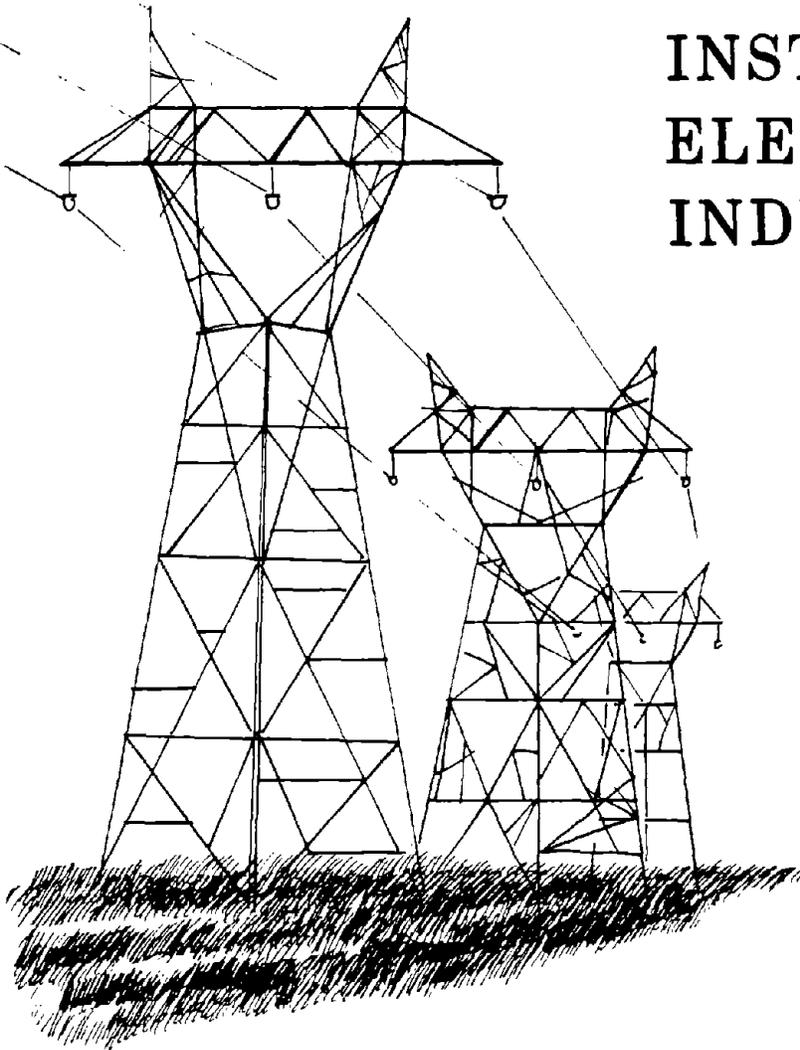




NIOSH

SELF-EVALUATION INSTRUMENT-- ELECTRIC UTILITY INDUSTRY



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

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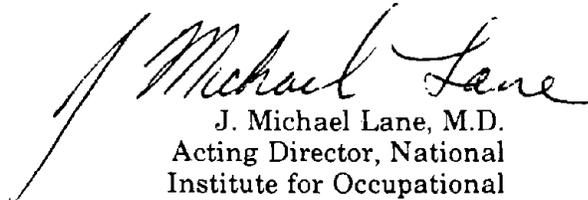
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FOREWORD

The National Institute for Occupational Safety and Health has a continuing responsibility to develop new approaches to the problem of ensuring a safe and healthful work environment through involvement with basic and applied research.

Toward this end, NIOSH has developed and expanded the concept of occupational self-evaluation as an additional approach to promoting safety and health among employers and employees in industry.

This concept as contained here is offered as an adjunct to existing regulatory procedures for compliance with the Occupational Safety and Health Act of 1970 and is intended to provide greater awareness of potential hazards in the development of comprehensive occupational safety and health programs.



J. Michael Lane, M.D.
Acting Director, National
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Safety and Health

PREFACE

Occupational self-evaluation is not a new concept; its systematic application, however, is a fresh approach for the identification of existing and potential occupational safety and health hazards. With an understanding of the industrial operation and a total commitment of both employer and employee, the benefits from self-evaluation become quickly apparent. Workers reinforce their knowledge of, or become aware of, good work habits; they appreciate the safe and healthful work environment. Management finds an effective way to reduce lost work days, production time losses, and the cost of workers' compensation and disability claims. Management, in view of state and federal occupational safety and health regulations, can identify problem areas and then develop a program that will meet or exceed these requirements.

Self-evaluation, as performed with the use of this "Self-Evaluation Instrument—Electrical Utility Industry," can be applied to all operations regardless of their complexity. Because the Instrument reduces complex operations to simple components, potential hazards are easily identified and controls can be readily implemented. Electrical utilities that rely on fossil fuel for power generation contain occupational hazards that are well recognized, and the caution needed to protect against shock makes the electric utility industry especially conscious of injury. Thus, it is indeed appropriate that the first of several Self-Evaluation Instruments to be developed concerns the operations and procedures involved in electric power generation, transmission, and distribution.

This "Self-Evaluation Instrument—Electrical Utility Industry" is designed to be used with a complementary, basic-core document "Self-Evaluation of Occupational Safety and Health Programs" (DHEW (NIOSH) Publication No. 78-187). The text of this core document is applicable to all industries and provides information to aid in implementing comprehensive occupational safety and health self-evaluation programs.

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ABSTRACT

So that employers and employees within the electric utility industry can more readily recognize actual or potential occupational hazards, a series of comments and self-evaluation questions applicable to this industry has been prepared. This field-tested, systematic questionnaire approach covers all identifiable work areas and work situations within utilities that use fossil fuel for electric power generation.

After responsible persons complete a survey and answer the questions and after the condition of all work areas is further evaluated, if necessary, those areas that need upgrading will become obvious. Because pertinent occupational safety and health standards for electric utilities are included, implementing corrective action should provide a measure of assurance that OSHA standards are being met.

A companion document "Self-Evaluation of Occupational Safety and Health Programs" gives basic information applicable to all industries and should be used with "Self-Evaluation Instrument—Electric Utility Industry" to aid in implementing a comprehensive occupational safety and health program.

CONTENTS

Foreword,	iii
Preface,	iv
Abstract,	v
Acknowledgment,	viii
Introduction,	1
Aerial Basket Equipment Used for Working Energized Primary,	3
Compressed Gases,	5
Construction Tools,	7
Dusts, Gases, and Organic Solvents,	9
Dusts, Gases, and Organic Solvents (Medical),	13
Electric Meters—Current and Potential Transformers,	15
Electrical Wiring and Switchboards,	17
Ergonomics: Physical Demands and Job Analysis,	19
Exits,	21
Explosives and Blasting Agents,	23
Fire Prevention—Fire Protection,	27
Flammable and Combustible Liquids,	29
Hand and Portable Tools,	31
Heat,	33
Heat Stress (Medical),	35
Job Planning—Job Briefing,	37
Live-Line Bare-Hand Maintenance,	39
Machinery and Machine Guarding,	41
Material Handling and Storage,	47
Medical and First Aid,	51
Noise,	57
Noise Stress (Medical),	59
Overhead Electrical Distribution,	61
Personal Protective Equipment,	63
Pole Handling,	67
Sanitation,	69
Temporary Grounding,	71
Traffic Barricading and Channelization,	73
Transmission,	75
Trenching and Shoring,	79
Underground Distribution System: Manholes and Vaults,	81
Underground Residential Distribution,	85
Vehicles and Cranes,	87
Walking and Working Surfaces,	91
Water Treatment Chemicals,	95
Welding, Cutting, and Brazing,	97
Working in Electric Substations,	103

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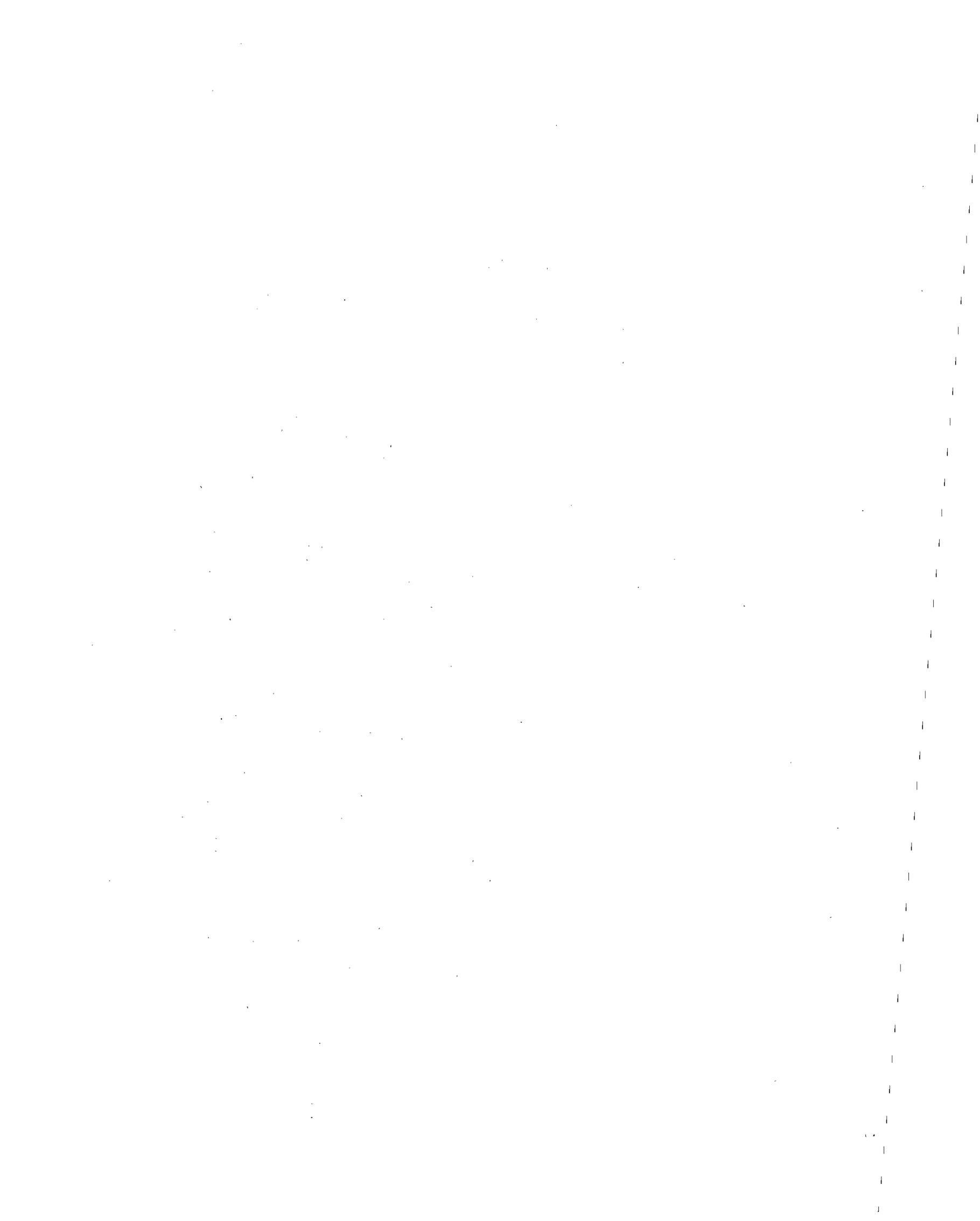
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INTRODUCTION

Since the enactment of the Occupational Safety and Health Act of 1970, management, organized labor, and individual workers have recognized the need for, and have the desire to provide, an environment free from safety and health hazards. Each, working independently, has made significant contributions. Now, through voluntary self-evaluation, these groups can participate in a coordinated procedure to accomplish the goal of a safe and healthful work environment.

This "Self-Evaluation Instrument—Electric Utility Industry" (SEI-EUI) has been developed by professionals in occupational safety, industrial hygiene, and occupational medicine—persons well acquainted with the problems associated with electric energy generation, transmission, and distribution. Working within various sections of the SEI-EUI, they have attempted to identify operations concerning this industry.

Each section begins with a brief explanation of the potential occupational safety and health hazards that may exist as the result of the operations or procedures covered by that section. Following these explanatory paragraphs, questions are presented to establish the existing status of a specific activity in terms of its potential to produce injury or illness. A "Yes" answer indicates appropriate environmental controls are in place. A "No" answer indicates changes may be necessary; or that controls are absent or ineffective; or that a good work practice is being violated.

The SEI-EUI is designed so that those persons most familiar with a specific operation or procedure will be able to respond to questions relating to that particular situation. Each section of the SEI-EUI should be reproduced and given to the person responsible for supervising the work to which it applies. The supervisor, or employees doing the work, or both can then complete their particular section.

After the results of the first use of the SEI-EUI are evaluated and acted upon, periodically repeating the self-evaluation procedure will afford management and employees the opportunity to judge the effectiveness of existing environmental controls and obtain a measure of assurance that their work environment continues to comply with state and federal OSHA standards.

The SEI-EUI is not designed to stand alone but is intended to be used with a companion publication "Self-Evaluation of Occupational Safety and Health Programs," which will answer most of the questions that may arise in the process of completing the SEI-EUI.

AERIAL BASKET EQUIPMENT USED FOR WORKING ENERGIZED PRIMARY

OSHA STANDARDS 29 CFR 1910.67

Hydraulic aerial basket and platform equipment, when properly used, can eliminate or minimize many hazards that electric utility employees have to cope with regularly. Like any other equipment, however, they have inherent hazards. These hazards must be recognized and safe practices followed to accomplish the goal of preventing accidents during the use of the aerial basket.

Read all of the questions in the section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are approved purchase specifications used for purchase of aerial vehicles? Yes No
2. Do the purchase specifications conform to ANSI standard A92-2, which requires certification of the dielectric strength of all insulated parts? Yes No
3. Are all new units load tested and dielectrically tested before being placed in service? Yes No
4. Is there a regular program of inspection and testing for aerial basket equipment? Yes No
5. Is the hydraulic oil passing through insulating portions included in the regular testing program? Yes No
6. Are power tool hydraulic lines included in dielectric test of upper boom? Yes No
7. Does the inspection program include the "Operator Option" to provide for testing anytime it is believed something may have affected the safety of the equipment? Yes No
8. Is a visual inspection of this equipment scheduled at least every 90 days? Yes No
9. During visual inspections, are the insulating portions cleaned to reduce contamination? Yes No
10. Are insulated basket liners used at all times when working energized equipment? Yes No
11. Are personnel required daily to test lower unit controls before use? Yes No
12. Is a bell or warning device used to alert crew when outriggers are being lowered? Yes No
13. Are outrigger pads required at all times except when outriggers are on concrete or equally firm surfaces? Yes No
14. During overhaul or major maintenance, does the program provide for nondestructive testing of critical components? Yes No

15. Are written records maintained of all inspection, testing, and maintenance? Yes No
16. Are wheel chocks required in addition to microbrakes anytime personnel are working aloft? Yes No
17. Is a training period required under the direct supervision of a qualified operator before certifying new operators? Yes No
18. Are all operators instructed to face in direction of travel? Yes No
19. Are operators prohibited from riding in basket during travel? Yes No

COMPRESSED GASES

There are several different compressed gases that are used in most power plants. Because of the high pressures contained in these cylinders, there is a tremendous amount of energy stored that can reach catastrophic proportions if accidentally released. It is of utmost importance that the cylinders be handled, stored, and used correctly to prevent accidents.

Some of the gases have properties that are hazardous in other ways such as being flammable, toxic, or oxygen depleting. All such properties need to be recognized so they can be properly controlled. Unless otherwise indicated, the term cylinder refers to all cylinders, whether full or empty, whether in use or spare, in storage or in transit.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are compressed gas cylinders always secured to prevent upset? Yes No
2. Are compressed gas cylinders individually chained? Yes No
3. Are compressed gas cylinders always used and stored in an upright position? Yes No
4. Are oxygen and fuel gas cylinders separated by at least 20 feet or is a 5-foot noncombustible barrier with a half-hour fire rating between them? Yes No
5. Is oxygen kept far enough from welding and cutting operations so that sparks and slag cannot reach it? Yes No
6. Is oxygen kept at least 20 feet from combustible materials (especially oil or grease)? Yes No
7. Are valve-protection caps always kept on cylinders that are not in use? Yes No
8. Are empty cylinders so marked and are their valves closed? Yes No
9. Are "No Smoking" signs displayed near fuel gas and oxygen storage areas? Yes No
10. Is a fire extinguisher kept in the vicinity of welding and cutting operations? Yes No
11. Do you have an automatic CO₂ fire extinguishing system? (If no, go to question 15). Yes No
12. Is there a predischage alarm on the CO₂ extinguishing system? ... Yes No
13. Is rescue equipment available for immediate use? Yes No
14. Are CO₂ cylinders inspected regularly? Yes No
15. If you use hydrogen: (If not, go to question 16).
 - 15a. Is the hydrogen storage 20 feet from flammable materials or oxidizing gases? Yes No
 - 15b. Is the storage such that it will always be 25 feet from open fires or ordinary electrical equipment? Yes No

- 15c. Is the storage 50 feet from other flammable gas storage? Yes No
- 15d. If stored outside, are weeds and vegetation kept away from the area? Yes No
- 15e. Is a sufficient quantity of CO₂ always readily available to purge the hydrogen from the generator? Yes No
- 15f. Are nonsparking tools used in hydrogen areas? Yes No
16. Are employees prohibited from using oil or grease for lubricating valves, gauge connections, or other parts of an oxygen system? Yes No
17. Are cylinder storage areas well ventilated? Yes No
18. Are employees prohibited from using cylinders (even empties) as rollers? Yes No
19. Are all cylinders approved, properly marked, and properly identified? Yes No
20. Do all CO₂ cylinders, including those in an automatic fire extinguishing system, receive a hydrostatic test every 5 years? Yes No
21. Are cylinders kept away from sources of heat? Yes No

CONSTRUCTION TOOLS

Powder-actuated (explosive-actuated) tools must be treated with the same safety-oriented care as loaded firearms. In addition, while such tools are in use and while explosive-type welding is performed, the safety rules provided by the manufacturer should be closely adhered to.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is special training and instruction required before employees are permitted to use powder-actuated tool? Yes No
2. Are powder-actuated tools always left unloaded until ready for actual use? Yes No
3. Is leaving loaded tools unattended at the worksite and transporting them away from the worksite prohibited? Yes No
4. Is pointing these tools, loaded or unloaded, at anyone prohibited? . Yes No
5. Are all other forms of horseplay with these tools prohibited? Yes No
6. Are safety goggles and face shields worn by the operator and any other persons in range of flying chips? Yes No
7. Before making a powder-actuated attachment, is it determined that the anchoring device will not pass completely through the material to which it is being attached? Yes No
8. In the event of a misfire, is it required that the tool not be removed from the surface for 30 seconds and that the cartridge be removed before lifting the guard from surface? Yes No
9. Is storing powder-actuated tools in the following locations prohibited:
Explosive atmosphere? Yes No
Vicinity of highly flammable materials? Yes No
10. Is wearing approved leather gloves and eye protection required of the operator during cadweld and thermoweld explosive-type welding? . Yes No
11. Is a careful inspection made of all wires to be welded to ensure there is no moisture present? Yes No
12. Are all personnel in the immediate area warned before igniting the charge? Yes No
13. Are extra charges stored a safe distance away from work in process? Yes No
14. Are tools inspected, cleaned, and stored in a safe place at the end of each working period? Yes No
15. Are defective tools removed from service until such defects have been properly corrected? Yes No

16. Is a suitable container provided to store extra charges, and does the legend "EXPLOSIVES" appear on at least two sides of this container? Yes No
17. Is approved eye protection required when operating a terminal hypress tool? Yes No
18. Are cable ends effectively secured before cutting cable with this tool? Yes No
19. Do all workers exercise extreme caution concerning the location of hands and fingers when the tool cutter or tool press is in operation? Yes No
20. Is adding gasoline to the pump engine when engine is hot prohibited? Yes No
21. Is the gasoline engine operator required to pay close attention to the operator for signals as to when to stop or start the cutter or press? Yes No

DUSTS, GASES, AND ORGANIC SOLVENTS

OSHA STANDARDS 29 CFR 1910.1000-1001

The questions in this section of the Self-Evaluation Instrument are designed to identify potential health hazards to employees resulting from exposure to dusts, gases, and organic solvents and to evaluate the establishment's program to protect employees from these hazards. An effective program includes:

- regular monitoring of dust, gas, and organic solvent levels in the work environment;
- engineering and administrative controls to protect employees from excessive exposure;
- the use of personal protective equipment by employees where controls have not sufficiently reduced exposure;
- precautions for the handling and storage of dusts, gases, and organic solvents;
- periodic medical evaluation to assess the effect of exposure on individual employees; and
- education and training of employees in the recognition and prevention of excessive exposure to dusts, gases, and organic solvents.

There are many different dusts and many industrial processes that cause dust generation. Wherever a mineral is used as a raw material, excessive dust generation is possible. An important source of dust generation is the grinding or machining of products with mineral content. Each point at which dusts or materials are handled should be studied closely to detect points of possible dust generation. The following is a list of some dusts that may cause pneumoconiosis.

amorphous silica	feldspar
asbestos	fibrous glass
barium	fuller's earth
calcium	granite
—cement	graphite
—gypsum	iron oxide
—lime	mica
—limestone	pumice
—marble	silica
carborundum	sillimanite
clays	slate
coal	talc
diatomaceous earth	tin

Asbestos is an important dust within power plants to which significant exposures can occur. Historically, asbestos has been used as a heat insulator in power plants—principally to cover steam pipes and the outside of furnace walls. The most effective control for airborne asbestos fibers is to keep the asbestos in a wet state. Because this is not too practical during installation (the material will fall apart in this state) and because of the toxicity of asbestos, substitute materials are desirable.

For many years in the future, it will be necessary to remove a great deal of asbestos covering from existing installations during repairs or equipment replacements. Keeping

such asbestos in a wet state is practical as it will not be used again. Prompt removal of this waste will prevent it from becoming airborne.

There are many sources and uses of gases in the industrial environment. The following are examples of some gases commonly found in industry:

- | | |
|--------------------|------------------|
| acetylene | freon |
| ammonia | hydrogen |
| butane | methane |
| carbon dioxide | propane |
| carbon monoxide | ozone |
| chlorine | phosgene |
| fluorine | hydrogen sulfide |
| oxides of nitrogen | |

It is important that the source of all gas generation be recognized and that appropriate measures be taken to prevent excessive exposure.

A solvent is any material used to dissolve another material. This section is concerned with industrial solvents containing carbon, i.e., aqueous organic solvents. Organic solvents can affect health, productivity, and efficiency.

If any employees at your establishment are exposed to dusts, gases, or organic solvents, this section should be completed. Often substances are identified by manufacturer trade names, making it possible that they are present at your establishment unknowingly. If you are uncertain, check with the manufacturer, a suitable reference book, or a knowledgeable person.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are environmental measurements of exposure to dusts, gases, and organic solvents made on a regular basis and are records kept? Yes No
2. Are exposure records kept on any employees exposed to dusts, gases, or organic solvents? (See Medical and First Aid section) Yes No
3. Have engineering controls been utilized at work areas where dusts, gases, or organic solvents are present? Yes No
4. List procedures that generate dusts, gases, or organic solvents; identify the contaminant; and list the engineering or administrative control, or personal protective device used.

Procedure	Contaminant	Engineering or administrative control	Personal protective device

5. Are approved respirators available to *all* employees exposed to dusts, gases, or organic solvents? Yes No
6. Are employees trained in the use of respirators?..... Yes No
7. Are warning signs posted where dusts, gases, and organic solvents are generated, stored, or occur? Yes No
8. Is make-up air (supply) used in places where local exhaust ventilation is present? Yes No
9. Is there an ongoing program to educate employees exposed to dusts, gases, or organic solvents about the following:
- Effects of these substances on health? Yes No
- Danger levels of exposure to each of these substances? Yes No
- Control of these substances? Yes No
- Personal protection against these substances? Yes No
- Other? (specify) (See Medical and First Aid section) _____
10. Are the following administrative controls used to limit employee exposure to dusts:
- Moisture is added to settled dusts or dry processes have been changed to wet processes? Yes No
- Wet vacuums are used instead of sweeping?..... Yes No
- Operators of processes generating dust are rotated to limit exposure time?..... Yes No
- Other (specify) _____
11. Is protective clothing available to *all* employees exposed to asbestos dusts?..... Yes No
12. Are eye protectors available to employees exposed to organic solvents? Yes No

DUSTS, GASES, AND ORGANIC SOLVENTS

(MEDICAL)

Dusts, when inhaled, can cause lung problems. Two specific examples of lung problems are silicosis (silica) and coal dust pneumoconiosis. Some dusts, such as asbestos, may cause pathologic changes, including cancers. Therefore, air concentrations of dusts should be identified and controlled.

Many different gases can be considered as industrial air contaminants. Some are directly manufactured and others are byproducts of other processes. Excessive exposure to contaminant gases can cause breathing problems, nosebleeds, hoarseness, chest pains, skin and eye irritation (or damage), insomnia, fatigue, nausea, stomach pains, asphyxiation, and even death. The presence of any contaminant gases in the workroom atmosphere should be investigated so that the potential health hazards can be recognized.

Organic solvents may exist in a liquid, mist, or vapor form. Some are highly toxic. They can cause skin and eye irritation (or damage) by contact, and can be absorbed into the bloodstream through the skin, by inhalation, or by ingestion. The hazard potential of a solvent depends upon its inherent toxicity, airborne concentration, and manner of use. Solvents with low vapor pressures exist mainly in liquid form. However, if the solvent is sprayed or heated, airborne concentrations will increase. Solvents with higher vapor pressures will have higher airborne concentrations. Excessive exposure to organic solvents can cause lung problems, irritation or itching of eyes, nose, or throat, skin rash, headache, dizziness, nausea, fatigue, loss of consciousness, paralysis, and even death.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help. It is important that this section be completed by the physician. Ideally, the physician or full-time, on-site nurse and supervisor will conduct a walk-through survey when answering the questions.

1. Is there a screening program to identify the employee who has a health condition (e.g., asthma) that might make the employee more susceptible to having an adverse reaction to exposure to dust, gases, or organic solvents? Yes No
2. Are the employees identified by the screening program:
 - Advised of their health condition? Yes No
 - Advised of the added risks in working in an environment where inorganic dusts are present? Yes No
 - Counseled in job selection to minimize their exposure to dust, gases, organic solvents? Yes No
 - Prevented from accepting a position where dusts, gases, or organic solvents are present? Yes No
 - Other (specify) _____
3. Do medical histories of employees potentially exposed to excessive levels of dusts, gases, and organic solvents include the following:
 - Smoking and drinking habits? Yes No

- Past and present exposure to silica, asbestos, coal dusts, contaminant gases, and organic solvents?..... Yes No
- Lung problems? Yes No
- Cardiovascular (heart) problems? Yes No
- Other (specify) _____
4. Are medical records kept on any employees exposed to dust, gases, and organic solvents? Yes No
5. Are the following medical tests or examinations given on a regular basis to employees exposed to *dusts*:
- Pulmonary function — FEV₁/FVC (spirometry)? Yes No
- Chest X-ray (PA)? Yes No
- Complete physical? Yes No
- Other (specify) _____
6. Are employees exposed to asbestos examined for “finger clubbing” and pulmonary rales? Yes No
7. Are the following medical tests or examinations given on a regular basis to employees exposed to *gases*:
- Complete blood count (CBC)? Yes No
- Chest X-ray (PA)? Yes No
- Urinalysis? Yes No
- Electrocardiogram (EKG)? Yes No
- Pulmonary function — FEV₁/FVC (spirometry)? Yes No
- Complete physical? Yes No
- Other (specify) _____
8. Are the following medical tests or examinations given on a regular basis to employees exposed to *organic solvents*:
- Complete blood count (CBC)? Yes No
- Urinalysis? Yes No
- Liver function test? Yes No
- Breath analysis? Yes No
- Complete physical? Yes No
- Other (specify) _____

ELECTRIC METERS—CURRENT AND POTENTIAL TRANSFORMERS

Increasingly high fault currents on electric systems require that extreme care be exercised when working energized meter installations, particularly three-phase metering equipment.

Hazards associated with this work include electric shock, skin burns, eye burns, and falls. Protection for the customer and the public must also be considered.

Personal protective equipment required for this work includes hard hats, eye protection, rubber protective gloves, and work gloves.

Courtesy being an element of safety, each employee should be instructed to announce his presence, state his business, and show proper identification (if requested) before entering a customer's premises. Each employee should also be required to observe any rules the customer may have regarding entering his premises, and to clean up after work is complete.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are portable lights provided for basement or other dark areas? Yes No
2. Are employees cautioned to be wary of all dogs, to speak to them but not to pet or tease them, and are they provided with spray repellent for protection? Yes No
3. When a strong odor of gas or other dangerous fumes is noted, are employees instructed not to enter and to notify the Gas Company or Gas Department? Yes No
4. Are repairmen instructed to stand on some type of insulating support when handling live connections in basements, on wet ground, or in other hazardous grounding locations? Yes No
5. Are employees enjoined to observe the following rules, requirements, or recommended work practices:
 - 5a. Carefully examine all ladders prior to use? Yes No
 - 5b. Before starting work, determine voltage of equipment by use of approved voltage detector? Yes No
 - 5c. Exercise extreme caution when working on or near 480 volt systems? Yes No
 - 5d. Never use fingers to test for presence of voltage? Yes No
 - 5e. Make all temporary connections so they will not easily be pulled loose or drop off? Yes No
 - 5f. Make certain all test leads, jumpers, and other test equipment are not set up in places where people may trip or fall over them? Yes No
 - 5g. Ensure that test leads are properly insulated and that barriers or safety rope is used to guard the work area as needed? Yes No

- 5h. Always check the meter connector box, socket, base, and cover to determine if box is energized or if ground wire has been disconnected before starting work? Yes No
- 5i. If ground or neutral is disconnected, install effective temporary until permanent connection can be made? Yes No
 (Note: (h) and (i) These precautions should be practiced diligently, particularly on installations where current and potential transformers are used.)
- 5j. When testing or repairing meters on current and potential transformer installations, ensure that the short circuit switches are properly made up to avoid possibility of opening secondary side of current transformer? Yes No
- 5k. Carefully inspect transformer-rated meter installations for damage or flash-over before beginning work? Yes No
- 5l. De-energize all instrument transformers before any repair work? Yes No
- 5m. Ensure that all current and potential transformers are grounded? Yes No
- 5n. Consider the possibility that the high voltage side of a potential transformer may be energized even though there is no voltage on the low side? Yes No
6. Before clearing a high voltage circuit for maintenance, are the fuses to potential transformers to the circuit removed? Yes No
7. Before making any changes on a three-phase meter installation, is a rotation check made by using a phase-sequence-indicator or by observing customer equipment? Yes No
8. Are socket type meters installed with the load-side terminals first and line-side terminals last? Yes No
9. Is removing meters under heavy load prohibited? Yes No
10. Are tools, test clips, connectors, etc., used on live circuits properly insulated? Yes No

ELECTRICAL WIRING AND SWITCHBOARDS

Although electrical utilities may be exempt from most parts of the National Electrical Code, they are required to comply with the National Electrical Safety Code. It is important that these requirements be understood and followed. Clearances from energized parts to earth in substations and the use of space behind switchboards are two areas that need special attention.

The proper tagging and grounding of de-energized circuits in power generation operations should be a standard procedure, as it is in transmission and distribution work. The use of protective equipment such as rubber gloves, rubber blankets, rubber matting, barriers, switch sticks, etc., is important.

The dust-tight or vapor-proof qualities of electrical systems in coal or hydrogen handling areas are often nullified by employees who bring ordinary extension cords and tools into such areas, or who fail to replace the globes of lighting fixtures after changing bulbs. Such carelessness could result in a disastrous explosion.

An effective electrical safety program for a power generation plant includes the following:

- education and training of employees in proper switching and tagging procedures;

- regular inspection and maintenance of protective equipment;

- education of employees in procedures to be followed in emergencies;

- periodic inspections to ensure the integrity of the dust-tight and explosion-proof qualities of the electrical system in hazardous areas; and

- adherence to the various classifications for electrical wiring in hazardous locations (Electrical Code NFPA 70-1971; ANSI CI-1971):

Class I: vapor-tight requirement (Article 501)

Class II: dust-tight requirement (Article 502)

Class III: water-tight requirement (Article 503).

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is the area behind switchboards never used for storage purposes? Yes No
2. Is matting provided behind switchboards to insulate employees from standing on a ground? Yes No
3. Are all floor openings sealed to prevent smoke and fumes from entering the area behind switchboards? Yes No
4. Can employees exit from both ends of switchboard compartments? Yes No
5. When energized parts are on only one side of a switchboard compartment, is there a 30-inch clearance to a grounded surface on the other side? Yes No
6. When energized parts are on both sides of a switchboard compartment, is there a 36-inch clearance between sides? Yes No
7. Is a 12-volt electrical system provided for temporary lighting in boilers and wet locations? Yes No
8. In all coal-handling areas, do the electrical wiring and all fixtures meet the dust-tight (Class II) requirements of the National Electrical Code? Yes No
Not applicable
9. Are proper dust-tight (Class II) extension cords and lights provided for temporary use in coal-handling areas? Yes No
Not applicable
10. Are periodic inspections made to ensure the integrity of the electrical equipment in coal-handling areas? Yes No
Not applicable
11. Are all electrical fixtures within 25 feet of a hydrogen system vapor-proof (Class I)? Yes No
Not applicable

ERGONOMICS: PHYSICAL DEMAND AND JOB ANALYSIS

By systematically evaluating the physical and psychological (mental) stress employees face on the job, methods and techniques for reducing or eliminating stresses often can be devised. Evaluating these stresses in your establishment means looking closely at the jobs employees perform, what motions are required, how often they are performed, how physically and mentally difficult they are, how monotonous they are, etc. The questions asked are designed to identify potential safety and health hazards to employees resulting from physical and mental stress and to evaluate your establishment's program to deal with these hazards. An effective program includes:

- an analysis of the physical and emotional demands of each job,
- an analysis of each employee's ability to meet the demands,
- the use of personal protective equipment and engineering and administrative controls to reduce or eliminate employee stress, and
- a preventive medical program involving early diagnosis and treatment of the effects of stress.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help. It is important that this section be completed by the physician. Ideally, the physician or full-time, on-site nurse and supervisor will conduct a walk-through survey when answering these questions.

1. Are any employees engaged in heavy work? Yes No
2. Are employees with back problems screened before being assigned to jobs requiring heavy work? Yes No
3. Are medical records kept for employees engaged in heavy or medium work? Yes No
4. Is there a limit on the maximum weight a worker is required to lift alone without the help of lifting equipment? Yes No
5. Are employees instructed in the proper manner of lifting heavy objects? Yes No
6. Are employees at risk given PA and lateral X-rays? Yes No
7. Are back X-rays given in preplacement screening to detect individuals with previously acquired back problems? Yes No

In placing employees, are questions similar to the following considered:

8. Are workers placed on equipment that can be adjusted in accordance with the ability of the operator? Yes No
9. Are normal verbal communications possible with the existing noise level? Yes No
10. Are precise hand movements considered in placing employees? Yes No

EXITS

OSHA STANDARDS 29 CFR 1910.35-38

Every building or structure, new or old, designed for human occupancy must be provided with exits sufficient to permit the prompt escape of occupants in case of fire or other emergency. The design of exits and other safeguards must be such that, in case of fire or other emergency, the lives of the occupants will not depend solely upon any single safeguard.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is more than one regular exit provided? Yes No
2. Can all employees exit from an area or building without the use of keys? Yes No
3. Are all doors that must be passed through to reach an exit, or way to an exit, always free to access so that there is no possibility of a person being locked inside? Yes No
4. Are all exit routes always kept free of obstructions? Yes No
5. Are all hazardous products kept away from access to exits? Yes No
6. Are exit aisles located so that they do not expose exiting people to hazardous operations? Yes No
7. Are exit doors side-hinged? Yes No
8. Do doors that employees use to exit from an area swing with exit traffic if it is possible for more than 50 people to be using them? Yes No
9. Are all exits marked with an exit sign and illuminated by a reliable light source? Yes No
10. Is the lettering at least 6 inches high with the principal letter strokes at least 3/4 of an inch wide? Yes No
11. Is the direction to exits, when not immediately apparent, marked with visible signs? Yes No
12. Are doors or other passageways, that are neither exits nor access to an exit and located where they may be mistaken for exits, appropriately marked "NOT AN EXIT," "TO BASEMENT," "STOREROOM," etc.? Yes No
13. Are all paths to exits and employees' aisles kept sufficiently illuminated whenever employees are present? Yes No
14. Is some means of emergency lighting provided? Yes No

EXPLOSIVES AND BLASTING AGENTS

OSHA STANDARDS 29 CFR 1910.109

This section is designed to help you perform a self-administered look at your working environment with respect to the use and handling of explosives (excepting powder-actuated tools). This will help you evaluate your program in protecting employees and the public from these hazards. An effective program includes:

- regular monitoring of explosive equipment and materials;
- the use of personal protective equipment and devices by employees as required;
- engineering and administrative controls to protect employees from explosive devices; and
- safety and health training of all employees.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is a set or list of rules and regulations governing the safe handling and use of blasting agents and explosives posted? Yes No
2. Are only authorized and qualified persons permitted to handle and use explosives? Yes No
3. Is the use of smoking, firearms, matches, or other heat producing devices prohibited within 50 feet of an explosive magazine and while explosives are being handled, transported, or used?..... Yes No
4. Are all explosives and blasting agents accounted for at all times, and are accurate inventory and use records of all explosives maintained? Yes No
5. Is any fire to be abandoned where there is imminent danger of contact with explosives? Yes No
6. Is an approved portable magazine used for transporting explosives from storage magazine to the blasting area? Yes No
7. Are blasting mats used to control the throw of fragments in a blasting situation where heavy congestion exists or structural installations may be damaged? Yes No
8. Is blasting done only between sunrise and sunset? Yes No
9. Are the empty boxes, paper, and fiber packing materials in which explosives and blasting devices were transported burned? Yes No
10. Are explosives, blasting agents, and blasting supplies visually checked for deterioration or damage?..... Yes No
11. Are these explosives destroyed? Yes No
12. Are all utility services whose communication lines or structures may be in jeopardy of damage before blasting contacted?..... Yes No
13. Are manufactured explosives used rather than black powder? Yes No

14. Are all blasts fired electrically except:
 - 14a. When sources of extraneous electricity make the use of electric blasting caps dangerous? Yes No
 - 14b. When the possibility exists that a leading line or blasting wire might be thrown over a live power line by the force of an explosion? Yes No
15. Does the blaster meet all of the qualifications spelled out in Section 1926.901 of Sub-Part "U" in the OSHA Safety and Health Standards? Yes No
16. Does the transportation of explosives meet the provisions of Department of Transportation regulations contained in 14 CFR Part 103, Air Transportation; 46 CFR Part 146-149, Water Carriers; 49 CFR Parts 171-179, Highways and Railways; 49 CFR Part 180, Pipelines; and 49 CFR Parts 390-397, Motor Carriers? Yes No
17. Does the driver who transports explosives meet all requirements of Section 1926.902 Paragraph (b) in rules and regulations Sub-Part "U" of the OSHA Safety and Health Standards? Yes No
18. Are explosives, blasting agents, and supplies that are not contained in approved portable magazines transported apart from other materials, cargos, or blasting caps? Yes No
19. Are the vehicles used for transporting explosives strong enough to carry the load and in good mechanical condition, with no exposed, spark-producing metal; and do they have sealed interiors? Yes No
20. Is the transporting of gasoline in the same vehicle with explosives prohibited? Yes No
21. Does every motor vehicle used for the transportation of explosives have warning signs on both sides, the front, and the rear, with the word EXPLOSIVES in red letters, not less than 4 inches in height, on white background? Yes No
22. Are fire extinguishers present in all vehicles transporting explosives? Yes No
23. If the motor vehicle conveying explosives breaks down, are explosives transferred to another vehicle before taking the vehicle into a garage or shop for repairs? Yes No
24. Is a watch always stationed over any motor vehicle transporting explosives? Yes No
25. If explosives are transported in an underground tunnel or roadway, do the practices comply with the rules and regulations stipulated in Section 1926.903 of the Sub-Part "U" in the OSHA Safety and Health Standards? Yes No
26. Are explosives and related materials stored in approved facilities required under the applicable provisions contained in 27 CFR 181, Commerce in Explosives? Yes No
27. Are blasting caps and electrical detonating primers and cartridges stored in separate magazines from other explosives or blasting agents? Yes No
28. Is a nonmetallic tamping pole used when tamping explosives after they are inserted in a drill hole? Yes No
29. Are qualified persons required to attend explosives or blasting agents at the blast site? Yes No

30. Are machinery and tools not being used for blasting removed from the blasting area, and is other unassociated work discontinued while blasting? Yes No
31. Are all power lines and portable electric cables for equipment being used kept a safe distance from explosives or blasting agents being loaded into holes? Yes No
32. Is any cable in the proximity of the blast area de-energized? Yes No
33. When loading holes for purposes of detonating the explosive:
- 33a. Is the depth and condition of the hole determined? Yes No
- 33b. Is drilling a new hole within 50 feet of a misfired hole prohibited? Yes No
- 33c. Are all persons prohibited from deepening drill holes that have contained explosives or blasting agents? Yes No
34. Is the use of explosives in the presence of combustible gases or dust prohibited? Yes No
35. Before adopting any system of electrical firing, does the blaster conduct a thorough survey for extraneous currents, to eliminate any possibility of an accident? Yes No
36. Does the blaster use blasting materials manufactured in the same style, with the same function, and from the same company? Yes No
37. Are all wires insulated-single-solid wires, of sufficient current-carrying capacity, and in good condition? Yes No
38. When firing from a power circuit, is the firing switch locked in the "open" or "off" position at all times, except when firing? Yes No
39. Is the blaster the only person allowed to have the keys to this switch? Yes No
40. Are the connections made as recommended by the manufacturer? .. Yes No
41. Is the number of electric blasting caps connected not in excess of the recommended rate for the blasting machine? Yes No
42. Do you exclusively use a blasting galvanometer equipped with a silver chloride cell that is especially designed for testing circuits to a charged hole? Yes No
43. Is the man who makes leading wire connections in electrical firing the only man to fire the shot? Yes No
44. Are the lead wires kept short-circuited until the final connection to the power source? Yes No
45. When using the safety fuse and the detonating cord, are the safe work procedures as spelled out in Section 1926.907 and 1926.908 of Sub-Part "U" in the OSHA Safety and Health Standards followed? Yes No
46. Is a code or set of blasting signals, such as those listed below, posted in one or more conspicuous places at the blasting site; and are all employees required to familiarize themselves with this code? Yes No
- Warning Signal—a 1-minute series of long blasts, 5 minutes before blast signal.
- Blast Signal— a series of short blast signals, 1 minute before the shot.
- All Clear Signal— a prolonged blast following inspection of blast area.
47. Are flagmen required to be present to keep watch and safely conduct the general public away from a blast zone during blasting? Yes No

48. Are warning signs installed indicating the blast area? Yes No
49. Do the warning signs have letters at least 4 inches high, with a contrasting background?..... Yes No
50. Following a blast, are the smoke and fumes allowed to leave the blasting area before returning to inspect whether or not all charges have been exploded? Yes No
51. Are employees allowed to return to work only after it has been ascertained that all charges have been exploded?..... Yes No
52. If a misfire is found, are all necessary precautions and safeguards taken for excluding all employees from the danger zone? Yes No
53. Is work prohibited from continuing until the hazard has been removed? Yes No
54. Is a misfire required to be removed by installing a new primer in the hole and having the hole reblasted?..... Yes No
55. If installing a new primer presents a hazard in itself, is the hazard required to be removed by washing out with water or, if the misfire is under water, by blowing out with air? Yes No
56. If there are any misfires while using cap and fuse, are all employees required to remain away from the charge for at least 1 hour? Yes No
57. Are misfires required to be handled under the direction of the person in charge of the blasting? Yes No
58. Are drilling, digging, or picking forbidden to proceed until all missed holes have been detonated, or authorized persons have approved work to proceed? Yes No

FIRE PREVENTION—FIRE PROTECTION

OSHA STANDARDS 29 CFR 1910.157-160

The potential for loss of life and the extremely great dollar value of a power plant should make it imperative that power plant fires be prevented—regardless of cost. Therefore, employees must be thoroughly familiar with all fire prevention measures and must be capable of effectively fighting a fire if one should start. All protection equipment must be readily accessible at all times and in a ready-to-use condition.

An effective program for the prevention and control of fire in power plants includes:

- periodic training of employees in proper methods of fire prevention and use of fire-fighting equipment;
- proper storage and handling of combustible and flammable materials;
- proper temporary storage and prompt disposal of flammable materials;
- good housekeeping practices;
- electrical facilities suitable for hazard areas;
- a plan of action in case of a fire; and
- regular inspection and maintenance of fire-fighting equipment, systems, and protective gear.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are fire extinguishers easily accessible in all work areas? Yes No
2. Are the fire extinguishers maintained in a fully charged and operable condition? Yes No
3. Are maintenance records of fire extinguishers kept? Yes No
4. Are fire extinguishers kept at their designated locations when not in use? Yes No
5. Are fire extinguishers mounted near the hazard they are designated to protect? Yes No
6. If located in an area of visual obstruction, are extinguisher locations designated by signs or other markings? Yes No
7. Are the appropriate extinguishers available for the various hazards present? Yes No
8. Are fire extinguishers marked for the types of fires for which they should be used? Yes No
9. Are employees given instructions on how to choose the right type of extinguisher for a particular fire? Yes No
10. Are employees given instructions on how to use a fire extinguisher? Yes No
11. Is the sprinkler system properly maintained and regularly inspected? Yes No
12. Are sprinkler system maintenance records kept? Yes No
13. Are there signs on all sprinkler controls stating their function? Yes No

14. If the static pressure on the stand pipe system exceeds 100 p.s.i. (pounds per square inch), is the outlet nozzle pressure 80 p.s.i. or less? Yes No
15. Does each fire hose have a control valve? Yes No
16. Are fire hoses always connected and ready for immediate use? Yes No
17. If there is a fixed CO₂ extinguishing system: (If not, go to question 18.)
- 17a. Are there provisions to ensure prompt evacuation of all employees in the CO₂ discharge areas? Yes No
- 17b. Are there provisions to carry out the prompt rescue of employees trapped by CO₂ discharge? Yes No
- 17c. Is the CO₂ system thoroughly inspected and tested annually? Yes No
- 17d. Are inspection records kept? Yes No
18. If there is a fixed dry chemical extinguishing system: (If not, go to question 19.)
- 18a. Is the system inspected at least once a year? Yes No
- 18b. Are the controls tested at least once a year? Yes No
- 18c. Are inspection and testing records kept? Yes No
19. Is there a local fire-alarm signaling system? Yes No
20. Does the maximum traveling distance to an alarm box never exceed 200 feet? Yes No
21. Are most of the alarm boxes located in the normal path of exit travel? Yes No
22. Are the alarm boxes well marked and readily visible? Yes No
23. Is the alarm system properly maintained? Yes No
24. Is the alarm system tested regularly? Yes No
25. Is more than one person assigned the responsibility of notifying the fire department during emergencies (even when an automatic fire alarm system is installed)? Yes No
26. Are there selected personnel to investigate and possibly begin fire-fighting operations before the fire department arrives? Yes No
27. Are there selected personnel to safely direct firemen to the fire location and inform them of any other hazards in the vicinity that might develop due to the fire? Yes No
28. Is there a means of notifying all employees that there is a fire and giving them necessary evacuation instructions? Yes No
29. Are periodic fire drills held? Yes No
30. Are all appropriate employees informed of the results of fire drills? Yes No
31. Is corrective action taken with respect to the adverse reports of fire drills? Yes No
32. Does the plant have a written disaster plan? Yes No
33. Are the following disasters considered and provided for in the disaster plan:
- Fire? Yes No
- Explosion? Yes No
- Chemical exposure? Yes No
- Radiation? Yes No
- Biological exposure? Yes No
- Natural disasters—windstorms, floods, earthquakes, etc.? Yes No
- Other (specify) _____

FLAMMABLE AND COMBUSTIBLE LIQUIDS

OSHA STANDARDS 29 CFR 1910.106

Improper storage, handling, and use of flammable and combustible liquids have resulted in numerous expensive industrial fires and many serious injuries and deaths. Proper storage must be provided for these materials and employees must be trained in approved methods for handling and using such liquids. Management must also institute controls to ensure that safe procedures and facilities are always used.

There are so many kinds of flammable and combustible liquids with widespread use that many persons are unfamiliar with the varying properties of these liquids. Employees should be encouraged to read the labels on all containers and to make sure that each container is properly identified and labeled.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. If flammable or combustible liquids are kept in an outside storage room or area: (If not, go to question 2.)
 - 1a. Are all containers in a secure position to prevent tipping or spilling? Yes No
 - 1b. Is proper drainage provided? Yes No
 - 1c. Are weeds and other rank vegetation kept clear of the area? ... Yes No
2. If flammable or combustible liquids are kept in an inside storage room: (If not, go to question 3.)
 - 2a. Does the room conform to National Fire Protection Association requirements? Yes No
 - 2b. Are all containers and drums properly grounded? Yes No
 - 2c. Are containers of over 30-gallon capacity stacked no more than two high? Yes No
 - 2d. Is all dispensing from drums done by transfer pump or self-closing valves? Yes No
 - 2e. Is fire protection provided? Yes No
 - 2f. Are "No Smoking" signs exhibited? Yes No
3. Are safety cans used for dispensing liquids at the point of use? Yes No
4. Are all dispensing containers properly labeled and color-coded as to contents? Yes No
5. Is the amount of liquid kept in other than an inside storage room or cabinet limited to no more than 25 gallons of class IA liquids in containers, and no more than 120 gallons of class IB, IC, II, or III liquids in containers? Yes No
6. Are flammable or combustible liquids that are not in safety cans stored in an approved cabinet? Yes No

7. Are flammable or combustible paints, etc., which are stored for more than 30 days, kept in approved cabinets? Yes No
8. Are large containers of oil (such as turbine oil) diked or curbed so as to direct liquid leakage and fire protection water to a safe location? ... Yes No
9. When drainage systems, which may contain oil, are connected to public sewers or waterways, are they equipped with traps or separators? .. Yes No

HAND AND PORTABLE TOOLS

This section of the Self-Evaluation Instrument is intended to evaluate the effectiveness of your small tool program. (See also section on Construction Tools.) Included in this section are:

- hand tools (nonpowered screwdrivers, hammers, chisels, knives, picks, axes, cutters, etc.) and
- portable power tools (electric, gasoline, pneumatic, hydraulic).

Since accidents can occur while using hand and portable tools, special consideration should be given to the condition and use of these tools. Hand and portable tools are often abused by being improperly stored and by being used for a job for which they are not designed. An effective small tool program includes:

- inspection and preventive maintenance procedures for the tools being used;
- training the users in the proper use and storage of each type of hand and portable tool;
- safeguarding the rotating or moving parts (points of operation); and
- use of personal protective equipment as needed.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Do employees using hand tools receive instructions in their safe usage? Yes No
2. Is there a program for periodic inspection of hand and power tools? Yes No
3. Are records kept of hand and power tool inspections? Yes No
4. Are poorly maintained or damaged tools taken out of service at the time of inspection? Yes No
5. Are there designated tool storage facilities? Yes No
6. Is eye protection required when persons use tools on materials producing flying chips or dust? Yes No
7. Is hand protection required when persons use tools on materials likely to produce splinters, burrs, or sharp edges? Yes No
8. Is the practice of carrying tools with unprotected sharp edges or points in pockets prohibited? Yes No
9. Are the points or sharp edges of tools sheathed or protected when not in use? Yes No
10. When portable electric power tools are used in severe grounding hazard locations, is power provided from an approved isolated power source or a 12-volt system? Yes No
11. If power is from an approved source, is this power supply source designed to interrupt at 5 MA or less leakage current? Yes No
12. Is there an established testing program for the isolated power supply equipment? Yes No

13. Are records maintained of the isolated power supply tests? Yes No
14. Is the integrity of the grounding conductor on portable electric tools tested? Yes No
15. Have procedures been established for turning in tools which require repairs or maintenance? Yes No
16. Is personal protective equipment, such as safety glasses, approved dust respirators, goggles, gloves, and earmuffs, used by employees when working with power tools? Yes No
17. Are the following portable electrical tools equipped with a switch that requires constant operator pressure for operation (or with a lock-on control that will turn off power with a single motion of the trigger finger):
- Drills Yes No
- Tappers? Yes No
- Fastener drives? Yes No
- Grinders? Yes No
- Belt sanders? Yes No
- Reciprocating, circular, and chain saws? Yes No
- Other (specify) _____
18. Are portable abrasive wheel grinders equipped with:
- 18a. Throat guards or spark arrestors used to protect against pieces of broken wheel? Yes No
- 18b. Are these guards adjusted to within 1/4 inch of the wheel? ... Yes No
19. If power lawnmowers are used: (If they are not, go to question 20.)
- 19a. Is a catcher assembly or stone guard in place? Yes No
- 19b. Is a shut-off device to stop the motor or engine easily accessible to the operator? Yes No
- 19c. Is a braking device provided on riding mowers? Yes No
- 19d. Are dead-man controls provided on riding mowers? Yes No
20. If jacks are used: (If they are not, go to question 21.)
- 20a. Are jacks operated within their rated design limits? Yes No
- 20b. After a load has been raised by a jack is it cribbed or blocked in position at once if someone is to get under the load? Yes No
21. If abrasive blast-cleaning nozzles are used: (If they are not, go to question 22.)
- 21a. Are the operating valves of the nozzles equipped with a dead-man control? Yes No
- 21b. Are NIOSH certified or U.S. Bureau of Mines approved respirators used? Yes No
22. If pneumatic-powered tools and hoses are used: (If they are not, go to question 23.)
- 22a. Is a retainer provided if the tool might be ejected from the hose without one? Yes No
- 22b. Before disconnecting the air hose from the line, is the air cut off and the pressure in the line released? Yes No
- 22c. When used with aerial devices, is the moisture accumulator drained daily? Yes No
23. If gasoline powered tools are used, is the gasoline dispensed from and stored in Underwriters Laboratories or Factory Mutual labeled safety cans? Yes No

HEAT

The questions in this section of the Self-Evaluation Instrument are designed to identify potential health hazards to employees resulting from exposure to excessive heat and humidity and to evaluate your establishment's program to protect employees from these hazards. An effective program includes:

- regular monitoring of heat and humidity levels in the work environment;
- engineering and administrative controls to protect employees from excessive exposure;
- the use of personal protective equipment by employees where controls have not sufficiently reduced exposure;
- periodic medical evaluation to assess the effect of exposure on individual employees; and
- education and training of employees.

The human body exchanges heat with the environment in one of three ways:

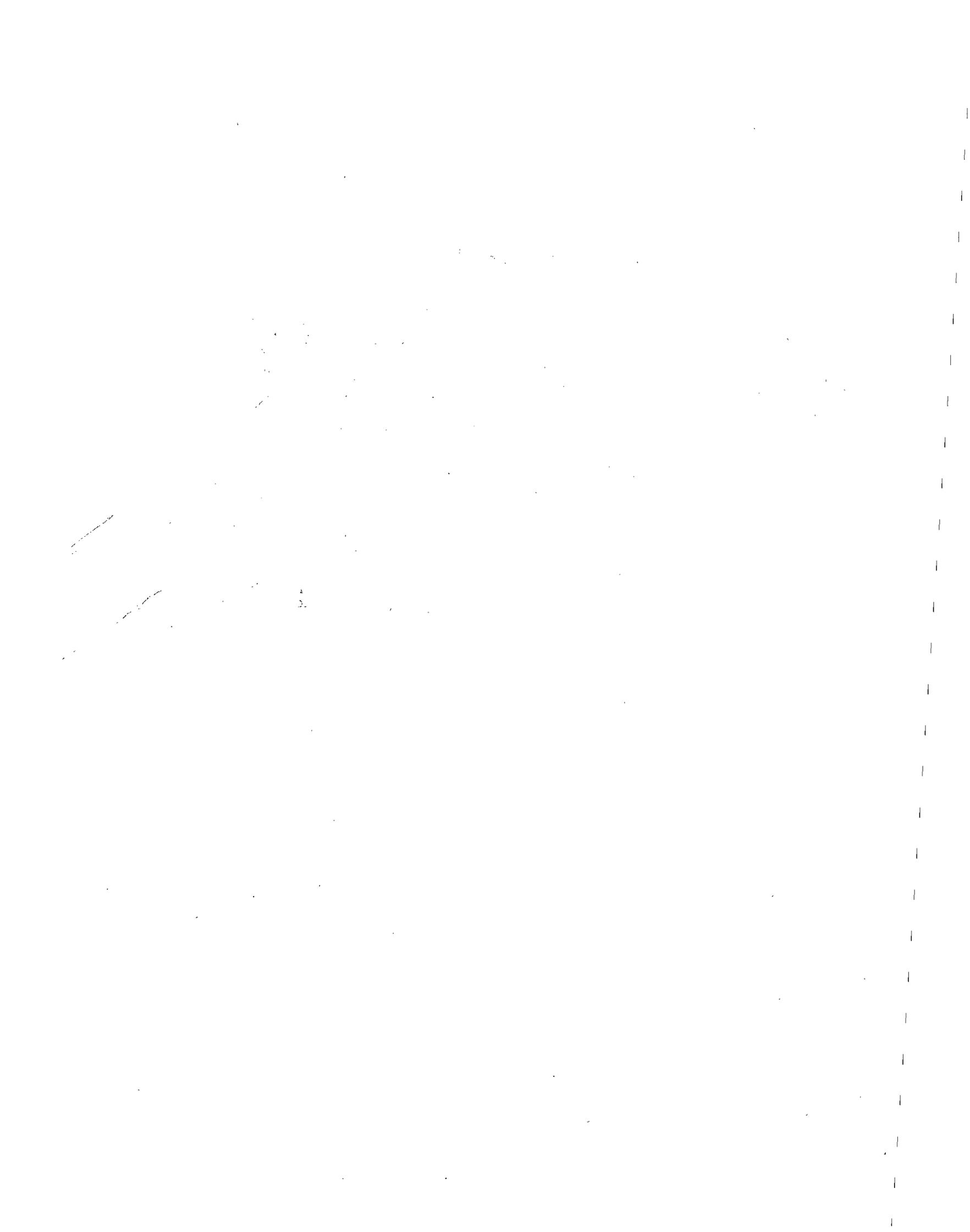
Conduction—direct heat transfer between the body and a hot or cold object;

Convection—transfer of heat due to the movement of air past the body; and

Radiation—the transfer of thermal energy between individuals and their surroundings where surface temperatures differ from skin temperatures. (The terms infrared, radiated heat, and radiant heat are often used synonymously.)

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are complaints of excessive heat promptly investigated? Yes No
2. Have measurements been made to evaluate heat stress? Yes No
3. Are exposure records kept on any employees exposed to heat? Yes No
4. Are measurements of heat exposure regularly scheduled? Yes No
5. Have *all* fixed work areas been provided with spot cooling or air conditioning? Yes No
6. Are the following administrative controls used to minimize individual exposure to heat:
 - Rotation of workers? Yes No
 - Frequent rest periods? Yes No
 - Heaviest work done during coolest periods? Yes No
 - Cafeterias and rest areas located in cooler places? Yes No
 - Only essential work done in hot areas? Yes No
 - Other (specify) _____



HEAT STRESS

(MEDICAL)

The effects of heat in producing emotional or physical stress and strain are quite complex and cannot be evaluated by measuring the level of heat exposure alone. It is often difficult to determine accurately whether continued exposure will merely make employees uncomfortable or whether it will actually produce significant ill-effects. Changes of three degrees above or two degrees below workers' normal body temperature will impair their performances. Moreover, exceeding this five-degree range presents a hazard to health. Some of the symptoms of heat stress are headache, weakness, dizziness, chills, muscle cramps, nausea, and irritability. In many establishments, climatic heat during summer months significantly contributes to the heat stress experienced from hot industrial processes. This heat, plus metabolic heat generated by the worker, can be substantial and can be directly related to a number of heat induced ill-effects. Heat exposure in the occupational environment can cause heat strain, cramps, exhaustion, or stroke, and can result in decreased job performance and a noticeable increase in job-related accidents. Workers may experience fatigue and irritable sensations that can affect other workers and their own home life.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help. It is important that this section be completed by the physician. Ideally, the physician or full-time, on-site nurse and supervisor will conduct a walk-through survey when answering the questions.

1. Do you have a screening program to identify the employee who has a health condition (e.g., heart disease, pulmonary problems) that might make the employee more susceptible to having an adverse reaction to heat? (If no, go to question 3.) Yes No
2. Are the employees who are identified by the screening program:
 - Advised of their health condition? Yes No
 - Advised of the added risks in working in a hot environment? Yes No
 - Counseled in job selection to minimize their exposure to heat? Yes No
 - Prevented from accepting a position in a hot environment? Yes No
 - Other (specify) _____
3. Is there a program of acclimatization or gradual introduction of employees to hot environment? Yes No
4. Is drinking water available at hot work sites? Yes No
5. Are the following medical tests or examinations given on a regular basis to employees exposed to heat:
 - Pulse rate? Yes No
 - Blood pressure? Yes No
 - Electrocardiogram (EKG)? Yes No
 - Physical examination? Yes No
 - Other (specify) _____

6. Are medical records kept on employees exposed to heat? Yes No
7. Is there an ongoing program to educate employees exposed to heat in the following:
- Effects of heat on health? Yes No
- Means to overcome heat stress? Yes No
- Emergency treatment of heat stress? Yes No
- Other (specify) _____
8. Are employees who are potentially exposed to excessive levels of heat protected from:
- Infectious agents? Yes No
- Acids? Yes No
- Alkalies? Yes No
- Gases? Yes No
- Inorganic and organic dusts? Yes No
- Organic solvents? Yes No
- Pesticides? Yes No
- Cold? Yes No
- Ionizing radiation? Yes No
- Noise, vibration, or other nonionizing radiation? Yes No
- Pressure? Yes No

JOB PLANNING—JOB BRIEFING

Preconstruction safety and health planning meetings with engineering and construction personnel should be conducted before beginning new construction jobs. These meetings should include representatives from other utilities such as telephone, gas, water, or sewer companies if their facilities are involved.

Similar meetings should be required for large-scale maintenance work involving more than one area or department. Engineering drawings should be reviewed at all construction and planning meetings.

The responsible supervisor from each affected area or department should be required to attend these meetings, and it is important that middle management personnel be present or represented.

On the site, job briefing is equally as important to safety as job planning. Each employee should understand the general purpose of the job and his particular work assignment.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is each immediate supervisor required to conduct "tailgate" or "tailboard" briefing sessions before beginning all jobs for all crew members under his supervision? Yes No
2. Does the supervisor stop any other activity during this time so that all crew members are able to hear and participate in the briefing session? Yes No
3. During these sessions are efforts made to ensure that each employee understands:
 - 3a. Exactly what work is to be done? Yes No
 - 3b. Why the work is necessary? Yes No
 - 3c. The existing hazards and proper methods to overcome these? .. Yes No
 - 3d. A step-by-step procedures for completion of the job? Yes No
 - 3e. That each employee knows his own job and what others will be doing? Yes No
4. If there is any change in the original work plan, are all crew members advised of the change and any additional hazards that might arise as a result of the change? Yes No
5. Are crew members encouraged to ask questions and make comments during these meetings? Yes No



LIVE-LINE BARE-HAND MAINTENANCE

This section will enable you to perform a self-administered inspection of your live-line bare-hand maintenance safety practices and procedures. All live-line bare-hand maintenance work must be personally supervised by a person trained and qualified to perform this procedure. Minimum clearance distances and insulation testing rules *must* be strictly adhered to.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are employees instructed and trained in live-line bare-hand technique and its safety requirements before being permitted to work on energized circuits? Yes No
2. Before using the live-line bare-hand technique on energized high-voltage conductors or parts, is a check made for:
The voltage rating of the circuit on which the work is to be performed? Yes No
The clearances to ground of lines and other energized parts on which work is to be performed? Yes No
The voltage limitations of the equipment intended to be used? Yes No
3. Is the equipment used designed for live-line bare-hand work? Yes No
4. Is all work personally supervised by a person trained and qualified to perform live-line bare-hand work? Yes No
5. Is a conductive bucket liner or other suitable conductive device provided for bonding the insulated device or the employee to the energized line or to the equipment used for performing live-line bare-hand work? Yes No
6. Are linemen connected to the bucket liner by use of conductive shoes, leg clips, or other suitable means while doing live-line bare-hand work? Yes No
7. Are ground level and bucket controls checked and tested to determine whether they are in proper working condition before moving the aerial lift into the working position? Yes No
8. Are arm current tests made before starting work each day, each time during the day when higher voltage is going to be worked, and when changed conditions indicate a need for additional tests? Yes No
9. Is the use of handlines between buckets, booms, and the ground prohibited? Yes No
10. Is a minimum clearance table printed on a plate of durable, nonconductive material and mounted in the bucket or its vicinity so as to be visible to the operator of the boom? Yes No
11. Are insulated measuring sticks used to verify clearance distances? Yes No



MACHINERY AND MACHINE GUARDING

OSHA STANDARDS 29 CFR 1910.211-219

Machine shop operations in power plants are not production or repetitive types of work but rather are done only as the need arises. Consequently, the work is quite varied and an employee may use several different pieces of powered equipment on any one job. Because this requires a working knowledge of several different types of equipment, training and observing an employee's competence is important to his safety.

The potential for personal injury is inherent in the use of almost any piece of powered machinery or equipment. Therefore, it is necessary to develop and follow safe procedures to control the potential hazards. An effective safety program for machine shop operation in power plants includes:

- adequate guarding of the moving parts of all machines;
- periodic inspection and formal preventive maintenance of each machine; and
- formal training for machine operators and maintenance personnel.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

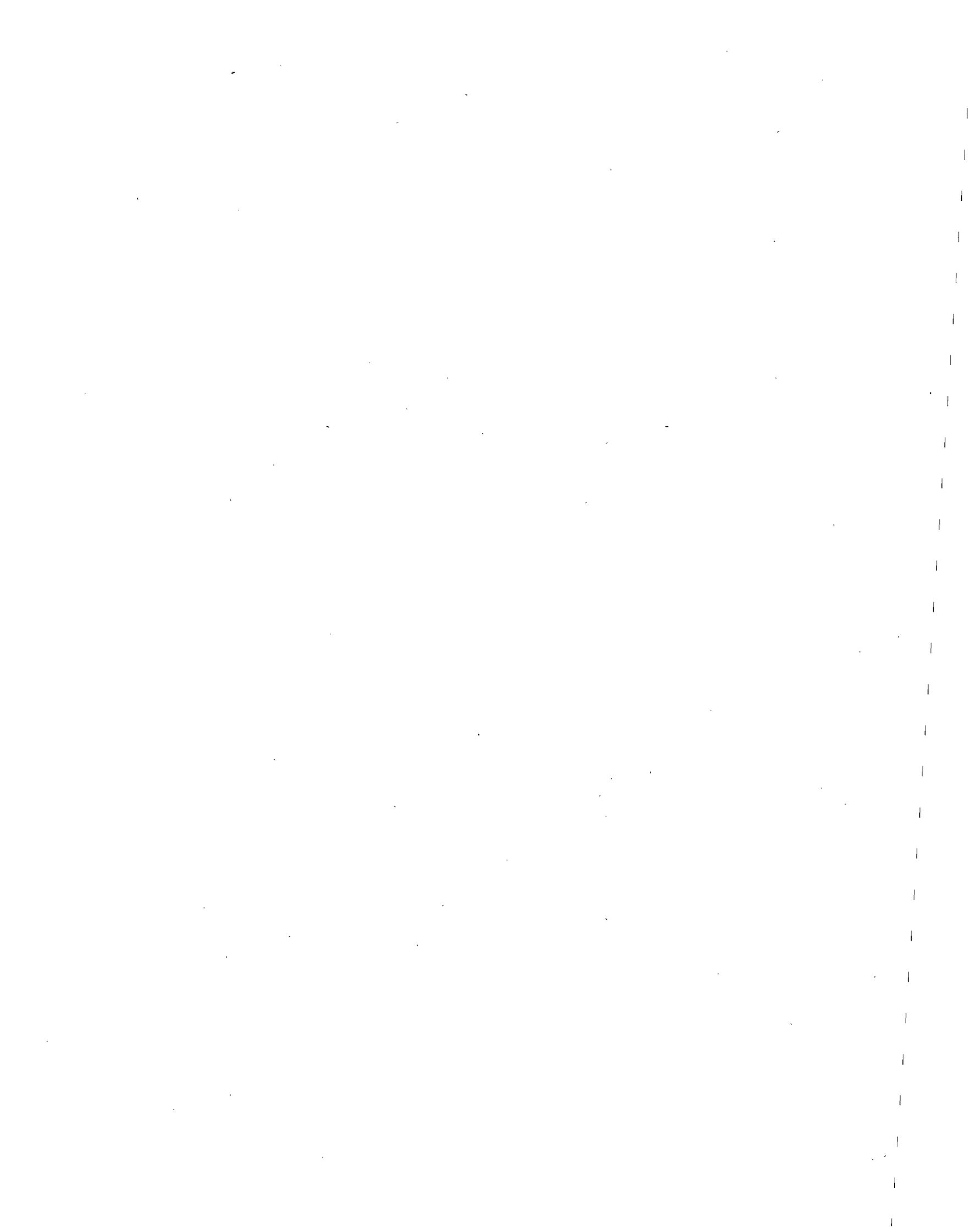
1. Is there a regular program of safety inspections of machinery and equipment? Yes No
2. Are records kept of safety inspections? Yes No
3. Is there a training program to instruct employees in safe methods of machine operations? Yes No
4. Is there adequate supervision to ensure that safe operating procedures are being followed? Yes No
5. Is adequate clearance provided between machines for machine operation, materials, and wastes without blocking traffic or interfering with machine operations? Yes No
6. Is equipment and machinery securely placed and anchored, if necessary, to prevent tipping or other movement that could result in personal injury? Yes No
7. Is there a power shut-off switch within reach of the operator's position at each machine? Yes No
8. Can electric power to each machine be locked out for maintenance, repair, or security? Yes No
9. Are the noncurrent-carrying metal parts of each machine electrically grounded? Yes No
10. Are foot operated switches always guarded or arranged in a manner to prevent accidental actuation by personnel or falling objects.? Yes No
11. Are manually operated valves and switches controlling the operation of equipment and machines clearly identified and readily accessible? Yes No
12. Are all pulleys and belts that are within 7 feet of the floor or working level properly guarded? Yes No

13. Are all moving chains and gears properly guarded? Yes No
14. Are safety glasses, face shields, or other eye-protective equipment provided and used by machine operators? Yes No
15. Before new abrasive wheels are mounted, are they visually inspected and ring tested? Yes No
16. Are work rests on grinders kept adjusted so they are no more than 1/8 inch from the wheel? Yes No
17. Are all grinders equipped with guards that enclose approximately 3/4 of the wheel? Yes No
18. Are all grinders equipped with tongue guards (spark arrestors) that extend from the top of the peripheral guard to within 1/4 inch of the wheel? Yes No
19. Are all bench grinders securely mounted to prevent movement? Yes No
20. Are dust collectors and powered exhausts provided on grinders used in operations that produce a large amount of dust? Yes No
21. Are all emergency stop buttons colored red? Yes No
22. Are splash guards mounted on machines that use coolant to prevent the coolant from reaching employees? Yes No
23. If machines are cleaned with compressed air, is air pressure maintained or controlled to below 30-pounds-per-square-inch, and is effective chip guarding used? Yes No
24. Are employees who operate revolving or reciprocating tools or equipment required to remove or secure loose clothing, jewelry, and long hair? Yes No
25. Are methods provided to protect the operator and other employees in the machine area from hazards created at the point of operation, ingoing nip points, rotating parts, flying chips, and sparks? Yes No
26. Is the guard secured and does it offer no accident hazard in itself? . Yes No
27. If point of operation exposes an employee to injury, is it guarded? . Yes No
28. Is the guard designed and constructed to prevent the operator from having any part of his body in the danger zone during the operating cycle? Yes No
29. If special handtools are used for placing and removing material, do they protect the operator's hands? Yes No
30. Are revolving drums, barrels, and containers guarded by an enclosure that is interlocked with the drive mechanism, so that revolution cannot occur unless the guard enclosure is in place? Yes No
31. Are fan blades guarded when their periphery is less than 7 feet above the floor or working level? Yes No
32. Does the guard have openings no larger than 1/2 inch? Yes No
33. Do arbors and mandrels have firm and secure bearing and are they free from play? Yes No
34. Can hinged saw tables be firmly secured in any position and in true alignment with the saw? Yes No
35. Is a locking-type belt shifter or equivalent positive device on a machine driven by belts and shafting? Yes No
36. Is provision made to prevent machines from automatically starting when power is restored after a power failure? Yes No
37. Are feed rolls or other moving parts guarded to protect the operator? Yes No
38. With respect to bandsaws and band resaws:
 - 38a. Is the saw blade enclosed or guarded except for the working portion? Yes No

- 38b. Are bandsaw wheels fully encased? Yes No
- 38c. Do guards comply with the requirements of Section 1910.213(i)(1)? Yes No
- 38d. Are automatic brakes provided to stop the wheel in case of blade breakage? Yes No
- 38e. Is there a tension control device to indicate proper tension for the saws used on the machine? Yes No
- 38f. Do feed rolls of band resaws provided with a guard meet the requirements of Section 1910.213(i)(3)? Yes No
39. With respect to profile and swing-head lathes and wood heel turning machines:
- 39a. Does each profile and swing head lathe have all cutting heads covered by a metal guard? Yes No
- 39b. Are cutting heads on lathes covered by hoods or shields? Yes No
40. Are dull, badly set, improperly filed, or improperly tensioned saws immediately removed from service? Yes No
41. Are bearings kept free from lost motion and are they well lubricated? Yes No
42. Is cleanliness maintained around machinery? Yes No
43. Are suitable push sticks or push blocks provided? Yes No
44. Are twists or kinks in bandsaws and band resaws hammered out? Yes No
45. Are brazed joints in bandsaws and band resaws the same thickness as the saw blade? Yes No
46. With respect to training:
- 46a. Is operator training required on all machines? Yes No
- 46b. Is adequate supervision provided? Yes No
- 46c. Is unauthorized-personnel operation restricted? Yes No
47. Are machines constructed so as to be free from excessive vibration when largest size tool is mounted and run idle at full speed? Yes No
48. Is use of wooden bandsaw wheels other than those of commercial manufacture prohibited? Yes No
49. Is use of an automatic cutoff saw that strokes continuously without the operator being able to control each stroke prohibited? Yes No
50. Do saw frames and tables have means to limit the size of the saw blade that can be mounted? Yes No
51. Can circular saw fences be secured without changing their alignment with the saw? Yes No
52. Are circular saws guarded to prevent accidental contact? Yes No
53. Are combs (featherboards) or suitable jigs provided where a standard guard cannot be used? Yes No
54. With respect to hand-fed rip saws:
- 54a. Are they guarded by a hood? Yes No
- 54b. Are they furnished with a spreader? Yes No
- 54c. Are they provided with nonkickback fingers or dogs? Yes No
55. Are hand-fed circular crosscut table saws guarded by a hood and provided with a spreader? Yes No
56. Are circular resaws guarded by a hood or shield above the saw? ... Yes No
57. Is each circular resaw provided with a spreader? Yes No
58. With respect to feed rolls:
- 58a. Are feed rolls and saws on self-feed circular saws protected by a hood or guard? Yes No

- 58b. Are sectional nonkickback fingers provided for the full width of the feed rolls located in front of the saw, and in continual contact with the wood being fed? Yes No
59. With respect to swing cutoff saws and sliding cutoff saws:
- 59a. Are they mounted above the table and provided with a hood? Yes No
- 59b. Are they provided with a device to return the saw automatically to the back of the table when released at any point of its travel? Yes No
- 59c. Are limit chains or other devices provided to prevent swing and sliding cutoff saws from swinging beyond edges of the table? Yes No
- 59d. Are inverted swing cutoff saws provided with a hood? Yes No
60. With respect to radial saws:
- 60a. Are upper hood and lower guards provided? Yes No
- 60b. Are radial saws used for ripping provided with nonkickback fingers or dogs? Yes No
- 60c. Is an adjustable stop provided to prevent forward travel of the blade? Yes No
- 60d. Is the front end of the unit slightly higher than the rear so that the cutting head will gently return to the starting position? Yes No
- 60e. Is ripping and ploughing against the direction in which the saw turns prohibited? Yes No
- 60f. Is direction of saw rotation marked on the hood? Yes No
- 60g. Is there a red label on the rear of the guard marked: DANGER: DO NOT RIP OR PLOUGH FROM THIS END? Yes No
61. With respect to jointers:
- 61a. Is each hand-fed planer and jointer with horizontal head equipped with a cylindrical cutting head, the knife projection of which does not extend more than 1/8 inch beyond the cylindrical body of the head? Yes No
- 61b. Is the opening in the table as small as possible? Yes No
- 61c. Is the clearance between the edge of the rear table and the cutter head not more than 1/8 inch? Yes No
- 61d. Is the table throat opening not more than 2-1/2 inches when tables are aligned with each other for zero cut? Yes No
- 61e. Is each hand-fed jointer with a horizontal cutting head equipped with an automatic guard and a guard that covers the section of the head back of the gauge or fence? Yes No
- 61f. Does each wood jointer with vertical head have an exhaust hood or other guard to enclose the revolving head? Yes No
62. With respect to tenoning machines:
- 62a. Are feed chains and sprockets completely enclosed except for the portion of chain used for conveying stock? Yes No
- 62b. Are cutting heads and saws covered by metal guards? Yes No
- 62c. If an exhaust system is used, does the guard form part or all of the exhaust hood? Yes No
63. With respect to boring and mortising machines:
- 63a. Do safety-bit chucks have no projecting set screws? Yes No
- 63b. Are boring bits provided with a guard? Yes No
- 63c. Is the top of the cutting chain and driving mechanism enclosed? Yes No
- 63d. Is provision made to prevent dropping off of the counterweight? Yes No

- 63e. Are universal joints on spindles of boring machines completely enclosed?..... Yes No
- 63f. Are operating treadles covered by an inverted U-shaped metal guard, fastened to the floor to prevent accidental tripping? Yes No
64. With respect to wood shapers and similar equipment:
- 64a. Are cutting heads of equipment that is not of the automatic feed type guarded? Yes No
- 64b. Are cylindrical heads used whenever possible? Yes No
- 64c. Are single cutter knives in shaper heads kept properly balanced? Yes No
- 64d. Are double-spindle shapers provided with a spindle starting and stopping device for each spindle? Yes No
63. Are knives and cutting heads of woodworking machines kept sharp, properly adjusted, firmly secured, and properly balanced? Yes No
64. Is sharpening or tensioning of saw blades or cutters done only by qualified personnel? Yes No



MATERIAL HANDLING AND STORAGE

OSHA STANDARDS 29 CFR 1910.176-190

Material is moved, either by hand or mechanical means, in every business and industry. Accidents from material handling account for 20% to 25% of all occupational injuries. The questions in this section of the Self-Evaluation Instrument are designed to identify potential hazards to employees resulting from methods of handling and storing materials and to evaluate the establishment's program to protect employees from these hazards. An effective material handling and storage program includes:

- training in safe work practices; and
- proper use of equipment, tools, and protective equipment so as to reduce personal injury.

A portion of this self-evaluation is intended to determine the effectiveness of the powered industrial truck safety program. Powered industrial trucks are those powered trucks (other than vehicles used on the road), designed to be controlled by a riding operator, and motorized hand trucks, designed to be controlled by a walking operator.

An effective safety program includes:

- systematic inspection and formal preventive maintenance for each powered industrial truck;
- formal training of operators and maintenance personnel; and
- adequate refueling and charging areas.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is there a limit on the maximum weight a worker is permitted to lift by himself without equipment? Yes No
2. Is the weight marked on objects to be lifted or carried manually? .. Yes No
3. Are workers employed in manual materials handling trained in proper lifting techniques? Yes No
4. Is there preplacement screening of workers applying for manual material handling jobs? Yes No
5. Is machinery available for lifting? Yes No
6. Do workers actually use the equipment for lifting when loads are heavy? Yes No
7. Is machinery available for pulling and carrying heavy loads? Yes No
8. Are special devices provided to employees when moving drums or barrels? Yes No
9. Are two-wheeled hand trucks and wheelbarrows equipped with knuckle-guards to protect hands from jamming against door frames or other obstructions? Yes No
10. Are two-wheeled trucks equipped with brakes? Yes No
11. Are loads on hand trucks, dollies, and wheelbarrows secure from slipping or falling? Yes No

12. Do employees keep the handles of flat trucks in a position that will not create a tripping hazard? Yes No
13. Is all material storage stable and secure from collapse? Yes No
14. Are derail or bumper blocks or both provided on all spur railroad tracks to prevent cars from entering a work area? Yes No
15. Are all dockboards for trucks and railroad cars anchored or equipped with devices to prevent their slipping? Yes No
16. Are all dockboards strong enough to carry the loads imposed on them? Yes No
17. Is riding on conveyors prohibited? Yes No
18. Do all conveyors have pop-out safety devices? Yes No
19. Is all stored material kept from under or adjacent to overhead electric lines? Yes No
20. Is all material kept at least 2 feet from a fire door? Yes No
21. Is all stored material kept at least 3 feet from sprinkler heads? Yes No
22. Are flammable and combustible materials stored separately from other storage? Yes No
23. Are hazardous materials kept where they will not create a dangerous condition? Yes No
24. Are all permanent aisleways properly marked? Yes No
25. Are aisleways kept clear of materials? Yes No
26. Are the proper types of fire extinguishers readily available for the different exposures? Yes No
27. Are flammable and combustible materials stored only in areas designed for their storage? Yes No
28. Are storage areas, which are not on grade level, posted with maximum weight limits? Yes No
29. Is all combustible waste kept in closed-cover, metal containers? ... Yes No
30. Are all persons except the operator prohibited from riding on industrial trucks (except where a passenger seat is provided)? Yes No
31. Are high-lift trucks fitted with an overhead guard of sufficient strength to protect the operator against a falling load or objects falling from high racks? Yes No
32. Are backrest extensions provided to prevent loads from sliding off the back of the lift? Yes No
33. Are all industrial trucks equipped with a horn or other warning device? Yes No
34. Are the brakes of highway trucks set, and chocks placed under their rear wheels, while they are being loaded and unloaded by industrial trucks? Yes No
35. Is protection provided to prevent movement of railroad cars during loading and unloading operations? Yes No
36. Are spinner knobs prohibited on steering wheels of trucks that were not originally equipped with them? Yes No
37. Are the following precautions normally taken by operators before they leave their trucks unattended:
 - Load engaging or lifting mechanism fully lowered? Yes No
 - All controls neutralized? Yes No
 - Brakes set? Yes No
 - All power shut off? Yes No
 - Wheels blocked when parked on an incline? Yes No
 - Other (specify) _____

- 38. Are industrial trucks refueled at this establishment? Yes No
- 39. Are trucks that are equipped with permanently mounted LP gas containers always refueled outdoors? Yes No
- 40. Are operators required to stop engines and leave the trucks during refueling? Yes No
- 41. Are all fuel containers handled carefully to avoid damage to container or valve assembly? Yes No
- 42. Are no more than two LP gas containers used on an industrial truck? Yes No
- 43. Are the following precautions taken for storing fuel cylinders:
 - Cylinders stored only in assigned areas? Yes No
 - Cylinders protected from being hit and/or knocked over? Yes No
 - Cylinders stored only in approved containers? Yes No
 - Cylinders properly marked and identified? Yes No
 - Cylinders secured from unauthorized persons? Yes No
 - Other (specify) _____
- 44. Is smoking prohibited in refueling and battery charging areas? Yes No
- 45. Are there formal training programs for all truck operators? Yes No
- 46. Is each operator's proficiency periodically reviewed? Yes No
- 47. Are the following subjects covered during training and reviews:
 - Operation within rated load limits? Yes No
 - Operation with insecure loads? Yes No
 - Loads that cause wheels to be lifted off the ground? Yes No
 - Safeguarding of personnel working or walking near this equipment? Yes No
 - Proper placement of forks during various operations? Yes No
 - Other (specify) _____
- 48. Is there a systematic, periodic inspection program for all industrial trucks? Yes No
- 49. Are inspection records kept? Yes No
- 50. Is there a routine preventive maintenance program for all industrial trucks? Yes No
- 51. Are preventive maintenance records kept? Yes No
- 52. Is the manufacturer's written approval obtained before modifying any industrial truck? Yes No
- 53. Are aisles and doorways wide enough for safe passage of trucks? . Yes No
- 54. Are storage locations for material and equipment situated somewhere other than under energized buses, lines, or near energized equipment? Yes No
- 55. Are employees instructed in the hazards of working around loads suspended by a crane, an A-frame, or similar equipment? Yes No

MEDICAL AND FIRST AID

Although today's workers in the electric utility industry expect preplacement medical examination as a condition of employment, they are less familiar with the need for periodic reexaminations. Management may not fully understand the economic reasons for either preplacement or periodic examinations. The managers of almost all electric utility industries look upon medical requirements as an added expense of doing business. However, the high cost of workers' compensation, the expense of diminished or variable production schedules, and the cost both in money and in time of replacement training make medical surveillance and biological monitoring essential for worker placement and retention in a particular job or at a given worksite.

Medical staff can only recommend to management actions to be taken or not taken concerning worker and worksite safety and health. It is management's responsibility to recognize that medical recommendations are but an additional tool for evaluating their prospective workers. Medical recommendations provide knowledge of the conditions under which existing or prospective workers may safely and effectively function.

Medical recommendations must be appropriate for worksite conditions and potential hazards. They must also be consistent with the goals of management and the requirements of labor. Medical recommendations must not be so lax that the safety and health of workers are compromised, nor so stringent that employment and retention of an individual are unfairly limited.

The results of all medical examinations, including Occupational Toxic Exposure History and reports of all biological specimens, must be discussed with the worker. It is important to remember that although individual workers are entitled to know the results of examinations, biological monitoring, and medical surveillance, management is generally entitled only to a medical assessment written in appropriate language by the medical personnel. This assessment should include information from which management can make decisions regarding placement, type of activity, and conditions under which the workers may safely and effectively work. Many companies also consider previous injuries and illnesses, revealed in the worker's medical and Occupational Toxic Exposure History, when making decisions about placement and retention.

Although most potential health problems in the electric utility industry concern safety, there is the possibility of acute and chronic exposure to a number of toxic chemicals, physical and biological agents, and psychological risk. The level of exposure varies depending on fuel (nuclear, coal, oil, gas, hydraulic); age of the plant (asbestos, mercury); location of the plant (heat and cold stress, neighboring industrial pollution); and other factors.

The medical or first-aid station of each facility should have readily available industry safety data sheets on all potentially harmful chemicals. These provide useful information and are available through the purchasing office of the manufacturing supplier. Some utilities subscribe to the Hygienic Guide Series published by the American Industrial Hygiene Association. This publication provides information concerning the physical properties of industrial chemicals; the atmospheric concentrations at which they become

an immediate concern to human health; their toxic properties through inhalation, ingestion, or skin absorption; recommended industrial hygiene practices and controls; as well as a certain amount of medical information written in nontechnical language. Your association may also have safety data sheets that can be made available to you.

Most supervisors recognize problems associated with heat and cold stress. Salt tablets may be provided when there is profuse perspiration, but they must only be made available under direct medical supervision. Moreover, management frequently postpones work in unusual instances of high heat, high humidity, or cold and strong winds (mindful of the temperature-wind index for lowering body temperature).

The alert manager, in addition, keeps up with current research now going on concerning effects of electric fields at frequencies generally found at transmission, distribution, and generation sites. Biomedical effects with respect to exposure at these frequencies are being documented, and it is good to be aware of current research studies in this area.

Frequently overlooked is how changing technology affects workers. Hard and soft contact lenses provide a case in point. Particulates and other pollutants can cause severe eye problems to persons wearing contact lenses. Some companies prohibit the use of contact lenses at all times; others require that approved safety goggles be worn over them.

The potential hazards of segmental or whole-body vibration are often neglected. Persons working on vibrating surfaces should be instructed to be aware of tingling or numbness of extremities and to report these symptoms to their supervisors and medical department.

The qualifications of occupational medical personnel including physicians, nurses, and first aiders vary widely in the electric utility industry. It is important that supervisors make sure that the medical personnel, whether salaried or contracted for part-time service, take time to visit the plant sites, transmission centers, and distribution networks to thoroughly familiarize themselves with the potential hazards. The National Institute for Occupational Safety and Health (NIOSH) provides informative materials useful for this purpose.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help. It is important that this section be completed by the physician. Ideally, the physician or full-time, on-site nurse and supervisor will conduct a walk-through survey when answering the questions.

1. Is there a formalized medical program at this location? Yes No
2. Is this program described in a readily available, written policy statement? Yes No
3. Does the organization have provision for:
 - Health counseling and education? Yes No
 - Sight and hearing conservation? Yes No
 - Prevention of occupational dermatitis (e.g., solvent cleaner burns)? Yes No
 - Protection from exposure to harmful physical and chemical agents? Yes No
 - Personal hygiene? Yes No
 - Stress resulting from a behavioral or situational type of problem? .
 - Instruction in the proper use and fitting of personal protective equipment? Yes No
 - Immunizations? Yes No
 - Biological hazards (e.g., bites, stings, poisonous plants)?
4. Does the organization have written policies with regard to the following:
 - Alcoholism? Yes No
 - Mental illness? Yes No

- Drug abuse? Yes No
- Smoking hazards? Yes No
- Obesity? Yes No
- Cancer? Yes No
- Pulmonary problems? Yes No
- Hypertension? Yes No
- Nutrition? Yes No
- Family problems? Yes No
5. Are appropriate medical facilities available? Yes No
6. Is an occupational nurse (RN, LPN) or nurse's aide available full-time? (If yes, go to question 9.) Yes No
7. Is an occupational nurse (RN, LPN) or nurse's aide available part-time? (If no, go to question 12.) Yes No
8. Are part-time nursing services available from:
- Hospital-based occupational safety and health clinic? Yes No
- Industry-based occupational safety and health service? Yes No
- Private service agency or individual? Yes No
- Governmental health agency? Yes No
- Voluntary health agency? Yes No
- Other (specify) _____
9. Does the nurse regularly visit the actual employee worksite? Yes No
10. Is the nurse one of the following:
- A trained occupational nurse? Yes No
- An experienced occupational nurse (3 years or more)? Yes No
11. Does a nurse or physician perform the following procedures:
- Fit safety glasses? Yes No
- Fit safety shoes? Yes No
- Fit ear protection? Yes No
- Dispense medication? Yes No
- Administer audiometric exams? Yes No
- Administer physiotherapy (diathermy, ultrasound, whirlpool, etc.)? Yes No
- Suture or tape (butterfly) superficial lacerations? Yes No
- Give physical exams? Yes No
- Inspect plant for health hazards? Yes No
- Give first aid training? Yes No
- Provide health education and counseling? Yes No
- Other (specify) _____
12. Is a physician available full-time? (If yes, go to question 14.) Yes No
13. Is a physician available part-time? (If no, go to question 18.) Yes No
14. Does a physician regularly visit the actual employee worksite? Yes No
15. Is the physician:
- Qualified in occupational medicine? Yes No
- Experienced in occupational medicine (3 years full time or equivalent)? Yes No
16. Is the physician consulted for possible medical effects of all new products or processes before proposed changes? Yes No
17. Does the physician have privileges at the nearest hospital or clinic? Yes No
18. Is a hospital, clinic, or other service accessible every day, at all hours, and within 15 minutes? Yes No

19. Is the employee informed of the results of his medical examination or biological monitoring? Yes No
20. Are the following medical tests and examinations normally given during preplacement:
- Spirometry (pulmonary function-FEV₁/FVC)? Yes No
 - Chest X-ray? Yes No
 - Back X-ray? Yes No
 - Complete blood counts (CBC)? Yes No
 - Neurologic examinations? Yes No
21. Are the above medical tests and examinations repeated during regular, periodic follow-ups? Yes No
22. Do your preplacement and periodic examinations include a test for the following:
- Visual acuity? Yes No
 - Color blindness? Yes No
 - Appropriateness of corrective lenses? Yes No
23. Is preplacement audiometric testing conducted? Yes No
24. Is audiometric testing conducted periodically? Yes No
25. Is the assessment based on visual and audiometric testing made available to the:
- Worker concerned? Yes No
 - Worker's supervisors? Yes No
 - Medical (physician) consultant? Yes No
 - Other (specify) _____
26. Is the audiometric testing performed elsewhere by an outside agency? (If yes, go to question 28.) Yes No
27. If audiometric testing is performed on the premises:
- Does the sound booth meet ANSI standards? Yes No
 - Is there a certified technician available? Yes No
 - Is equipment calibrated on a regular basis? Yes No
 - Is the testing biologic? Yes No
 - Is the testing acoustical? Yes No
28. Does the initial or periodic examination consider the ability of the worker to function in:
- High places? Yes No
 - Underground? Yes No
 - Windy conditions (potential metabolic hazard)? Yes No
29. Does the preplacement examination provide for an assessment of potential vertigo (dizziness)? Yes No
30. Do preplacement and periodic medical examinations include an assessment of each worker's cardio-pulmonary function relative to his ability to use positive and negative pressure respirators without significant discomfort or harm? Yes No
31. Does medical evaluation to assess the effects of exposure by individual employees to pesticides include:
- Complete blood count? Yes No
 - Specific pesticide blood analysis? Yes No
 - Neurological (motor function) examination? Yes No
 - Urinalysis for pesticide metabolites? Yes No

32. Is eye and skin protection provided workers potentially exposed to pesticides? Yes No
33. Are all women workers aware of the medical policy concerning pregnancy? Yes No
34. Are all foremen and supervisors aware of the medical policy concerning pregnancy? Yes No
35. Within the limitations of confidentiality and need to know, do the following have access to an employee's medical records:
- The employee? Yes No
- The employee's private physician? Yes No
- The employee's labor representative? Yes No
- The employee's subsequent employers? Yes No
- Qualified individual or individuals studying occupational illness? . Yes No
- Representatives of the Secretaries of Labor and of Health, Education, and Welfare? Yes No
- Other (specify) _____
36. Are medical records maintained by:
- Medical department? Yes No
- Outside medical facility? Yes No
- Personnel? Yes No
- Other (specify) _____
37. Are employee medical records kept for the length of service plus at least 30 years? Yes No
38. Are the results of biological monitoring made available to:
- The employee? Yes No
- Management? Yes No
- Labor representative? Yes No
- The appropriate physician? Yes No
39. Is preventive health education (in the worker's native language) provided for:
- Vision conservation? Yes No
- Hearing conservation? Yes No
- Skin hygiene? Yes No
- Prompt and accurate reporting of accidents or injury? Yes No
- Use of protective equipment for:
- Respiration? Yes No
- Vision? Yes No
- Hearing? Yes No
- Skin? Yes No
- Good work practices? Yes No
- Specific hazards? Yes No
- Toxicological and other harmful exposures? Yes No
- Personal hygiene, especially in regard to:
- Smoking? Yes No
- Cleanliness? Yes No
40. Are safety and preventive health education meetings held on a regular basis? Yes No
41. Are attendance records kept at safety and health education meetings? Yes No
42. Does the educational program include training in:
- Recognition of warning signs and posters? Yes No
- Understanding of safety manuals? Yes No

- Good work practices? Yes No
- Individual job training? Yes No
- First aid? Yes No
43. Have the first-aiders in each section or each shift received training from the American Red Cross, as military corpsmen, or by equivalent means? Yes No
44. Are first-aid kits inspected and a log kept for completeness, appropriateness, and sanitation each week? Yes No
45. Are consumable items in the first-aid kit replaced immediately after use? Yes No
46. Are the names, addresses, and phone numbers of advisory physicians or alternate medical facilities posted for all supervisors and first-aiders to use? Yes No
47. Where used, are the physician's standing orders kept:
- With each first aid kit? Yes No
- At each first aid station? Yes No
- With each foreman? Yes No
- Other (specify) _____
48. Do the appropriate workers have specific training in the first-aid treatment of electrical shock? Yes No
49. Are first aiders trained in the recognition and early treatment of organic pesticide poisoning? Yes No
50. Is an eye-wash fountain (with sufficient water for 15 minutes of irrigation) available at all sites where caustic substances may be splashed in the eye? Yes No
51. Have workers or first aiders been instructed in proper eye-flushing technique? Yes No
52. Are appropriate workers trained in the early recognition of damage to the skin and eyes from:
- Sunlight. Yes No
- Electric arc welding? Yes No
- Incandescent lamps? Yes No
- Electric flash? Yes No
53. Is there training in early recognition of heat stress, cold stress, and frostbite? Yes No
54. Is water replacement available for workers exposed to heat stress? Yes No
55. Are first aiders trained in the early recognition of the effects of segmental and whole-body vibration? Yes No
56. Are supervisory employees trained in the early recognition of:
- Alcoholism? Yes No
- Drug abuse? Yes No
57. Is training in the early recognition of psychological stress provided? Yes No
58. Are appropriate employees made aware of materials and processes likely to create potential health hazards? Yes No

NOISE

OSHA STANDARDS 29 CFR 1910.95

The questions in this section of the Self-Evaluation Instrument are designed to identify potential health hazards to employees resulting from exposure to excessive noise, and to evaluate your establishment's program to protect employees from this hazard. An effective program includes:

- regular monitoring of noise levels in the work environment;
- engineering and administrative controls to protect employees from excessive exposure;
- the use of hearing protective equipment (noise attenuating devices) by employees where controls have not sufficiently reduced exposure;
- periodic medical evaluation to assess the effect of exposure on individual employees; and
- education and training of employees.

The ill-effects of noise in general, and industrial noise in particular, can be prevented by controlling noise at its source, or at least by protecting the employee against the effects of noise. Measurement, control, and protection from hazardous noise is a solvable technical problem. The identification of potentially hazardous noise sources is the first step. After identifying the sources of noise, the establishment can design a noise survey that will measure its intensity, frequency distribution, and duration. The results of the survey can then be used to define the appropriate mechanism for the control of the noise. In addition, the level of noise exposure that employees experience can be evaluated to determine the possible threat of noise-induced hearing loss, as well as the other ill-effects resulting from noise exposure. This evaluation can be used to define the appropriate mechanism for protection of the employee against any noise-related ill-effects.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Have work areas where noise levels make voice communication between employees difficult been identified? Yes No
2. What are the major sources of noise here? (LIST MAJOR NOISE PRODUCING EQUIPMENT AND LOCATION OF EACH. INDICATE WITH AN "X" WHETHER THE NOISE IS PRODUCED CONTINUOUSLY, INTERMITTENTLY, OR AS IMPACT/IMPULSE.)

Source/Location	Continuous	Intermittent	Impact/Impulse
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Have noise levels been measured? (If no, go to question 5.) Yes No

4. Which of the following monitoring devices have been used to measure noise levels:
- Sound level meter?
- Octave band analyzer?
- Impact noise analyzer?
- Personal dosimeter?
5. Are exposure records kept on any employee exposed to noise? Yes No
6. Have engineering controls been used to reduce noise levels? (If no, go to question 8.) Yes No
7. Which of the following engineering controls have been used to control noise levels:
- Acoustical enclosures of noisy equipment?
- Acoustical absorption material on ceilings and walls to minimize sound wave reflection?
- Machine maintenance to reduce noise levels?
- Acoustical barriers to interrupt transmission of noise from one area to another?
- Provision of sound-insulated work stations?
- Other (specify) _____
8. Is a low noise requirement included in specifications for potentially noisy new equipment? Yes No
- What level is specified? less than _____ dBA
9. Which of the following administrative controls have been used by this establishment to minimize individual employee exposure to noise:
- Rotation of workers?
- Frequent rest periods?
- Cafeterias and rest areas located in quieter places?
- Only essential work done in noisy area?
- Other (specify) _____
10. Is approved hearing protective equipment (noise attenuating devices) available to every employee working in noisy areas? Yes No

NOISE STRESS

(MEDICAL)

Noise is defined as undesirable sound. Noise occurring in the occupational environment can cause: (1) noise-induced hearing loss; (2) stress-related illness (physiological or psychological); and (3) decreased job performance. Hearing loss, which is recognized as the most serious of these ill effects, is easily identified and measured. There are insufficient data at this time for determining clear cause and effect relationships between excessive exposure to noise and other problems. However, a hearing conservation program designed to eliminate noise-induced hearing loss should also reduce the risks of all noise-related ill-effects.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help. It is important that this section be completed by the physician. Ideally, the physician or full-time, on-site nurse and supervisor will conduct a walk-through survey when answering the questions.

1. Do you have a screening program that identifies the employee who has a health condition (e.g., hypertension) which might make the employee more susceptible to having an adverse reaction to noise? Yes No
2. Are employees who are identified by the screening program:
 - Advised of their health condition? Yes No
 - Advised of the added risks in working in a noisy environment? Yes No
 - Counseled in job selection to minimize their exposure to noise? Yes No
 - Counseled against accepting a position in a noisy environment? ... Yes No
 - Other (specify) _____
3. Have employees exposed to noise received audiometric testing within the past 2 years? Yes No
4. Does the medical and Occupational Toxic Exposure History (see Medical and First Aid section) of employees working with or exposed to noise include past and present exposure and results of audiometric testing? Yes No
5. Are preplacement audiometric tests required? Yes No
6. Are medical records (including results of audiometric testing) maintained on employees exposed to noise? Yes No
7. Is there an ongoing preventive health program to educate employees in the following:
 - Safe levels of noise exposure? Yes No
 - Personal protection against excessive noise exposure? Yes No
 - Effects of noise exposure on health? Yes No
8. Are employees who are potentially exposed to excessive levels of noise protected from exposure to:
 - Infectious agents? Yes No

Acids?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Alkalies?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Contaminant gases?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Inorganic and organic dusts?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Organic solvents?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Pesticides?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Cold?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Heat?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Ionizing radiation?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Vibration and nonionizing radiation?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Pressure?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

OVERHEAD ELECTRIC DISTRIBUTION

Accidents on overhead distribution lines most frequently result from electrical contact and falls. They are usually serious. For this type of safety program to be effective, all supervisors and workers must follow safe practice procedures.

Since many accidents occur when using tools and equipment, special consideration should be given to the condition and use of these tools. Tools and equipment are often abused by being improperly stored or by being used for jobs for which they were not designed. An effective tool and equipment program includes:

- an inspection and maintenance procedure for the tools and equipment being used; and
- training of employees in the proper use, storage, and maintenance of each type of tool and equipment.

Each employee should have a safe procedures manual that spells out in detail the rules and regulations of overhead line work.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is a rubber glove safety factor required that is sufficiently higher than the highest voltage to be worked with rubber gloves? Yes No
2. Are only electric servicemen (troubleshooters) allowed to work on energized conductors alone? Yes No
3. Is there a formal training program for linemen? Yes No
4. Are all numbered line switches under the control of a designated employee (dispatcher)? Yes No
5. Is there an inspection program for the overhead system (field inspection)? Yes No
6. Are all tools and equipment used by the linemen periodically inspected? Yes No
7. Are special compartments provided for rubber protective equipment? Yes No
8. Are insulated platforms (hotboards) used in conjunction with rubber gloves? Yes No
9. Is the foreman's safety card used when working de-energized circuits or apparatus? Yes No
10. Are switches rendered inoperable where design permits? Yes No
11. Are there written instructions for overhead lines? Yes No
12. Are caution orders and clearances handled and recorded through a designated employee (dispatcher)? Yes No
13. Are periodic safety meetings held with employees? Yes No
14. Is there a designated safety employee? Yes No

15. Are poles inspected for ground depth and for decay both above and below the ground line before climbing? Yes No
16. If there is a fused secondary system, are the fuses marked with a sign or tag? Yes No
17. When a crew or crews are working on the same line section at different locations, are reliable communications established? Yes No
18. When a crew is divided and working at different locations, is an employee designated to be in charge? Yes No
19. Is worn or damaged lineman's equipment removed from service? .. Yes No

PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARDS 29 CFR 1910.140

Personal protective equipment is required whenever toxic or other substances can do bodily harm through absorption, inhalation, or physical contact. Various processes, environments, chemicals, or mechanical irritants constitute hazards for which personal protective devices for the eyes, face, head, and extremities, as well as protective clothing and respiratory devices, are required.

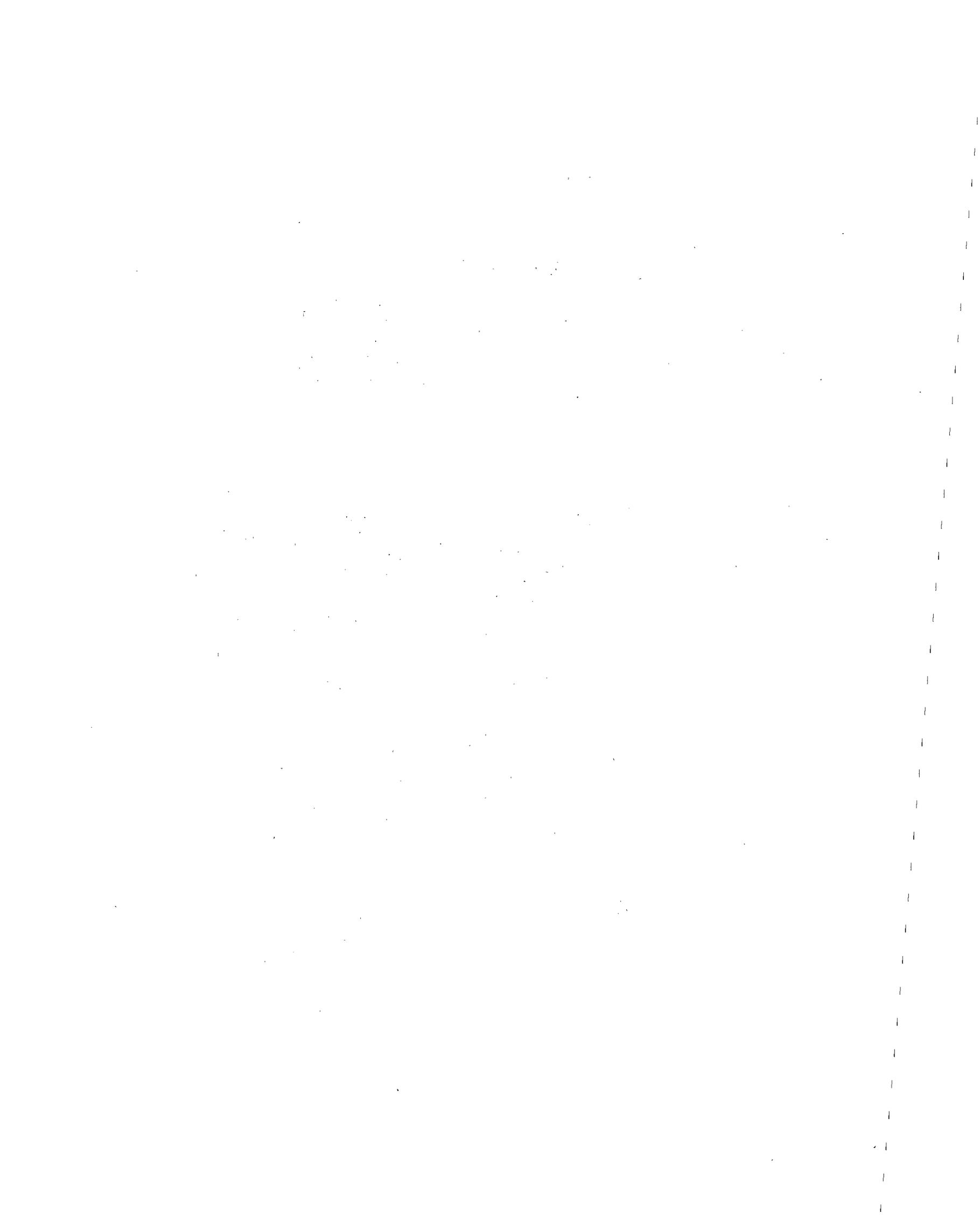
All personal protective equipment must be properly designed and sufficiently well constructed to provide the protection for which it is intended. It must be maintained in a sanitary and reliable condition.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Do hard hats used by employees meet the requirements of American National Standards Institute (ANSI) standard Z89.2, 1971 Industrial Protective Helmets for Electrical Workers? Yes No
2. Is wearing approved (ANSI Z87.1) safety glasses required at all times in the following hazardous locations:
 - Outside construction job sites? Yes No
 - Electrical work (primary)? Yes No
 - Electrical work (secondary)? Yes No
 - Automotive garages? Yes No
 - Heavy equipment garages? Yes No
 - Carpenter shop? Yes No
 - Electric substation switching? Yes No
 - Removing and installing electric meters? Yes No
 - Cable splicing (lead)? Yes No
 - Cable splicing (PE)? Yes No
3. Are calobar lens safety glasses required when working energized electrical apparatus when the possibility of arcing exists? Yes No
4. Are the following lenses required when employees are working energized equipment at night or in underground vaults and other poorly lighted locations:
 - Calobar lens? Yes No
 - Clear lens? Yes No
5. Are employees who require corrective lenses required to use approved industrial safety glasses or to wear protective goggles over their glasses? Yes No
6. Is the wearing of metal frame glasses prohibited while performing electrical work? Yes No
7. Do employees working in streets and roadways where they are exposed to the hazards of traffic wear colored warning vests? Yes No

8. Do written standard operating procedures govern the selection and use of respirators in accordance with OSHA standards 1910.134? Yes No
9. Are a medical assessment and a physical examination performed on personnel using self-contained respirators? Yes No
10. Is there an established inspection program for respirators? Yes No
11. Are records of respirator inspections maintained? Yes No
12. Are the respirators used certified by the National Institute for Occupational Safety and Health (NIOSH)? Yes No
13. Are employees who use respiratory equipment instructed in the proper methods and required to clean, inspect, and sanitize respirators? ... Yes No
14. Are respirators assigned to individual employees for their exclusive use? Yes No
15. Does all safety toe footwear provided or subsidized by the company conform to ANSI standard Z41.1? Yes No
16. Are U.S. Bureau of Mines approved hearing protection devices provided for your employees? Yes No
17. Are hearing protectors individually fitted to the user's ears? Yes No
18. Are employees who are issued hearing protectors trained in proper methods and required to clean and sanitize this equipment? Yes No
19. Is all lineman's climbing equipment, which is required to be used by employees, manufactured, used, and maintained in accordance with the requirements of OSHA standard 1926.959? Yes No
20. When new gloves are purchased, are they inspected and tested to ensure compliance with ANSI standard J6.6? Yes No
21. Are rubber protective gloves electrically tested at least once every 90 days? Yes No
22. Are rubber protective gloves tested in accordance with ANSI standard J6.6? Yes No
23. Are personnel required to visually inspect and "air" test rubber gloves at least daily before use? Yes No
24. Are leather protectors required with the use of rubber gloves? Yes No
25. Is the wearing of rings, watches, etc., prohibited while using rubber protective gloves? Yes No
26. Is the wearing of approved cotton liners under rubber gloves required when an employee's hands are being treated with medication that may be harmful to rubber? Yes No
27. Are protective bags provided for rubber protective gloves? Yes No
28. Are gloves placed in the bag with cuff toward bottom and properly protected from damage when not in use? Yes No
29. Is the use of rubber protective gloves prohibited as work gloves or for any purpose other than protection from electrical shock? Yes No
30. When rubber gloves fail during testing, are they immediately destroyed or properly marked to avoid the possibility of reuse for electrical purposes? Yes No
31. Is the use of discarded leather protectors prohibited as work gloves to avoid the possibility of a worker erroneously approaching energized equipment without rubber glove protection? Yes No
32. Is all rubber protective equipment stored in bins or containers that will maintain its natural shape and protect it from water, excessive temperatures, sharp objects, and petroleum products? Yes No

33. Are rubber gloves required when using hot line sticks at distribution voltages? Yes No
34. Are rubber sleeves required with rubber gloves when working energized primary equipment? Yes No
35. Do employees have the option to change rubber protective equipment anytime regardless of test if they are concerned about its condition? Yes No
36. Is there an established program of testing:
- Rubber line hose? Yes No
 - Rubber blankets? Yes No
 - Hotsticks? Yes No
 - Switch sticks? Yes No
 - Hoods? Yes No
 - Shields? Yes No
 - Worker's ability to use positive and negative pressure respirators? .. Yes No
37. Is throwing or dropping rubber protective equipment from elevated heights prohibited? Yes No
38. When rubber protective equipment is left on conductors overnight or for an extended period of time, must it be tested before reuse? Yes No



POLE HANDLING

The term "pole handling" as used in this section includes the loading and unloading of pole transporting equipment in places of storage or use and the transporting of poles on all streets or roadways of public thoroughfare. Also included is setting poles in energized lines.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. During pole handling does your safety program require that:
 - 1a. Only approved methods, tools, and equipment shall be used in pole handling operations? Yes No
 - 1b. During pole hauling operations, all loads shall be thoroughly inspected to prevent displacement, and a red flag and warning sign shall be displayed at the trailing end of the longest pole? . Yes No
 - 1c. When hauling poles during the hours of darkness, illuminated warning devices and a reflectorized sign shall be attached to the trailing end of the longest pole? Yes No
 - 1d. Employees are forbidden to stand or pass under a suspended load or adjacent to, over, or under a loaded winch line? Yes No
 - 1e. Only authorized operators shall be used in pole loading operation? Yes No
 - 1f. Loading operators shall accept signals only from the designated signal man, but shall obey a "STOP" signal from any employee? Yes No
 - 1g. Employees are not permitted to ride pole trailers or dollies? Yes No
 - 1h. Precautions shall be exercised to prevent blocking of roadways or endangering other traffic? Yes No
2. Are employees prohibited from standing between pole pile and the transporting or loading equipment? Yes No
3. Are poles loaded in a pyramidal fashion? Yes No
4. Is the maximum allowable capacity indicated on each trailer, and is this the governing factor concerning load limits? Yes No
5. Are pole trailers equipped with two safety chains having hooks and automatic keepers of sufficient strength to maintain control of trailer in the event of uncoupling from towing vehicle? Yes No
6. When setting or removing poles in or adjacent to lines energized at primary voltage, are employees handling poles required to wear rubber protective gloves? Yes No
7. Are two cant hooks or sling ropes used for guiding poles in this operation? Yes No
8. Do employees using cant hooks use rubber gloves? Yes No

9. Are rubber protective equipment line guards or pole guards or both used if there is a possibility of the pole contacting an energized primary line? Yes No
10. Are crane trucks or mechanical equipment used to set poles in or adjacent to energized primary apparatus effectively grounded or barricaded and considered as energized? Yes No

SANITATION

OSHA STANDARDS 29 CFR 1910.141

Sanitation and good housekeeping are essential parts of any effective occupational safety and health program. The questions in this section of the Self-Evaluation Instrument are designed to identify potential sources for the spread of infection and disease and to evaluate the establishment's program to prevent unsanitary conditions. An effective sanitation program includes:

- regular inspection of facilities to identify unsanitary conditions;
- a frequent, regular program of housekeeping;
- review of records to determine if there is any connection between poor sanitation and employee illness or absence; and
- education of employees in personal hygiene.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is housekeeping a regularly scheduled activity at this establishment? Yes No
2. Are floors kept dry and clean? Yes No
3. Are work areas kept clean? Yes No
4. Are machines and equipment kept clean? Yes No
5. Do work areas have a sufficient number of waste receptacles? Yes No
6. Are waste receptacles leakproof? Yes No
7. Are waste receptacles kept clean? Yes No
8. Do waste receptacles have tight covers? Yes No
9. Are waste receptacles emptied regularly? Yes No
10. Are regular inspections made for insects, rodents, and vermin? Yes No
11. Are potable water dispensers provided at all work locations? Yes No
12. Are water dispensers kept clean and sanitary? Yes No
13. Are all nonpotable water outlets clearly marked? Yes No
14. Are they all separate (i.e., free from cross connections) from potable systems? Yes No
15. Are an adequate number of properly equipped toilet facilities provided? Yes No
16. Are whole-body showers provided? Yes No
17. Are showers properly equipped and provided with adequate personal supplies? Yes No
18. Is protective clothing supplied by the employer and kept clean and repaired? Yes No
19. Are special areas (e.g., cafeterias or lounges) provided for food and beverage consumption on the premises? Yes No

20. Is consuming or storing food and beverages in toilet rooms or near toxic materials prohibited? Yes No
21. Are the food service facilities, including vending machines, regularly inspected for sanitary conditions? Yes No

TEMPORARY GROUNDING

Temporary safety grounds are used for the protection of employees working electrical apparatus. The need for good grounding procedures is increasingly important as lines are constructed closer together, generation sources become larger, and available fault currents increase. It is not possible for written grounding procedures to cover every possible grounding application, but if the principles involved are applied with discretion, safe working conditions will result.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are circuits that are de-energized for work properly grounded? Yes No
2. Are there approved purchase specifications for grounding apparatus?
..... Yes No
3. Is there an approved inspection and testing program for grounding
apparatus? Yes No
4. Is there a regular schedule for testing grounding apparatus? Yes No
5. Has fault current analysis been done to determine if grounding
apparatus is adequate? Yes No
6. Are circuits being worked as de-energized grounded at point of work?
..... Yes No
7. Are switches that provide clearance rendered inoperable where design
permits and tagged? Yes No
8. If conductors are opened, such as in working a double deadend, is
continuity maintained by use of an approved jumper? Yes No
9. Are conductors grounded on both sides of an open circuit that is being
worked? Yes No
10. Is there an approved standard grounding procedure? Yes No
11. Are de-energized circuits tested for the presence of voltage before
grounding? Yes No
12. Is grounding apparatus attached to ground both at electrode and at
system neutral? Yes No
13. Are capacitors grounded before work proceeds? Yes No
14. Are capacitors left out of service grounded? Yes No
15. Are crane and derrick trucks grounded when working within reach of
energized conductors? Yes No
16. Where grounds are installed, is the ground connection always made
first? Yes No
17. When grounds are installed, are hot sticks always used? Yes No
18. When installing grounds, is the following personal protective
equipment used:
Hotsticks? Yes No

- Hard hats? Yes No
- Approved glasses? Yes No
- Rubber gloves? Yes No
- Other (specify) _____
- 19. In the wire pulling process, are the machines grounded?..... Yes No
- 20. Are the stringing blocks grounded at the deadend structures?..... Yes No
- 21. Are grounds installed on structures adjacent to an energized crossover? Yes No
- 22. Are rolling grounds used on conductors being pulled in? Yes No
- 23. Are grounds installed at deadends before work proceeds? Yes No
- 24. Are grounds left at deadends until work is complete? Yes No
- 25. Are conductors being spliced at ground level grounded on both sides of the splice and continuity maintained?..... Yes No

TRAFFIC BARRICADING AND CHANNELIZATION

Traffic barricading and channelization includes work-area protection for electric utility industry employees and safety of the motoring public in the vicinity of utility construction and maintenance worksites.

Regulations for traffic barricading and channelization are governed by the Manual on Uniform Traffic Control Devices issued by the U.S. Department of Transportation's Federal Highway Commission. The general principles outlined in this Manual are applicable to both rural and urban areas.

The provisions for public protection established in the Manual are for application by all, including employees of public utility companies performing work on or so closely adjacent to highways or roadways as to create hazards for the public or themselves.

The single most important element within the system of traffic control in construction and maintenance areas is the taper that is provided for channelization. An inadequate taper will almost always produce undesirable traffic conditions and cause congestion, which may result in traffic accidents at your worksite.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Does the company conform to the regulations of the Manual on Uniform Traffic Control Devices for Streets and Highways? Yes No
2. Are the following departments in the organization familiar with and do they have access to copies of this Manual:
 - Safety Department? Yes No
 - Engineering Department? Yes No
 - Construction and Maintenance Department? Yes No
3. Do the size, shape, and color of barricades and signs conform to the regulations of the Manual? Yes No
4. Are your personnel familiar with the minimum desirable taper rate, which is expressed as length in feet per foot of offset, and is numerically equal to the 85-percentile speed? Yes No
 Example: If a lane of traffic is to be closed on a roadway with an existing 45 m.p.h. 85-percentile speed, the channelization to accomplish the transition should be placed on a 45:1 taper.
5. When a road or street must be temporarily closed for utility work, are the following notified:
 - Fire Department? Yes No
 - Police Department? Yes No
 - Traffic Engineer? Yes No
 - Other (specify) _____

6. Are your personnel aware that in most urban areas there are special requirements concerning permits and reporting of construction work adjacent to hospitals, nursing homes, and schools when the work may affect emergency vehicle travel?

Yes No

TRANSMISSION

This section is intended to evaluate your work and safety procedures in transmission line construction and maintenance. This section includes:

- material handling,
- overhead lines,
- de-energizing lines and equipment,
- tools and protective equipment, and
- grounding for protection of employees.

Since many accidents occur when using tools and equipment, special consideration should be given to the condition and use of these tools. Tools and equipment are often abused by being improperly stored and used for a job for which they are not designed. Therefore, to be effective, a tool and equipment program should include these major points:

- an inspection and maintenance procedure for the tools and equipment being used; and
- training users in the proper use, storage, and maintenance of each type of tool and equipment.

The most frequent type of accidents on transmission lines result from electrical contact and falls. They are usually serious. For a safety program to be effective, all supervisors and workers need to know and practice good safety work procedures.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

EXCERPT FROM SUBPART V. POWER TRANSMISSION AND DISTRIBUTION 29 CFR 1926.950 (GENERAL REQUIREMENTS)

- (c) *Clearances.* The provisions of subparagraph (1) or (2) of this paragraph shall be observed.
- (1) No employee shall be permitted to approach or take any conductive object, without an approved insulating handle, closer to exposed energized parts than shown in Table V-1, unless:
 - (i) The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part), or
 - (ii) The energized part is insulated or guarded from him and any other conductive object at a different potential, or
 - (iii) The employee is isolated, insulated, or guarded from any other conductive object(s), as during live-line bare-hand work.
- (2) (i) The minimum working distance and minimum clear hot stick distances stated in Table V-1 shall not

be violated. The minimum clear hot stick distance is that for the use of live-line tools held by linemen when performing live-line work.

- (ii) Conductor support tools, such as link sticks, strain carriers, and insulator cradles, may be used: *Provided*, that the clear insulation is at least as long as the insulator string or the minimum distance specified in Table V-1 for the operating voltage.

TABLE V-1
ALTERNATING CURRENT—MINIMUM DISTANCES

Voltage range (phase to phase) kilovolt	Minimum working and clear hot stick distance
2.1 to 15	2 ft. 0 in.
15.1 to 35	2 ft. 4 in.
35.1 to 46	2 ft. 6 in.
46.1 to 72.5	3 ft. 0 in.
72.6 to 121	3 ft. 4 in.
138 to 145	3 ft. 6 in.
161 to 169	3 ft. 8 in.
230 to 242	5 ft. 0 in.
345 to 362	*7 ft. 0 in.
500 to 552	*11 ft. 0 in.
700 to 765	*15 ft. 0 in.

*Note: For 345-362 KV., 500-552 KV., and 700-765 KV., the minimum working distance and the minimum clear hot stick distance may be reduced provided that such distances are not less than the shortest distance between the energized part and a grounded surface.

1. Are poles, ladders, scaffolds, or other elevated structures required to be inspected to determine if they are safe to climb? Yes No
2. Are tests required to be sure lines and equipment are de-energized? Yes No
3. Are proper clearances from exposed energized parts observed? Yes No
4. Are lines and equipment to be de-energized clearly identified and isolated from all sources of voltage? Yes No
5. Are tags placed on all disconnect points for each crew working on a de-energized line? Yes No
6. Are spotlights or portable lights provided so that night work can be performed safely? Yes No
7. Are insulating-type hydraulic fluids used in the insulated section of aerial lifts and hydraulic tools that are used on or around energized lines and equipment? Yes No
8. Are body belts and straps or lanyards required to be worn by employees working in elevated locations on poles, towers, or other structures? Yes No
9. Are personal tools inspected each day to determine that they are in safe working condition? Yes No
10. Are all ropes and measuring tapes used near energized parts of the nonconducting type? Yes No
11. Are all hydraulic tools that are utilized on or around energized lines or equipment used with nonconducting hoses? Yes No
12. Are all pneumatic tools that are utilized on or around energized lines or equipment used with nonconducting hoses? Yes No

13. Does each pneumatic tool that is utilized on or around energized lines or equipment have an accumulator on the compressor to collect moisture? Yes No
14. Are employees standing on the ground informed of the hazards involved, and is contact with equipment or machinery working adjacent to energized lines or equipment forbidden? Yes No
15. Is lifting equipment considered energized and effectively barricaded or grounded when used near energized equipment or lines? Yes No
16. Are unattended pole holes covered or guarded? Yes No
17. Are hot sticks carried in compartment or trailers constructed for that purpose? Yes No
18. When digging, are other utilities properly located to prevent dig-in? Yes No
19. If chain saws are used in the air to top a pole or for other work, are employees instructed in their proper use? Yes No
20. Are guys or tag lines used on towers during erection to reduce the possibility of tipping? Yes No
21. Are conductors grounded when there is a possibility of a conductor contacting an energized circuit or receiving a dangerous induced voltage buildup? Yes No
22. Are tension reels, guard structures, tie lines, or other means used to prevent accidental contact with energized circuits? Yes No
23. Are reliable communications provided between the reel tender and pulling rig operator? Yes No
24. Is each pull snubbed or dead-ended at both ends before subsequent pulls? Yes No
25. When stringing adjacent to energized lines, is all pulling and tensioning equipment isolated, insulated, or grounded? Yes No
26. Are employees guarded from any other conductive object at different potential while doing live-line work? Yes No
27. Is a clear hot stick distance enforced for linemen doing live-line work as stated in the OSHA Safety and Health Standards? Yes No
28. When practical, before working on any energized line or equipment, are the automatic reclosing features of a circuit interrupting device made inoperative? Yes No
29. Are hot sticks tested at regular intervals? Yes No
30. Are hot sticks visually inspected and wiped clean before each use? Yes No
31. Are hot sticks that are found to have defects taken out of service until repaired? Yes No
32. When hot stick surfaces become dull, are they cleaned; and if abraded, are they refinished? Yes No
33. Are hot sticks properly stored so as not to be exposed to prolonged exposure or weathering, scuffing, or scarring? Yes No
34. Are racks or tarpaulins provided for linemen's sticks used at the jobsite? Yes No
35. Are live-line maintenance tools used only for purpose for which they were designed? Yes No
36. Are hot stick crew members taught the correct use and limitations of hot line tools? Yes No

TRENCHING AND SHORING

This section will help you determine whether or not your standards for trenching and shoring are adequate to protect your employees and the public. The requirements are covered in federal and state regulations for trenches and excavations. Your safety program should include procedures of daily inspections around excavations to discover changing conditions due to rain, traffic, freezing and thawing, or blasting.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Before opening an excavation, does the company contact other utilities (gas, water, telephone, and sewer) or a joint utility locating department (if available) to determine whether such underground facilities shall be encountered? Yes No
2. Are trees, boulders, and any other surface encumbrances which may create hazards to employees removed before work is begun? Yes No
3. Are trenches and other excavations required to be adequately protected from danger of cave-in by suitable sloping, shoring, or bracing? Yes No
4. When employees are working in trenches 4 feet or more deep, is an adequate means of exit provided, such as a ladder or steps so located that no more than 25 feet of lateral travel is required? Yes No
5. When employees are required to work in trenches more than 5 feet deep, is shoring provided, or is the bank laid back to a stable slope, or are equivalent means of protection from cave-in provided? Yes No
6. Are trenches less than 5 feet deep effectively protected when examination indicates hazardous ground movement may occur? Yes No
7. When shoring or bracing is provided, is it adequate to meet the requirements of OSHA Standard 1926.652? Yes No
8. Are employees entering bell-bottom pier holes protected by installation of a casing for the full depth of the hole above the bell? Yes No
9. Do the workmen wear a shoulder harness attached to an individually manned lifeline while working in the bell hole? Yes No
10. When trench shoring is used, is it installed from the top, down; and removed from the bottom, up? Yes No
11. When working in trenches or excavations, are the spoil, excavated material, tools, and equipment effectively stored and maintained at least 2 feet from the edge of the excavation or trench? Yes No
12. Are employees working in excavation or trenches prohibited from working closer than 6 feet from a digging machine in operation? .. Yes No
13. Is operation of digging machines, buckets, or conveyors stopped for mechanical adjustments or removal of obstructions? Yes No

14. Does a competent person daily inspect trenches and excavations for indications of earth weakening, movement of bracing or shoring, or cave-in indications? Yes No
15. Does the person making the inspection have the authority to cease operations until corrections have been made? Yes No

UNDERGROUND DISTRIBUTION SYSTEM: MANHOLES AND VAULTS

A network system consists of a number of high voltage circuits, each of which feeds a number of banks of distribution transformers. The transformers, in turn, feed into an interconnected low voltage secondary network. A protector is used in the system, i.e., a low voltage circuit breaker that protects the network system against high voltage cable faults or transformer faults. Because network systems are used only where a large amount of electric power is to be distributed, a very high quantity of power could feed into a short circuit or fault at any point where a network protector is installed. Any short circuit at such a point is very dangerous and extreme care should be exercised when installing or working on an energized protector. At periodic intervals, the protector must be disconnected and rolled out for testing and inspection. Maintenance procedures such as relay changes and cleaning of the contacts are necessary. Askarel (Pyranol, Inerteen, etc.) and oil samples are taken from transformers at regular intervals and tested for dielectric strength. Switching, grounding, and splicing are also done on a network system.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Does the company have available a gas mask or respirator (maintained on a regular schedule and approved by the U.S. Bureau of Mines or NIOSH certified) to be used when handling hot Askarel in confined spaces? Yes No
2. Is all scrap Askarel, including solvents contaminated with Askarel, collected and shipped back to the manufacturer or other approved agent for proper disposal? Yes No
3. When work is performed in a manhole, is an employee required to be stationed outside the manhole to render emergency assistance? Yes No
4. Do workmen erect barricades or guards before removing manhole covers or making excavations in places accessible to vehicular or pedestrian traffic? Yes No
5. Before cutting a power cable or opening a splice, is the splicer required to take the following steps to ensure that the circuit is actually de-energized:
 - Check maps or drawings? Yes No
 - Check for load with ammeter? Yes No
 - Check cable tags? Yes No
 - Use statiscopes or other approved testing devices? Yes No
 - Use a cable spear? Yes No
6. Are employees required to wear rubber gloves when testing with a high-voltage megger? Yes No
7. Are fire-resistant blankets provided for cable splicers to protect cables below the splice area? Yes No

8. Do cable splicers use drip pans to catch molten lead when wiping lead joints? Yes No
9. Is eye protection required when working with molten lead or hot compounds? Yes No
10. Do employees ventilate confined spaces when work is done in the presence of toxic fumes or toxic solvents? Yes No
11. Are power cables installed in such a manner as to avoid damage by objects falling or being pushed through the grating of the vault or manhole? Yes No
12. Are all power cables required to be permanently identified by tags at each manhole or access opening of the conduit system? Yes No
13. Are cable sheaths or cable shields effectively grounded during splicing operations? Yes No
14. Are manhole covers suitably designed or restrained so they cannot fall into manholes? Yes No
15. Are workmen required to wear fire-retardant clothing, safety face shields, and hoods when disconnecting and rolling out a protector from its housing? Yes No
16. Are employees required to wear safety harnesses and attached life-lines when disconnecting a protector for roll-out from its housing? Yes No
17. When disconnecting a protector for roll-out, do employees use:
 - Rubber gloves? Yes No
 - Insulated tools? Yes No
 - Eye protection? Yes No
 - Network terminal? Yes No
18. Is it required that the protector be "rolled-out" and disconnected from the buss and transformer before work is performed on the protector? Yes No
19. Is it required that the protector be tested from a full-operation-voltage, remote-low-energy source before rolling in and connecting to transformer and network buss? Yes No
20. Do employees make a final inspection for tools and materials before closing and securing protector door? Yes No
21. Are workers prohibited from throwing tools and materials in and out of manholes? Yes No
22. Is the shoring of ditches and other excavations required when the depth exceeds 5 feet in solid earth and 3 feet in sand? Yes No
23. Are employees cautioned on the dangers of rodding or fishing ducts when the possibility exists that the fish tape or rod may contact exposed energized electrical equipment? Yes No
24. Is it required that the exposed grounded equipment in the vicinity of the work area be covered with suitable barriers or insulation when working on energized low voltage network cables? Yes No
25. Is the moving of cable that is operating at high voltage (600 kV and above) prohibited? Yes No
26. Is the placing of gas cylinders such as butane or propane in manholes or vaults prohibited? Yes No
27. Are all heating pots for solder, oil, or compounds required to be safely positioned, so their contents cannot enter the vault or manhole in the event of spillage? Yes No

28. Is the lifting of compressed gas cylinders of the valves or caps prohibited? Yes No
29. Are workmen reminded that although nitrogen is not explosive or toxic, a person will suffocate in an atmosphere of nitrogen due to lack of oxygen? Yes No
30. Are employees working with asbestos required to wear either a NIOSH certified or U.S. Bureau of Mines approved respirator? Yes No
31. Are cable splicers required to remove asbestos fire-proofing from power cables in a wet state? Yes No
32. Are asbestos-free fireproofing materials used? Yes No
33. Is the grounding of underground power cables on both sides of the splicing operations required before work is permitted on the network system? Yes No
34. Does the network operation call for the manual opening, tagging, and and locking of the protector switch handle when de-energizing and grounding network feeders for splicing operations? Yes No
35. Before entry into a manhole or unvented vault, is the following performed:
- Forced ventilation? Yes No
- Atmosphere tested for combustible gas? Yes No
- Atmosphere tested for oxygen deficiency? Yes No
36. Is inspection made before and during entry into a manhole or un-vented vault for unsafe conditions including cracks or other defects in roof, floor, walls, ducts, and sump pumps, and for evidence of sheath cracks and leaks in cable joints? Yes No
37. Are approved tools provided and required for removing manhole covers? Yes No
38. Are approved ladders provided and required for entering and leaving manholes and vaults? Yes No
39. When the work involves open flames, is continuous forced ventilation provided? Yes No
40. Have personnel been instructed that, in the event that a vehicle accidentally runs into a manhole opening while work is being performed, all open flames should be immediately extinguished and the engine of the vehicle turned off? Yes No
41. Is there an emergency plan for extraction of an injured employee from a manhole or vault? Yes No

UNDERGROUND RESIDENTIAL DISTRIBUTION

To develop and administer an effective safety program in underground residential distribution construction and maintenance, the following topics should be carefully considered:

- work area protection for employee and public protection,
- minimum clearance distances when working around energized equipment,
- adequate grounding and locking procedures (temporary and permanent),
- trenching and shoring rules and procedures, and
- personal protective equipment

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Is physical handling of URD cables energized above 600 volts prohibited? Yes No
2. Are grounding points incorporated into system? Yes No
3. Are all cuts and splices made with the cable grounded at both ends? Yes No
4. Is metallic sheath continuity maintained when making splices? ... Yes No
5. Are all conductive, noncurrent-carrying materials permanently grounded? Yes No
6. When working on loop feeds, is the switch cable grounded on both sides of the work? Yes No
7. When work is performed on energized secondary connections, are all terminals not being worked covered? Yes No
8. During switching procedures, does the tagging procedure include the use of HOLD cards when sectionalizing URD systems? Yes No
9. Are cables tested with an approved tester before grounds are installed? Yes No
10. Do you have URD cable contained in manholes or vaults? Yes No

VEHICLES AND CRANES

Employees should never be allowed to drive and operate specialized power equipment unless properly trained and authorized to do so.

Drivers and operators must learn to acquaint themselves with the overall height and width of the equipment when loaded as well as unloaded. They should be constantly alert to avoid striking overhead projections (underpasses, bridges, etc.).

It is the responsibility of all vehicle operators to know and obey all local, state, and federal regulations and know and practice defensive driving.

Questions 1 through 21 deal primarily with the operation of digger derricks and mobile cranes. Questions 22 through 27 deal with other specialized power vehicles such as dump trucks, front-end loaders, backhoes, and bulldozers. Questions 28 through 48 deal with other vehicles.

The questions are intended to evaluate the effectiveness of your vehicle safety program. They concern motorized equipment that is used on the road, such as trucks, passenger cars, buses, motorcycles, and off-the-road equipment, such as bulldozers and road graders.

Since most motor vehicle accidents are due either to unsafe driving practices or to poor equipment maintenance, an effective vehicle safety program should include the following areas of concern:

- systematic inspection and formalized preventive maintenance of each vehicle,
- formal training and selection of operators and maintenance personnel, and
- thorough investigation of each vehicle accident.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are only designated personnel permitted to operate a derrick digger or crane? Yes No
2. Is it required that only one person give the operator signals at one time? Yes No
3. Are daily inspections of the equipment performed on:
 - Vehicle brakes? Yes No
 - Oil and grease levels? Yes No
 - Wire or fiber ropes? Yes No
 - Hydraulic levels where applicable? Yes No
 - Safety guards and devices? Yes No
4. Are readily available, written, dated, and signed inspection reports (logs) made monthly on brakes, crane hooks, and ropes? Yes No
5. Is load determined and care taken not to load cranes beyond the rated load? Yes No
6. Is a load rating chart and degree of elevation indicator clearly visible? Yes No

7. Are written rated-load tests available showing adequacy of repairs and alterations? Yes No
8. If the crane is re-rated, is the test report available? Yes No
9. Are crane operators prohibited from dragging loads sideways? Yes No
10. During hoisting, is care taken to avoid sudden acceleration and deceleration and not to contact any obstruction? Yes No
11. Are employees kept off the load or hook while crane is operating? . Yes No
12. Is hoist rope prohibited from being wrapped around the load when lifting (except when the load is a pole)? Yes No
13. Are the following precautions taken in transit:
 - 13a. Boom carried in line with the direction of motion? Yes No
 - 13b. Superstructure secured against rotation? Yes No
 - 13c. Empty hook restrained so that it cannot swing freely? Yes No
14. When rotating, are sudden starts and stops avoided and speed reduced to avoid overswinging the load? Yes No
15. When two or more cranes are lifting one load, is a person designated to supervise the operation? Yes No
16. Are at least two full wraps of rope always remaining on the drum when lifting a load? Yes No
17. When working on a grade, are at least two wheels chocked on the down grade side? Yes No
18. Is wire rope removed from service when any of the following conditions exist:
 - 18a. The rope strength has been significantly reduced due to corrosion, pitting, or heat? Yes No
 - 18b. The thickness of the outer wires has been reduced to two-thirds of the original thickness? Yes No
 - 18c. Permanent damage is apparent from excessive kinking, crushing, or severe twisting? Yes No
19. Is the use of outriggers as grounds prohibited? Yes No
20. When working near energized conductors, are barricades used to isolate the equipment from traffic or unauthorized personnel in the area? Yes No
21. Are outriggers used when required by the manufacturer? Yes No
22. Are wood blocks of sufficient size to prevent shifting used to support outriggers? Yes No
23. Are tool boxes stored so as not to interfere with access or operation? Yes No
24. Are bulldozer and scraper blades, end-loaders, and dump-body vehicles required to be fully lowered or blocked when not in use? .. Yes No
25. Are all dump-body vehicles equipped with a positive means of support that is permanently attached and capable of being locked in position to prevent accidental lowering of body during maintenance and inspection? Yes No
26. Do all job site vehicles having an obstructed view to the rear have reverse signal alarms audible above the surrounding noise levels,

- or else is an observer always present to signal the driver when it is safe to back? Yes No
27. Do dump trucks that are loaded by front-end loaders or cranes have a cab shield adequate to protect the operator from shifting or falling materials? Yes No
28. Is it required that a safety check be made of all job site vehicles at the beginning of each shift to ensure that all safety equipment and accessories are in safe operating condition? Yes No
29. Are new drivers carefully selected on the basis of driving record and physical and mental health? Yes No
30. Are new drivers properly trained for the particular equipment they will operate? Yes No
31. Is the proficiency of all drivers periodically reviewed? Yes No
32. Are all accidents reported to the supervisor whether or not property damage or injuries have occurred? Yes No
33. Are written records kept of all accidents? Yes No
34. Are all accidents investigated and actions instituted to prevent a recurrence? Yes No
35. Are accident repeaters retrained or removed from their job? Yes No
36. Are drivers prohibited from drinking while driving? Yes No
37. Are employees driving or riding in vehicles required to use safety belts all the time? Yes No
38. Are the following required of drivers:
- Inspect vehicle daily? Yes No
- Report immediately items needing repair? Yes No
- Verify load is secured? Yes No
- Check to see that all doors are locked? Yes No
- Other (specify) _____
39. Are persons who drive emergency vehicles directed to adhere to all traffic rules during routine operations when no life is in jeopardy? (See local regulations.) Yes No
40. Are plant roads well-marked, with signs posted to keep traffic flowing safely at a reasonable speed? Yes No
41. Do signs conform to the Manual on Uniform Traffic Control Devices for Streets and Highways, ANSI D6.1? Yes No
42. Are warning signs, barricades, and lights maintained in repair and construction areas, and promptly provided as dangerous conditions occur? Yes No
43. Is there a regularly scheduled preventive maintenance program for each vehicle? (If no, go to question 46.) Yes No
44. Are written records kept of maintenance performed? Yes No
45. Are all malfunctions corrected before the vehicle is returned to service? Yes No
46. Are coal-moving vehicles equipped with closed cabs? Yes No
47. If locomotives are used: (If they are not, go to question 48.)
- 47a. Are all locomotive operators trained in their use? Yes No
- 47b. Are employees prohibited from riding locomotive footboards? Yes No

48. If mobile cranes are used: (If they are not, this section is completed.)
- 48a. Are mobile cranes equipped with fire extinguishers? Yes No
- 48b. Are rated-load capacities and hazard warnings posted in view of the operator? Yes No
- 48c. Is the equipment inspected by a competent person before each use? Yes No
- 48d. Are mobile cranes inspected annually by a competent person? Yes No
- 48e. Are records kept of annual inspections? Yes No

WALKING AND WORKING SURFACES

OSHA STANDARDS 29 CFR 1910.22-30

All places of employment, passageways, storerooms, and service rooms must be kept clean and orderly and, as far as possible, in a dry condition. Where mechanical handling equipment is used, safe clearances must be allowed for aisles, at loading docks, through doorways, and wherever turns or passage must be made. Aisles and passageways must be kept clear and appropriately marked. Covers or guardrails must be provided to protect personnel from the hazards of open pits, tanks, floor or wall openings, elevated platforms, etc.

Scaffolds and manually propelled mobile ladder stands are elevated work platforms that support people and materials. The questions in this section of the Self-Evaluation Instrument are meant to evaluate the design, construction, use, and maintenance of different types of scaffolds that you may be using at your establishment.

The different types of scaffolds include:

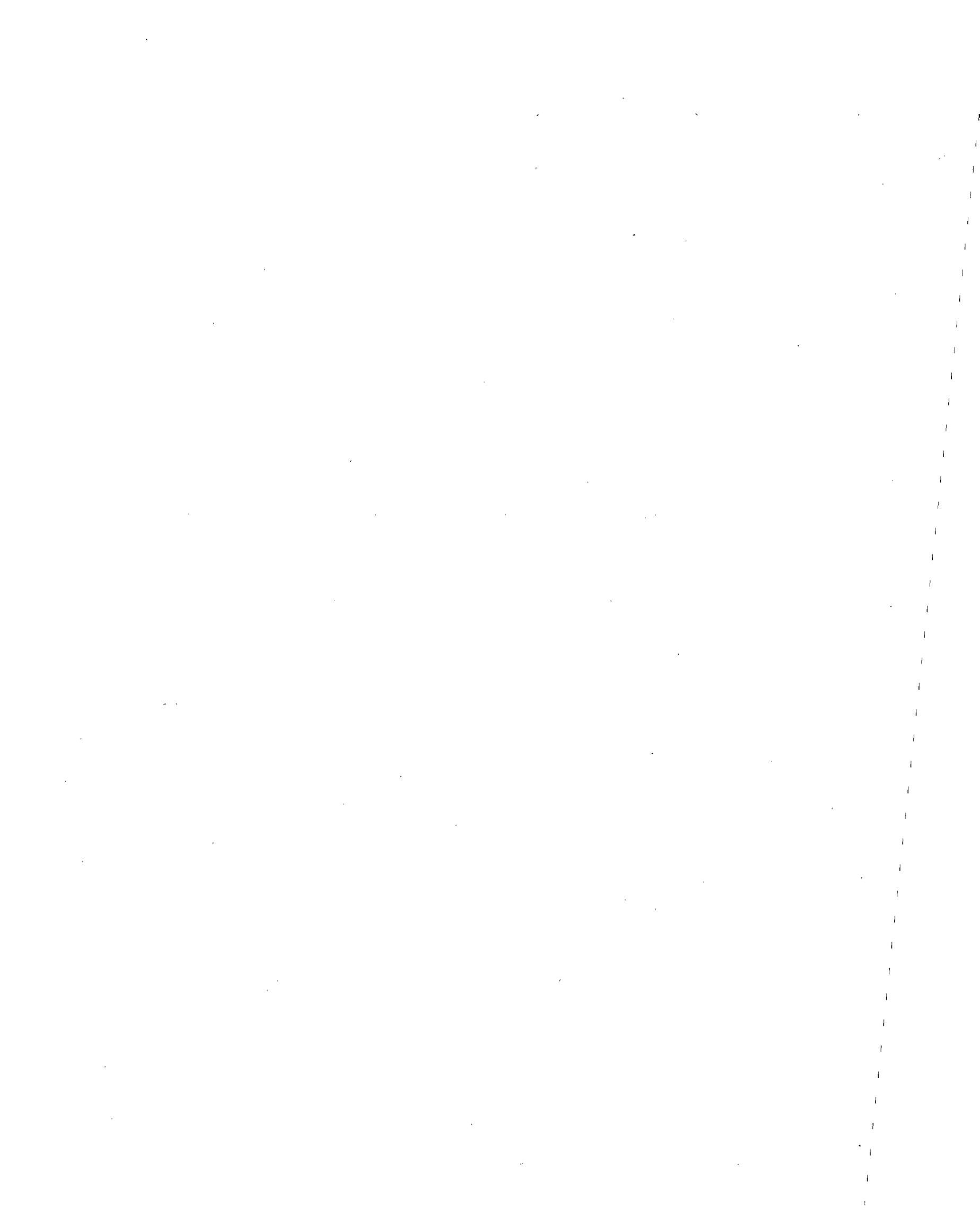
- Fixed scaffolds*, such as those of tubular steel, are usually of a temporary nature and are generally dismantled when they are no longer needed.
- Suspended scaffolds*, often called swinging scaffolds, are light-duty, temporary units, suspended from overhead supports, and raised and lowered to the desired level by tackle or hoisting machines. These should not be confused with powered platforms, used for exterior building maintenance, which are permanent installations. These are covered in another section of this Self-Evaluation Instrument.
- Mobile scaffold towers and ladder stands* are equipped with wheels or casters and may be kept assembled and moved to new locations as necessary.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are all walkways provided with sufficient lighting to clearly distinguish the walking surfaces? Yes No
2. Are aisles clearly defined and marked? Yes No
3. Are all walkways and aisles free of protrusion, loose material, rock or any material that could cause a bumping, tripping, or falling hazard? Yes No
4. Is workspace other than aisle space provided for all machine operators? Yes No
5. Are all holes and openings provided with guardrails, or fitted with a flush cover of sufficient strength for the anticipated load? Yes No
6. Are signs showing floor load capacity present? Yes No
7. Are standard guardrails provided around all open pits? Yes No
8. Are all platforms provided with toeboards and guardrails as required? Yes No
9. If a wax is applied to floors, is it nonslip wax? Yes No

10. Are walkways that are subject to water or other liquids provided with nonslip surfaces? Yes No
11. Are mats provided inside entrance doors so people can wipe snow and ice from their shoes before walking onto a floor that is slippery when wet (e.g., terrazzo or varnished concrete)? Yes No
12. Are snow and ice removed from walkways and/or exitways? Yes No
13. Are there standard stair rails or handrails on all stairways having four or more risers? Yes No
14. Are all stairs at least 22 inches wide? Yes No
15. Is all stair construction uniform? Yes No
16. Are all stairs well illuminated to prevent falling? Yes No
17. Are all treads made of nonslip material? Yes No
18. Do stairs have at least a 7-foot overhead clearance? Yes No
19. Do stairs angle no more than 50° and no less than 30°? Yes No
20. If there are elevators at this establishment: (If not, go to question 21.)
 - 20a. Are all elevators inspected regularly? Yes No
 - 20b. Does this establishment have a current elevator inspection certificate for each elevator? Yes No
 - 20c. Are all elevators in good working condition? Yes No
21. Is only one person at a time permitted on ladders designed for one-man operations? Yes No
22. Are the joints between ladder side rails and steps tight? Yes No
23. Are ladders free from improvised repairs and from modifications to make them longer? Yes No
24. Are ladders sturdy and strong enough for their intended use? Yes No
25. If no cage, well, or ladder safety device is provided on a fixed ladder, is there a landing platform for each 20 feet or fraction thereof? Yes No
26. Are rung spacings uniform for fixed ladders? Yes No
27. Are clearances adequate for fixed ladders? Yes No
28. Do fixed ladders have at least 3 feet of extension at the top of the landing? Yes No
29. Is the distance between the centerline of rungs on a fixed ladder and the nearest permanent object in back of the ladder at least 7 inches or more? Yes No
30. Do all fixed ladders have a preferred pitch of 75°-90°? Yes No
31. If a portable ladder cannot be placed so as to prevent slipping, is it lashed or held in position by some other means? Yes No
32. Are portable ladders free of cracks, splinter, burrs, and bent rungs or frames? Yes No
33. On two-section ladders, is height adjustment made only when user is at the bottom of the ladder? Yes No
34. Is it prohibited to use the top of an ordinary step ladder as a step? Yes No
35. Are guardrails and toeboards installed on all sides of scaffolds that are to be used at a height of 10 feet or more? Yes No
36. Are guardrails 36 to 42 inches high? Yes No
37. Are toeboards a minimum 4 inches high? Yes No

38. Whenever there is danger of material falling off the scaffold onto persons below, is a wire mesh enclosure or equivalent provided between the guardrail and the toeboard? Yes No
39. Are scaffolds erected on solid ground and fastened or anchored to prevent accidental movement? Yes No
40. Are walking surfaces of nonskid materials? Yes No
41. Are walking surfaces kept clear of snow and ice? Yes No
42. Are employees prohibited from altering or horizontally moving scaffolds? Yes No
43. Has a licensed structural engineer approved in writing any scaffold over 50 feet high? Yes No
44. Are scaffold planks cleated to prevent lateral movement? Yes No
45. Do scaffold planks extend no more than 12 inches, nor less than 6 inches, from the end supports? Yes No



WATER TREATMENT CHEMICALS

The chemicals used in water treatment processes at power plants can have toxic effects on employees and can cause irritation to the skin, eyes, throat, and even lungs when high concentrations are present. The degree of danger to the employee depends upon the specific chemical, its concentration, and its exposure.

It is important to be aware of the properties of all the different chemicals used in a power plant so that proper safeguards can be established. Potential health hazards can also arise from chemical mist or dust. Exposure can be by skin contact, ingestion, or inhalation. The questions in this Self-Evaluation Instrument are designed to identify potential health and safety hazards to employees resulting from exposure to water treatment chemicals and to evaluate your establishment's program to protect employees from these hazards. An effective program includes:

- regular monitoring of chemicals in the work environment;
- engineering and administrative controls to protect employees from excessive exposure;
- the use of personal protective equipment by employees where controls have not sufficiently reduced the exposure;
- precautions for the storage and handling of chemicals; and
- periodic medical evaluation to assess the effect of exposure on individual employees.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are emergency showers and eye-wash fountains (with sufficient water to provide 15 minutes of continuous irrigation) provided in all areas where acids and caustics are present, including battery locations? Yes No
2. Are all large containers of acids and caustics diked or curbed to contain spills or leaks? Yes No
3. Are acid and caustic tanks labeled as to type and concentration? .. Yes No
4. Are acid and caustic filling pipes prominently labeled? Yes No
5. Have any air concentrations of acids or caustics been measured at this establishment? Yes No
6. Is protective clothing or equipment or both (body suit, boots, gloves, face shield, acid goggles, respirator, hard hat, apron) readily available at acid and caustic locations? Yes No
7. Are employees required to use protective equipment when working with or around acids and caustics? Yes No
8. Are employees who work with or are exposed to acids and caustics forbidden to wear contact lenses? Yes No
9. Is acid protective equipment readily available at all battery locations? Yes No

10. Before starting to unload a tank car or truck, is the storage tank gauged to determine if there is adequate space to contain the material being added without overflowing? Yes No
11. Are all chemical spills promptly cleaned up using approved methods? Yes No
12. Is flushing with an ample amount of water the only method used for cleaning chemical spills? Yes No
13. Are some employees trained in emergency and rescue work in the event of major chemical spills or leaks? Yes No
14. Are all storage areas posted with appropriate warning signs? Yes No
15. Are areas where acid cleaning is to be done barricaded, and are smoking and open flames prohibited? Yes No
16. Are employees trained to understand the hazards associated with water treatment chemicals and proper procedures for working with them? Yes No
17. Are any ventilation measures used in areas where water treatment chemicals are being handled? Yes No
18. Are the same precautionary measures used when working with hydrazine and morpholine as with other water treatment chemicals? Yes No
19. Are two units of approved self-contained breathing apparatus readily available at ammonia and chlorine locations? Yes No
20. If dry chlorine is used, is it stored in an area where it will not be mixed or contaminated with anything but water? Yes No

WELDING, CUTTING, AND BRAZING

OSHA STANDARDS 29 CFR 1910.251-252

The use of welding, cutting, and brazing equipment, especially by occasional users, poses potentially hazardous problems. All persons authorized to use such equipment must be trained in the proper safeguards. Observers, if allowed, must be as well protected as the operator.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

INSTALLATION AND OPERATION OF OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING

1. Are precautions taken to prevent the mixture of air or oxygen with flammable gases except at the burner or in a standard torch? Yes No
2. Are precautions taken to prevent acetylene from being generated, piped (except in approved cylinder manifolds), or utilized at a pressure in excess of 15 p.s.i. gauge pressure or 30 p.s.i. absolute pressure? Yes No
3. Is the use of liquid acetylene prohibited? Yes No
4. Are flashback arrestors used? Yes No
5. Are only approved apparatus (torches, regulators, pressure-reducing valves, acetylene generators, manifolds) used? Yes No
6. Are cylinders constructed, maintained, and marked in accordance with the requirements of this standard (29 CFR 1910.251-252)? Yes No
7. Are cylinders kept away from radiators and other sources of heat? Yes No
8. When inside buildings, are cylinders stored in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials? Yes No
9. Are cylinders kept away from elevators, stairs, or gangways? Yes No
10. Do empty cylinders have their valves closed? Yes No
11. Are signs reading: DANGER—NO SMOKING, MATCHES, OR OPEN LIGHTS, or the equivalent posted? Yes No
12. Are acetylene cylinders stored valve-end up? Yes No
13. Are oxygen cylinders stored at a distance from highly combustible materials, reserve stocks of other cylinders, or any other substance likely to cause or accelerate fire? Yes No
14. Are cylinders, cylinder valves, couplings, regulators, hoses, and apparatus kept free from oily or greasy substances? Yes No
15. Is care taken so that a jet of oxygen can never strike an oily surface, or greasy clothes, or enter a fuel oil or other storage tank? Yes No
16. When transporting cylinders by crane or derrick, is a cradle, boat, or suitable platform used? Yes No

17. Is care taken not to drop or strike cylinders? Yes No
18. Is it prohibited to lift or pry up cylinders by valve-protection caps? . Yes No
19. Unless secured on special trucks, are regulators removed and valve-protection caps put in place before moving cylinders? Yes No
20. Do cylinders without fixed hand wheels have keys, handles, or nonadjustable wrenches on stem valves when in service? Yes No
21. Is care taken to avoid cylinders becoming part of an electrical circuit? Yes No
22. Is it prohibited to use cylinders as rollers or supports? Yes No
23. Is it prohibited to tamper with numbers and markings stamped on cylinders? Yes No
24. Is it prohibited to tamper with safety devices and valves? Yes No
25. Are cylinders handled carefully to avoid dropping? Yes No
26. Is it prohibited to use hammers or wrenches to open cylinder valves? Yes No
27. If trouble is experienced with a cylinder valve, is the supplier notified and are his instructions followed? Yes No
29. Are fuel-gas cylinders placed with valve-end up when in use? Yes No
30. Are liquefied gases stored and shipped valve-end up? Yes No
31. Is rough handling of fuel-gas cylinders avoided? Yes No
32. Is care taken never to crack a fuel-gas cylinder valve near sources of ignition? Yes No
33. Before a regulator is removed, is the valve closed and gas released from the regulator? Yes No
34. Are cylinders with leaky valves or fittings removed from sources of ignition and slowly emptied? Yes No
35. Is a warning notice posted near cylinders with leaky valves or fittings before the supplier is notified? Yes No
36. Is it prohibited to use fuel-gas from cylinders without reducing pressure via a regulator? Yes No
37. Is the cylinder valve always opened slowly? Yes No
38. Is it prohibited to open the acetylene cylinder valve more than 1½ turns of the spindle? Yes No
39. If a special wrench is required, is it left in position? Yes No
40. Are the manifolds approved? Yes No
41. Are fuel-gas cylinders connected to one manifold inside a building limited to 300 pounds of liquefied petroleum gas or 3000 cubic feet of other fuel-gas? Yes No
42. If more than one manifold is in the same room, are they at least 50 feet apart or separated by a barrier? Yes No
43. Is installation of service piping systems in compliance with this standard (29 CFR 1910.251-252)? Yes No
44. Are underground pipe and tubing and outdoor ferrous pipe and tubing covered or painted with a material suitable for protection against corrosion? Yes No
45. Are aboveground piping systems marked in accordance with ANSI A13.1-1956, "Scheme for the Identification of Piping Systems"? Yes No
46. Are station outlets marked to indicate the name of the gas? Yes No
47. Are piping systems tested and proved gas tight at 1½ times maximum operating pressure? Yes No

48. Are piping systems thoroughly purged of air before being placed in service? Yes No
49. When lines are being purged of gas or air, are sources of ignition removed from uncapped openings? Yes No
50. Is only approved equipment installed, and is it used as recommended by the manufacturer? Yes No
51. Are service piping systems protected by pressure relief devices? Yes No
52. With respect to hose and hose connections:
- 52a. Does hose for oxy-fuel gas service comply with the Compressed Gas Association and Rubber Manufacturer's Association "Specification for Rubber Welding Hose, 1958"? Yes No
- 52b. Is red used to identify the acetylene (and other fuel-gas) hose, green for oxygen hose, and black for inert gas and air hose? .. Yes No
- 52c. When parallel lengths of hose are joined together, are no more than 4 inches out of every foot of hose covered by tape? Yes No
- 52d. Do hose connections comply with the Compressed Gas Association "Standard Hose Connection Specifications, 1957"? Yes No
- 52e. Will hose connections withstand twice normal pressure, and no less than 300 p.s.i.? Yes No
- 52f. Are hoses showing leaks, burns, worn places, or other defects repaired or replaced? Yes No
53. With respect to pressure-reducing regulators:
- 53a. Are pressure-reducing regulators used only for the gas and pressures for which they are intended? Yes No
- 53b. Do connections comply with the Compressed Gas Association "Regulator Connection Standards, 1958"? Yes No
- 53c. Is repair work performed by skilled, properly instructed mechanics? Yes No
- 53d. Are gauges on oxygen regulators marked USE NO OIL? Yes No
- 53e. Are union nuts and connections on regulators inspected before use and damaged parts destroyed? Yes No

APPLICATION, INSTALLATION, AND OPERATION OF ARC WELDING AND CUTTING EQUIPMENT

1. Does the apparatus comply with "Requirements for Electrical Arc-Welding Apparatus," NEMA EW-1-1962, National Electrical Manufacturers Association, or with "Safety Standard for Transformer-Type Arc-Welding Machines," ANSI C33.2-1956, Underwriters' Laboratories? Yes No
2. Is open circuit (No Load) voltage of arc welding and cutting machines as low as possible and not in excess of the limits specified in 29 CFR 1910.252(b)(2)(iii)(a-b) Yes No
3. Where higher voltages are required, are precautions taken to protect the operator? Yes No
4. Under wet conditions, are automatic controls for reducing no load voltage used? Yes No
5. Is the installation of arc welding equipment in compliance with this standard (29 CFR 1910.251-252)? Yes No
6. Are workers assigned to operate or maintain arc welding equipment familiar with OSHA requirements? If doing gas-shielded arc welding,

- with "Recommended Safe Practices for Gas-Shielded Arc Welding," A6.1-1966, American Welding Society? Yes No
7. Are all connections checked before starting? Yes No
 8. Is welding cable spread out before use? Yes No
 9. Is grounding of the machine frame and safety ground connections of portable machines checked? Yes No
 10. Is equipment checked to make sure there are no leaks of cooling water, shielding gas, or engine fuel? Yes No
 11. Is proper switching equipment for shutting down the machine provided? Yes No
 12. Are manufacturer's printed rules and instructions strictly followed? Yes No
 13. Are electrodes removed from the holders when not in use? Yes No
 14. Is care taken that unused electrode holders cannot make electrical contact? Yes No
 15. Is the electric power to the machine shut off when no one is in attendance? Yes No
 16. Are portable or fixed shields or both used to protect others from injurious rays? Yes No
 17. Is it prohibited to use cables with splices within 10 feet of the holder? Yes No
 18. Is the welder forbidden to coil or loop welding electrode cable around his body? Yes No
 19. Is it prohibited to use defective equipment until repairs have been made and safety ensured? Yes No
 20. Are wet machines thoroughly dried and tested before being used? .. Yes No
 21. Are work and electrode lead cables frequently inspected for wear and damage, and replaced when needed? Yes No
 22. Do means for connecting cable lengths have adequate insulation? .. Yes No
 23. Is adequate operator training required? Yes No
 24. Is adequate supervision provided? Yes No

FIRE PREVENTION—FIRE PROTECTION

1. If the object to be welded or cut cannot be moved, are movable fire hazards in the vicinity removed? Yes No
2. If the object to be welded cannot be moved and fire hazards cannot be removed, are guards used to confine heat, sparks, and slag? Yes No
3. Are precautions taken to prevent sparks from dropping through floor openings onto combustible materials below? Yes No
4. Is suitable fire extinguishing equipment available for instant use? .. Yes No
5. Are fire watchers utilized when welding or cutting is performed in locations where a serious fire might develop? Yes No
6. Are fire watchers instructed in their duties, as specified in this standard (29 CFR 1910.251-252)? Yes No
7. Are floors in work areas swept clear for a radius of 35 feet? Yes No
8. Are combustible floors kept wet, covered by damp sand, or protected by fire-resistant shields? Yes No
9. If floors are wet down, are personnel protected from shock? Yes No
10. Is cutting or welding prohibited in the following situations:
 - 10a. In areas not authorized by management? Yes No

- 10b. In sprinkler-equipped buildings while such protection is impaired? Yes No
- 10c. In the presence of explosive atmospheres?..... Yes No
- 10d. Near readily ignitable materials? Yes No
11. Are ducts and conveyor systems that might carry sparks protected or shut down?..... Yes No
12. Are nearby combustible walls protected by fire-resistant shields or guards? Yes No
13. When welding is done on metal walls, are precautions taken to protect combustibles on the other side? Yes No
14. Is welding prohibited on metal partitions, walls, ceilings, or roofs having combustible coverings, or on walls or partitions of combustible sandwich-type panel construction? Yes No
15. Is cutting or welding prohibited on pipes or metal in contact with combustible walls, partitions, ceilings, or roofs? Yes No
16. Has management:
- 16a. Established areas for cutting and welding, and procedures for cutting and welding in other areas?..... Yes No
- 16b. Designated a responsible individual for authorizing cutting and welding in areas not specifically designated for these operations? Yes No
- 16c. Ensured that cutters and welders and their supervisors are suitably trained in safe operations? Yes No
- 16d. Advised all contractors about flammable materials or hazardous conditions of which they may not be aware? Yes No
17. Before hot work is begun, are used drums, barrels, tanks, and other containers so thoroughly cleaned that no substances remain that could explode, ignite, or produce toxic vapors?..... Yes No
18. Are hollow spaces vented before cutting or welding?..... Yes No
19. Is a fire check made of the area ½ hour after completion of welding? Yes No
20. When work is suspended for any appreciable period of time, are electrodes removed from holders, torch valves closed, and fuel-gas and oxygen supply shut off at a point outside the confined area? ... Yes No
21. Are torch valves closed and is the gas supply shut off when welding is suspended for any appreciable period of time, such as lunch or overnight? Yes No
22. After welding operations are completed, is the hot metal marked to provide a warning to other workers? Yes No

HEALTH PROTECTION AND VENTILATION

1. Are welders and helpers working on platforms, scaffolds, or runways protected against falling?..... Yes No
2. Is welding cable so placed that it is clear of passageways, ladders, and stairways? Yes No
3. Does eye protection (helmets, hand shields, goggles) meet the requirements of this standard (29 CFR 1910.251-252)? Yes No
4. Are employees exposed to the hazards created by welding, cutting, or brazing operations protected with personal protective equipment and clothing, as required by 29 CFR 1910.132 and 29 CFR 1910.251-252? Yes No
5. Is adequate ventilation provided in and where welding or cutting is performed? Yes No

6. When working in confined places:

- 6a. Are environmental monitoring tests taken? Yes No
- 6b. Are cylinders and welding machines left on the outside? Yes No
- 6c. Is portable equipment on wheels securely blocked? Yes No
- 6d. Are means provided for quick removal of welders in case of an emergency? Yes No
- 6e. Is an attendant with a preplanned rescue procedure stationed outside? Yes No

WORKING IN ELECTRIC SUBSTATIONS

The congestion of energized high voltage equipment and the nearness of high voltage equipment to earth requires that extraordinary caution be exercised when entering and working in substations.

Construction and maintenance work in energized substations should not be started until authorization is obtained from the designated authorized person.

When working in de-energized areas, proper working signs, barricades, and barriers should be installed to prevent contact with energized equipment in bordering danger zones.

The movement of all mechanized equipment should, at all times, be controlled by designated, qualified employees and should be effectively grounded.

Employees working in substations should never be allowed to carry ladders, tools, or materials on their shoulders.

When construction and maintenance is done in energized substations, close control of all workmen should be maintained by assigning a supervisor or a watchman assigned the responsibility to:

- observe workmen perform their work and ensure that workmen wear all required personal protective equipment;
- be certain that all protective equipment, barriers, and barricades are properly installed and that workmen confine their activities within the protected area; and
- ensure that workmen observe the minimum clearances as applicable.

The types of batteries that this questionnaire covers are those containing sulfuric acid diluted with water to a predetermined ratio. Since these batteries do contain an acid, the handling of these batteries requires that employees follow rules and safe practice procedures to ensure their safety and health. Electrochemical devices that store electric energy can, under some short circuit conditions, deliver 12,000 amps dc or higher.

High voltage testing of insulation is usually done on de-energized high voltage equipment and will be in the general area of energized equipment. The safety procedures for working on and around energized equipment must be adhered to for the protection of all employees involved and for the public. When high voltage is applied, the material or apparatus under test must be isolated and barricaded. Personal protective equipment (rubber gloves, rubber sleeves, and safety glasses) must be utilized, and a reliable means of communication between all workmen involved must be established. Give careful consideration to the dangers of residual charges retained by tested materials and equipment.

It is essential that you have a written safe practice procedure for each piece of high voltage test equipment and insist that the procedures be followed.

Read all of the questions in this section; discuss the questions with those people at your establishment who know the most about the areas covered; and while conducting a survey, complete this section with their help.

1. Are there easily understood switching and clearance procedures? .. Yes No
2. Are employees trained in the use of switching and clearance procedures? Yes No

3. Is it required that mobile antennas be bent down and secured before entering substations? Yes No
4. Is it required that a qualified employee control the movements of visitors and contractors in substations.? Yes No
5. Are all visitors and employees required to wear hard hats in substations? Yes No
6. Is it required that de-energized work areas be roped off and barricaded and that work be allowed only in those areas? Yes No
7. Are all the required danger signs installed for workmen's protection? Yes No
8. Is there a safe practice procedure for workmen to follow when working inside of large transformers or circuit breakers? Yes No
9. During transformer maintenance and inspection, are air testing and forced ventilation required before entering? Yes No
10. Is it required that a second workman be stationed at the transformer manhole when a man is working inside a transformer or circuit breaker? Yes No
11. While work is being performed on oil-filled equipment, is smoking prohibited in the area? Yes No
12. When working in circuit breakers with pneumatic type mechanisms, is the air storage tank required to be shut off and the air in the piping exhausted? Yes No
13. When working in circuit breakers with hydraulic type mechanisms, is it required that the hydraulic operating pressure be bled down and turned off? Yes No
14. Is adequate grounding and bonding of vehicles and oil filtering units required in substation work areas? Yes No
15. Is dropping of tools or material from the top of transformers and other equipment prohibited? Yes No
16. Is it required that lightning arrestors that have failed be wrapped in a tarp in case of explosion? Yes No
17. Are hydrogen cylinders and other compressed gas cylinders legibly marked to identify contents? Yes No
18. Are employees trained in the use of fire extinguishers? Yes No
19. Do battery rooms and the maintenance of batteries comply with appropriate standards? Yes No
20. Is storage of materials under energized lines and equipment in substations prohibited? Yes No
21. Are workmen reminded that although nitrogen is not explosive or toxic, a person will suffocate in an atmosphere of nitrogen due to a lack of oxygen? Yes No
22. Are employees required to wear high-voltage rubber gloves and safety glasses when operating high-voltage equipment? Yes No
23. Are employees operating high-voltage test equipment required to be on an insulating stool or high-voltage rubber blanket? Yes No
24. Is a designated, qualified employee in charge of each high-voltage testing operation? Yes No
25. Is high-voltage equipment under test required to be grounded when connecting and disconnecting test equipment? Yes No

- 26. Is there a written safe practice procedure for each high-voltage testing device used? Yes No
- 27. Are protective grounds required to be left on until all residual charges have been removed (four times the charging time)? Yes No
- 28. Is a check for residual charge after grounds have been removed insisted upon? Yes No
- 29. Are facilities provided for:
 - 29a. Flushing and neutralizing spilled electrolyte? Yes No
 - 29b. Fire protection? Yes No
 - 29c. Protecting charging apparatus from damage? Yes No
- 30. Are batteries located in enclosures with outside vents so arranged as to:
 - 30a. Permit the escape of explosive fumes or gases? Yes No
 - 30b. Prevent the electrolyte from spraying into other areas? Yes No
- 31. Are the floors made of an acid-resistant construction? Yes No
- 32. When racks and trays are used to support batteries, are they:
 - 32a. Substantial enough to support the batteries? Yes No
 - 32b. Made up or coated with a nonconductive material? Yes No
 - 32c. Resistant to the electrolyte? Yes No
- 33. Are all unauthorized personnel kept out of the battery? Yes No

