt of the notice of proposed penalty, the citation, and proposed assessment of penalties are deemed to be a final order of the Occupational Safety and Health Review Commission and are not subject to review by any court or agency and the alleged violation must be corrected within the abatement period specified in the citation.

2. If any of the employees working on the site of the alleged violation are union members, a copy of the notice of contest must be served upon the union.

3. If any employees who work on the site are not represented by a union, a copy of the notice of contest must either be posted at a place where the employees will see it or be served upon them personally.

4. The notice of contest must also contain a listing of the names and addresses of those parties who have been personally served a notice and, if such notice is posted, the address of the place where the notice was posted.

5. If the employees at the site of the alleged violation are not represented by a union and have not been personally served with a copy of the notice to contest, posted copies must specifically advise the unrepresented employees that they may be prohibited from asserting their status as parties to the case if they fail to properly identify themselves to the Commission or judge (hearing examiner) prior to the commencement of the hearing or at the beginning of the hearing.

6. There is no specific form for the notice of contest. However, such notice should clearly identify what is being contested - the citation, the proposed penalty, the notice of failure to correct a violation, or the time allowed for abatement of the violation or any combination of these items.

With respect to citations and proposed penalties, an employee or authorized employee representative may contest only the time allotted for abatement of an alleged violation.

When a notice of contest is received by an Area Director from an employer or from an employee or an authorized employee representative, he will file with the Review Commission the notice of contest and all contested citations, proposed penalties, abatement times, or notice of failure to abate. Upon receipt of the notice of contest from the Area Director, the Executive Secretary of the Commission will assign the case a docket number.

Within 20 days of the date the Notice of Contest is received by OSHA, counsel for the Secretary of Labor must file a written complaint with the Review

Commission. This complaint sets forth the alleged violations in detail, relates the basis for the proposed abatement period, and the justification for the proposed penalty. A copy of the complaint must be sent to all other parties to the case.

Employers must file a written answer to the complaint with the Review Commission within 15 days of the date the Secretary files the complaint. The answer must be either a general denial of the complaint or it must specify those statements in the complaint that are denied or that can be explained.

When these pleadings are completed, the employer will be notified of the name of the commission judge to which the case has been assigned. Pre-hearing conferences may then be scheduled by the Review Commission.

A notice as to the time and place of the hearing will be received by the employer at least 10 days in advance, and the hearing notice must be posted by the employer.

The formal hearing is an adversary civil procedure and the burden of proof rests with the plaintiff, the Secretary of Labor. In preparing for your formal hearing, compare each alleged violation, serious or non-serious, with the cited standard. You should divulge no information concerning your defense strategy unless directed to do so in writing by the Solicitor for the Secretary of Labor.

When a case goes to hearing before a Review Commission judge, an employer's evidence and argument on penalties receives the same consideration as that of the Secretary of Labor. The actual hearing is conducted like a trial in court and is usually conducted in or near the community where the alleged violation occurred. The OSHA Administrator will present its case and will be subject to a cross examination by other parties. The defendant then presents his case and will be subject to a cross examination by other parties. Affected employees or an authorized employee representative may participate in the

hearings. The decision by the judge will be based only on what is in the record. Therefore, if statements are unchallenged, the statement will be assumed to be fact.

Upon completion of the hearings, the judge will submit the record and his report to the Commission. Each party will receive a copy. The decision becomes final 30 days after its receipt by the Commission, unless within that 30 day period any Commission Member directs that the case be reviewed by the full Commission. If any Commission Member orders a review of the case, the Commission itself must render a decision. The Commission's orders become final 15 days after issuance unless stayed by a court order.

Any person adversely affected or aggrieved by an order of the Commission may obtain a review of such order in the US Court of Appeals if sought within 60 days of the order's issuance.

7.5.11 - Petitions for Modifications of Abatement Date

An employer may file a petition for modification of abatement date when he has made a good faith effort to comply with the abatement requirements of a citation, but such abatement has not been completed because of factors beyond his reasonable control.

A petition for modification of abatement date shall be in writing and shall include the following information:

1. All steps taken by the employer and the dates of such action, in an effort to achieve compliance during the prescribed abatement period.

2. The specific additional abatement time necessary in order to achieve compliance.

3. The reasons such additional time is necessary, including the unavailability of professional or technical personnel or of materials and equipment, or because necessary construction or alteration of facilities cannot be completed by the original abatement date.

4. All available interim steps being taken to safeguard the employees against the cited hazard during the abatement period.

5. A certification that a copy of the petition has been posted and, if appropriate, served on the authorized representative of affected employees, and a certification of the date upon which such posting and service was made.

A petition for modification of abatement date shall be filed with the Area Director of the United States Department of Labor who issued the citation no later than the close of the next working day following the date on which abatement was originally required. A later-filed petition shall be accompanied by the employer's statement of exceptional circumstances explaining the delay.

A copy of such petition shall be posted in a conspicuous place where all affected employees will have notice thereof or near such location where the violation occurred. The petition shall remain posted for a period of ten (10) days. Where affected employees are represented by an authorized representative said representative shall be served with a copy of such petition.

Affected employees or their representatives may file an objection in writing to such petition with the aforesaid Area Director. Failure to file such objection within ten (10) days of the date of posting of such petition or of service upon an authorized representative shall constitute a waiver of any further right to object to said petition.

The Secretary or his duly authorized agent shall have the authority to approve any such petition for modification of abatement date. Uncontested petitions shall become final orders.

The Secretary or his authorized representative shall not exercise his approval power until the expiration of fifteen (15) working days from the date the petition was posted or served by the employer.

Where any petition is objected to by the Secretary or affected employees, the petition, citation, and any objections shall be forwarded to the Commission within three (3) working days after the expiration of the fifteen (15) day period.

SECTION 8

GENERAL SAFETY & HEALTH REFERENCES

REFERENCES

A. GENERAL SAFETY & HEALTH REFERENCES

The following is a list and the source of common safety and health references used by Company and Safety Representatives and other Company Supervisors.

1. Accident Prevention Manual for Industrial Operations, F. E. McElroy, (National Safety Council, 425 N. Michigan Ave., Chicago, IL 60611)

2. Advanced First Aid and Emergency Care, (American National Red Cross, 17th and E St., N.W., Washington, D.C. 20005 1973, 318 p or local Red Cross Chapter)

3. ANSI Standards, (American National Standards Institute, 1430 Broadway, New York, N.Y. 10018)

4. Blasters Handbook, (E.I. duPont de Nemours and Co. Explosives Department, Wilmington, Delaware 19898)

5. Dangerous Properties of Industrial Materials, (H. Irving Sax, Reinhold Book Corp., 430 Park Ave., New York, N.Y. 10022)

6. Dictionary of Terms used in the Safety Profession (American Society of Safety Engineers, 850 Busse Highway, Park Ridge, IL 60068)

7. Explosives Handling, Storage, Use and Transportation Pamphlets, (Institute of Makers of Explosives, 420 Lexington Ave., New York, N.Y.)

8. Fire Codes, (National Fire Protection Association, 60 Batterymarch St., Boston, Massachusetts 02110)

REFERENCES (Cont'd)

9. Fire Protection Handbook, (National Fire Protection Association, 60 Batterymarch St., Boston, Massachusetts 02110)

10. Fundamentals of Industrial Hygiene, (National Safety Council, 425 N. Michigan Ave., Chicago, Illinois 60611)

11. General Safety Requirements, Corps of Engineers, U. S. Army, (Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20401)

12. Industrial Noise Manual, (American Industrial Hygiene Association, 14115 Prevost St., Detroit, Michigan 48227)

13. Industrial Ventilation, American Conference of Government Industrial Hygienists (Committee on Industrial Ventilation, P. O. Box 16153, Lansing, MI 48902)

14. Motor Carrier Safety Regulations, U. S. Department of Transportation, (Bureau of Motor Carrier Safety, Washington, D. C. 20590)

15. National Electrical Code, (NFPA, 470 Atlantic Ave., Boston, MA 02210)

16. Riggers Bible, (R. P. Leach, P. O. Box 3302, Glenstone St., Springfield, MI)

17. Rigging, Handbook of, W. E. Rossuagel, (McGraw-Hill Publishing Co., P. O. Box 509, Hightstown, New Jersey 08520)

REFERENCES (Cont'd)

18. SAE Technical Reports Referenced in OSHA Construction Equipment Standards (Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096)

19. Safety and Health Regulations for Construction, (U. S. Department of Interior, Bureau of Reclamation, Division of Safety, Denver, CO 80225)

20. Handbook of Compressed Gases, (Reinfold Publishing Corp. Compressed Gas Association Dept. J, 430 Park Avenue, New York, N.Y. 10022)

21. American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances & Physical Agents in the Workroom Environment, (P. O. Box 1937, Cincinnati, Ohio 45201)

B. BASIC EQUIVALENTS

LENGTH

1 centimeter = 0.3937 inch = 10 millimeters
1 foot = 0.305 meter
1 inch = 2.540 centimeters
1 kilometer = 0.621 mile = 1000 meters
1 meter = 39.37 inches = 1.094 yards = 100 centimeters
1 micron = 0.001 millimeter = 0.00003937 inch
1 mil = 0.001 inch = 0.0254 millimeter
1 mile (statute or land) = 5,280 feet = 1,609 meters = 320 rods
1 rod = 5.5 yards = 16.5 feet = 5.02 meters
1 yard = 0.914 meter

AREA

1 acre = 43,560 square feet
1 square centimeter = 0.155 square inch
1 square foot = 144 square inches = 929 square centimeters
1 square inch = 0.00694 square foot = 6.452 square centimeters
1 square kilometer = 247.104 acres = 0.386 square mile
1 square meter = 1,196 square yards = 10.764 square feet
1 square yard = 0.836 square meter = 9 square feet

VOLUME

1 cubic centimeter = 1.000 milliliter = 0.610237 cubic inch = 0.0338140 U.S. fluid ounce
1 cubic foot = 1728 cubic inches = 7.48052 U.S. gallons = 28.3161 liters = 0.03703704 cubic yard
1 cubic inch = 0.554113 U.S. fluid ounce = 16.387 cubic centimeters
1 cubic meter = 1000 liters = 35.3147 cubic feet
1 cubic yard = 264.172 U.S. gallons = 27 cubic feet = 46,656 cubic inches

B. BASIC EQUIVALENTS (Cont'd)

VOLUME (Cont'd)

1 fluid ounce (U.S.) = 1.80469 cubic inches = 29.573 millimeters
1 fluid ounce (British) = 0.96076 U.S. fluid ounce
1 gallon (U.S.) = 231 cubic inches = 128 U.S. fluid ounces = 3.78531 liters
1 liter = 61.0255 cubic inches = 33.815 U.S. fluid ounces = 0.264179 U.S. gallon
1 milliliter = 0.0610255 cubic inch = 0.033815 U.S. fluid ounce

MARINER'S MEASURES

1 fathom = 6.08 feet
1 knot = 1 nautical mile per hour
1 nautical mile = 6,080.2 feet = 1.15 statute miles

MASS

1 grain = 0.0647989 gram = 0.00228571 ounce
1 gram = 0.002204623 pound = 0.0352740 ounce
1 kilogram = 1000 grams = 2.204623 pounds
1 long ton = 2240 pounds = 1.12 short tons
1 metric ton = 1000 kilograms = 2204.623 pounds
1 ounce = 437.5 grains = 23.3495 grams
1 pound = 7000 grains = 16 ounces = 453.5923 grams
1 short ton = 2000 pounds = 0.892857 long ton = 907.1846 kilograms

VELOCITY

1 foot per minute = 0.0113636 mile/hour = 0.00508 meter/second
1 foot per second = 60 feet/minute = 0.681818 mile/hour = 0.3048 meter/second
1 meter per second = 3.28084 feet/second = 196.850 feet/minute = 3.6 kilometer/hour = 2.23694 miles/hour

B. BASIC EQUIVALENTS (Cont'd)

VELOCITY (Cont'd)

1 mile per hour = 1.46667 feet/second = 88 feet/minute = 1.609344 kilometer/hour

1 kilometer per hour = 0.621371 mile/hour = 0.277778 meter/second = 0.911344 feet/second

POWER

1 horsepower = 0.746 kilowatt = 550 foot-pounds/second = 0.701 British thermal unit/second = 0.178 kilocalorie/second

1 kilowatt = 1.34 horsepower = 737.54 foot-pounds/second = 0.948 British thermal unit/second = 0.2388 kilocalorie/second

WORK

1 British thermal unit = 252.08 calories = 1055.07 joules = 788 foot-pound

1 calorie = 4.1855 joules = 0.00397 British thermal unit

1 foot-pound = 1.35582 joules

1 joule = 0.23892 calories

1 kilowatt hour = 3413 British thermal unit = 1.34 horsepower-hour

FLOW RATES

1 cubic foot/minute = 28.32 liters/minute = 7.50 gallons/minute = 1.699 cubic meters/hour = 0.01667 cubic feet/second

1 cubic foot/second = 1690.0 liters/minute = 448.8 gallons/minute = 102.0 cubic meters/hour

1 gallon/minute = 3.78 liters/minute = 0.227 cubic meters/hour = 0.1338 cubic feet/minute = 0.00223 cubic feet/second

B. BASIC EQUIVALENTS (Cont'd)

FLOW RATES (Cont'd)

1 liter/minute = 0.06 cubic meter/hour = 0.2640 gallon/minute = 0.0353 cubic feet/minute = 0.000589 cubic feet/second

1 cubic meter/hour = 16.67 liter/minute = 4.4 gallons/minute = 0.588 cubic feet/minute = 0.00989 cubic feet/second

C. BASIC FORMULAE

CIRCUMFERENCE OF CIRCLE:

3.1416 x diameter

6.2832 x radius

DIAMETER OF CIRCULE:

0.31831 x circumference

AREA OF CIRCLE:

3.1416 x square of radius

0.7854 x square of diameter

VOLUME OF CYLINDER:

Area of Base x perpendicular height

VOLUME OF CONE:

1/3 x area of base x perpendicular height

AREA OF SPHERE:

3.1416 x square of diameter

12.5680 x square of radius

VOLUME OF SPHERE:

0.5236 x cube of diameter

4.1893 x cube of radius

C. BASIC FORMULAE (Cont'd)

AREA OF TRIANGEL:

1/2 x base x altitude

TEMPERATURE CONVERSION:

Centigrade = 5/9 x (Fahrenheit - 32)

Fahrenheit = 9/5 x Centigrade + 32

D. CONVERSION TABLE

MULTIPLY	BY	TO OBTAIN
Acres	43,560	Square Feet
Barrels of Cement	376	Pounds of Cement
Bags of Cement	94	Pounds of Cement
Cubic feet	7.48052	U.S. Gallons
Cubic feet	1.728	Cubic inches
Cubic feet	0.03704	Cubic yards
Cubic inches	.0005787	Cubic feet
Cubic inches	.004329	U.S. Gallons
Cubic yards	27	Cubic feet
Cubic yards	46.656	Cubic inches
Cubic yards	202.0	U.S. Gallons
Fathoms	6	Feet
Feet	0.3048	Meters
Meters	3.281	Feet
Meters	39.37	Inches
Meters	1.094	Yards
Miles	5,280	Feet
Pounds of Water	0.01602	Cubic feet
Pounds of Water	27.68	Cubic inches
Pounds of Water	0.1198	U.S. Gallons
Square feet	144	Square inches
Square miles	640	Acres
Square yards	9	Square feet
Square yards	.0002066	Acres
Tons (short)	2,000	Pounds
Tons (long)	2,240	Pounds

E. DENSITY OF MATERIALS

Substance	Weight per cubic foot in pounds	Substance	Weight per cubic foot in pounds
Alcohol, 100%	49	Earth, mud, packed	112
Sluminum, cast-		Emery	250
hammered	165	Feldspar	159
Aluminum bronze	481	Gasoline	42
Ammonia 27.9%	56	Glass, common	164
Asbestos	47	Glass, crystal	184
Ashes	43	Glass, flint	188
Asphaltum	87	Glass, plate	161
Babbitt metal	456	Gneiss	165
Bauxite	159	Granite	179
Benzine	46	Granite, piled	96
Brass, cast-rolled	534	Graphite	131
Brick, soft	100	Gravel, dry, loose	90-105
Brick, common	112	Gravel, dry, packed	100-115
Brick, hard	125	Gravel, wet	110
Brick, pressed	135	Gypsum	140
Brick, fire	145	Hay and straw, in bales	20
Brick, sand-lime	136	Ice	55-57
Brickwork, mortar	100	Iron, cast pig	450
Brickwork, cement	112	Iron, wrought	485
Bronze, 7.9 to 14% Sn.	509	Iron, ferro silicon	437
Cement, Portland	94	Iron ore, hematite	325
Chalk	137	Iron ore, hematite,	
Charcoal, pine	23	in bank	160-180
Clay	137	Iron ore, hematite, loose	130-160
Coal, anthracite	97	Irone ore, limonite	237
Coal, bituminous	84	Iron ore, magnitite	315

E. DENSITY OF MATERIALS (Cont'd)

Substance	Weight per cubic foot in pounds	Substance	Weight per cubic foot in pounds
Coal, peat turf, dry	47	Iron, slag	172
Coke	22-27	Kerosene	50
Concrete, plain	145	Lead	710
Concrete, reinforced	150	Lead ore, galena	465
Copper, cast-rolled	556	Lime, quick, in bulk	55
Cork	15	Limestone	165
Earth, dry, loose	75	Linseed oil	58
Earth, dry, packed	93	Magnesite	187
Earth, moist, loose	81	Manganese	475
Earth, moist, packed	100	Manganese ore, pyrolusite	259
Earth, mud, flowing	106	Marble	170
Masonry, Ashlar, granite -- syenite, gneiss	165	Peat	47
		Petroleum	54
Masonry, Ashlar, lime- stone, marble	160	Petroleum, refined	50
		Phosphate rock	200
Masonry, Ashlar, sand- stone, bluestone	140	Pitch	72
		Plaster-of-Paris	103
Masonry, mortar rubble, granite, syenite, gneiss	155	Porcelain	250
		Porphyry	172
Masonry, mortar rubble, limestone, marble	150	Pumice	40
		Quartz, flint	165
Masonry, mortar rubble, sandstone, bluestone	130	Riprap, limestone	80-85
		Riprap, standstone	90
Masonry, dry rubble, granite, syenite, gneiss	130	Riprap, shale	105
		Rubber, manufacturer	95
Masonry, dry rubble, limestone, marble	125	Salt, granulated, piled	48
		Saltpeter	67

E. DENSITY OF MATERIALS (Cont'd)

Substance	Weight per cubic foot in pounds	Substance	Weight per cubic foot in pounds
Masonry, dry rubble, ——— sandstone, bluestone --	110	Sand, gravel, dry, loose	90-105
		Sand, gravel, dry, packed	100-115
Masonry, brick, pressed brick ———	140	Sandstone, bluestone ———	147
		Shale, slate ———	175
Masonry, brick, common brick ———	120	Silver ———	655
		Slag, bank ———	69
Masonry,brick,soft brick	100	Slate ———	175
Masonry,concrete,cement, stone, sand ———	144	Snow, fresh fallen ———	8
		Snow, compacted by rain -	15-50
Masonry, hollow concrete, cement, stone, sand --	86	Soapstone, talc ———	169
		Steel ———	489
Masonry, hollow concrete, slag, etc. ———	78	Stone, crushed ———	100
		Talc ———	169
Masonry, hollow concrete, cinder, etc. ———	60	Tar, Bituminous ———	75
		Terra cotta ———	119
Mica ———	175	Tile ———	115
Mortar ———	95	Tin ———	459
Mud ———	111	Trap rock ———	185
Naphtha ———	47	Water, 4° C, maximum density ———	62.428
Nickel ———	537		
Oils, mineral, lubricants	57	Water, 100° C ———	59.830
Paper ———	58	Water, Sea ———	64
Paraffin ———	56	Wood, ash, white-red ———	40
Wood, cedar, white-red --	22	Wood, pine, red ———	30
Wood, cypress ———	30	Wood, pine, yellow long-leaf ———	44
Wood, fir, Douglas spruce	32		
Wood, fir, eastern ———	25	Wood, pine, yellow,	

E. DENSITY OF MATERIALS (Cont'd)

Substance	Weight per cubic foot in pounds	Substance	Weight per cubic foot in pounds
Wood, elm, white	45	short-leaf	38
Wood, hemlock	29	Wood, redwood, California	26
Wood, hickory	49	Wood, spruce, white-black	27
Wood, maple, hard	43	Wood, walnut, black	38
Wood, oak, white	46	Zinc, cast-rolled	440
Wood, pine, Oregon	32	Zinc ore, blende	253
Wood, pine, white	26		

MSA
Mine Safety Appliances Company
600 Penn Center Boulevard
Pittsburgh, Pennsylvania 15235

HEADQUARTERS
412 – 273-5000

AT 600 Penn Center Blvd., Pittsburgh, PA. 15235
(DIRECT ALL CORRESPONDENCE TO ABOVE ADDRESS)

DATE March 4, 1981

Ebasco Services Incorporated
Two World Trade Center
New York, New York 10048

Attn: Mr. J. E. Pakenham

RECEIVED
MAR 9 1981
Labor Relations Dept.

QUOTATION NO. 7752

TERMS Payable net within 30 days unless otherwise noted below.

F.O.B. Shipping Point

YOUR REFERENCE Letter 1-26-81

QUOTATION

ITEM	QUANTITY	PART NO.	DESCRIPTION	PRICE	TOTAL	DELIVERY
			Yearly Requirements for M.S.A. V-Gard Protective Helmets			
	5-10,000	06-	M.S.A. Slotted V-Gard Protective Caps with Staz-on Suspension, and single color Ebasco Logo embossed on front Colors available: White Red Blue Gray Yellow Gold Orange Tan Green *Delivery: Initial Delivery of embossed helmets would require a lead time of 6-8 week A.R.O. This is to allow for the producing of the embossing die and production scheduling. Unembossed Helmets would be available from any stocking location as shown on the attached list at a cost of $4.00 each. Refer questions to Paulette Whalen 412-273-5166.	4.15 ea.		*

(1) "Quotations subject to the conditions of the Contract for sale set out on the reverse side."
(2) "Please refer to this Quotation on your Order."

cc: W. M. Rock

MINE SAFETY APPLIANCES COMPANY

James F. Madden
James F. Madden
Admst. Asst. to Sales Manager
Safety Products Division

MSA Branch Offices

ALABAMA
Birmingham 35235
200 Roebuck Industrial Parkway
Tel. 205-655-7415

ARIZONA
Tucson 85717
P.O. Box 40427—Mail
Tucson 85719
305 East 18th St.
Tel. 602-623-1814

CALIFORNIA
Los Angeles Office
North Hollywood 91605
7100 Fair Avenue
Tel. 213-875-2905
D-U-N-S: 08-432-2635

GEORGIA
Atlanta Office
Decatur 30035
Mail
P.O. Box 35140
5330 Snapfinger Woods Dr.
Tel. 404-981-1990
D-U-N-S: 09-580-5248

ILLINOIS
Chicago Office
Elk Grove Village 60007
1000 Nicholas Blvd
Elk Grove—
Tel. 312-439-7474
Chicago—
Tel. 312-921-7474
D-U-N-S: 06-850-4919

KANSAS
Overland Park 66214
8932 Bond St.
Shipment
Tel. 913-888-2628
D-U-N-S: 05-789-2994

LOUISIANA
New Orleans Office
Harahan 70123
5812 Plauche St.
Plauche Industrial Park
Tel. 504-486-5368

MICHIGAN
Farmington Hills 48024
Farmington Hills
Industrial Center
24734 Crestview Ct.
Tel. 313-478-3560

MISSOURI
St. Louis 63141
2053 Congressional Dr.
West Plains Industrial Park
Tel. 314-872-9331
D-U-N-S: 08-591-5023

NEW JERSEY
Mountainside 07092
1100 Globe Ave.
Tel. [illegible]-232-3490

NEW YORK
New York Office
Mountainside, N.J.
07092
1100 Globe Ave.
Direct Line from N.Y. —
Tel. 212-267-6297
D-U-N-S: 05-812-5893

Tonawanda 14150
P.O. Box 70—Mail
Audubon Industrial Park
159 Creekside Dr.
Tel. 716-691-6922

OHIO
Cleveland 44143
32 Alpha Park
Tel. 216-461-6300
D-U-N-S: 08-523-4029

PENNSYLVANIA
Philadelphia Office
Malvern 19355
36 Great Valley Parkway
Tel. 215-647-7700
D-U-N-S: 06-131-8530

Pittsburgh Office
Glenshaw 15116
1901 William Flynn Highway
Tel. 412-782-6660

RHODE ISLAND
Esmond 02917
2 Esmond St.
Tel. 401-231-6900
D-U-N-S: 00-119-1832

TEXAS
Dallas 75247
P.O. Box 47246—Mail
9213 Sovereign Row
Tel. 214-631-2570

Houston 77036
P.O. Box 36860—Mail
5706 Savoy Lane
Tel. 713-785-4040
D-U-N-S: 05-362-8970

UTAH
Salt Lake City 84116
1975-W. No. Temple St.
Tel. 801-355-7517
D-U-N-S: 02-093-8172

WASHINGTON → PORTLAND AREA 226-1054 EUGENE AREA 683-7282
Seattle Office
Tukwila 98188
P.O. Box 88161—Mail
18296 Andover Park West
Tel. 206-575-0405
D-U-N-S: 07-819-9445

WEST VIRGINIA
Charleston Office
Dunbar 25064
P.O. Box 69—Mail
503-28th St.
Tel. 304-766-6123

Warehouse facilities at each of these locations.

→ BALTIMORE AREA 467-2813
WASHINGTON AREA 393-0414

MSA
600 Penn Center Boul
Pittsburgh, Pa. 15235
Phone (412) 273-5000