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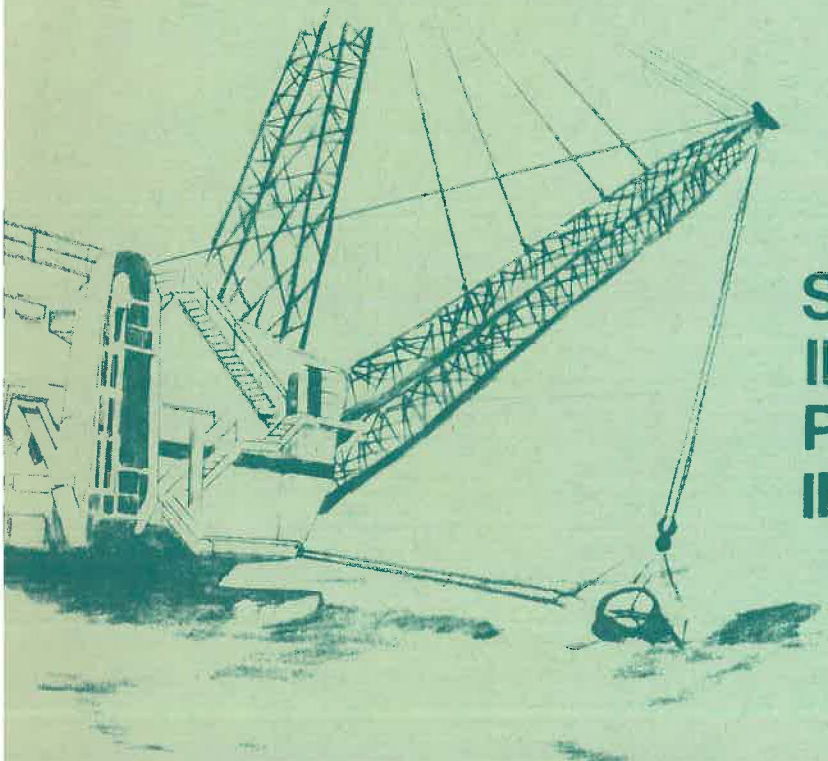
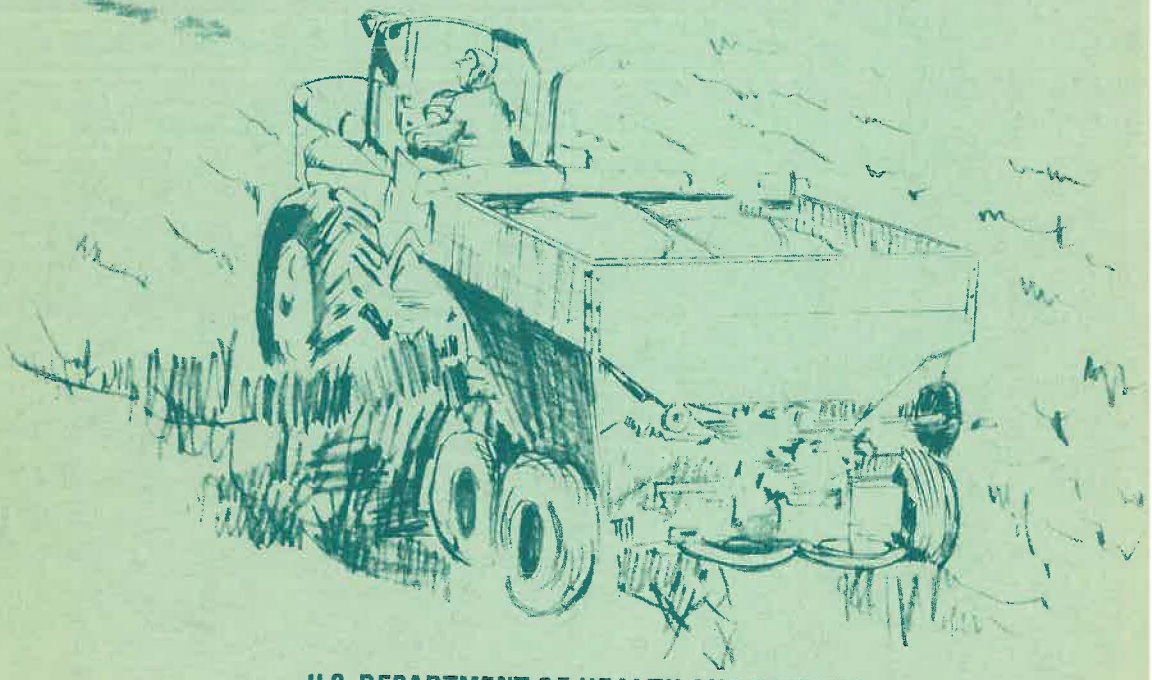


SELF-EVALUATION INSTRUMENT-- PHOSPHATE FERTILIZER INDUSTRY



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

SELF-EVALUATION INSTRUMENT -- PHOSPHATE FERTILIZER INDUSTRY

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FOREWORD

This document, designed for the phosphate fertilizer industry, is one of a series of industrial self-evaluation instruments that have provided an additional approach to promoting safety and health among employers and employees in industry.

The concept of voluntary self-evaluation is an adjunct to existing regulatory procedures and is intended to improve awareness of the need to develop comprehensive occupational safety and health programs.

The development of this concept in cooperation with the industries and employees involved is another means by which NIOSH attempts to fulfill its responsibilities under the Occupational Safety and Health Act of 1970.

John L. Francis for

Anthony Robbins, M.D.
Director
National Institute for Occupational
Safety and Health

PREFACE

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 effort to accomplish the goal of a safe and healthful work environment.

This "Self-Evaluation Instrument--Phosphate Fertilizer Industry" (SEI-PFI) has been developed by professionals in occupational safety, industrial hygiene, and occupational medicine--persons well acquainted with the problems associated with phosphate fertilizer production, handling, and transportation. They have attempted to identify operations where a SEI-PFI would be advantageous to industry. This instrument has been designed to deal with the operations within the fertilizer 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 carried out in 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 controls are in place. A "No" answer indicates changes may be necessary, that controls are absent or ineffective, or that a good work practice is being violated.

The SEI-PFI 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-PFI should be reproduced and given to the person responsible for supervising the work to which it applies. The supervisor and employees doing the work can, then, complete their particular sections.

After the results of the first use of the SEI-PFI are evaluated and acted upon, periodically repeating the self-evaluation procedure will afford management and employees the opportunity to judge the effectiveness of existing controls and to obtain a measure of assurance that their work environment continues to comply with state and Federal Occupational Safety and Health Administration (OSHA) and with Mine Safety and Health Administration (MSHA) standards.

The SEI-PFI is not designed to stand alone, but is intended to be used with a companion NIOSH 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-PFI.

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ABSTRACT

So that employers and employees within the phosphate fertilizer 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 identifiable work areas and work situations within the phosphate industry.

After responsible persons complete a walk-through investigation and answer the questions, and after the condition of all work areas is further evaluated, those areas that need upgrading will become obvious. Because pertinent occupational safety and health standards for phosphate fertilizer manufacturing are included, implementing corrective action should provide a measure of assurance that OSHA and MSHA standards are being met.

The 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--Phosphate Fertilizer Industry" to aid in implementing a comprehensive occupational safety and health program.

ACKNOWLEDGEMENT

Self-evaluation is a new approach to a systematic identification of potential safety and health problems in industry. NIOSH is very pleased to have been asked to work with The Fertilizer Institute in the preparation of this document. That The Fertilizer Institute is committed to providing a safe and healthful work environment is evidenced by the dedication and long hours volunteered by many responsible and highly competent individuals and their sponsoring companies. In addition, the authors are indebted to the following individuals and member companies of The Fertilizer Institute for their assistance in orientation of the industry and subsequent testing and review of the document:

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CONTENTS

MEDICAL AND FIRST AID

Although today's workers in the phosphate fertilizer industry often 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 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 assessments provide knowledge of the conditions under which existing or prospective workers may safely and effectively function.

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

The results of all medical examinations, including an 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 medical personnel. This assessment should include information from which management can make decisions regarding worker placement, type of activity, and conditions under which the workers may safely and effectively work. Companies should also consider previous injuries and illnesses, revealed in the worker's medical history and Occupational Toxic Exposure History, when making decisions about placement and retention.

Most potential health problems in the phosphate fertilizer industry concern safety; however, there is the possibility of acute and chronic exposure to a number of toxic chemicals, physical and biological agents, and psychological stress.

The medical or first aid station of each facility should have industry safety data sheets readily available on all potentially harmful chemicals. These provide useful information and are available through the purchasing office of

the manufacturing supplier. Some companies 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 only be provided under very selected circumstances when there is profuse perspiration, and then they must only be made available under constant, direct medical supervision. Adequate potable drinking water must be furnished so fluid lost in sweat can be replenished. Moreover, management frequently postpones work in unusual instances of high heat, high humidity, or cold and strong winds.

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. Many companies prohibit the use of contact lenses at all times by all workers; others require that approved safety goggles be worn over contact lenses.

The potential hazards of segmental or whole-body vibration are often neglected. Persons working with vibrating surfaces or with vibrating hand-held power tools 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. It is important that supervisors make sure that the medical personnel, whether salaried or contracted for part-time service, are familiar with and visit the plant sites 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 persons 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 with the physician or nurse. The physician or nurse and supervisor should conduct a walk-through survey when answering the questions.

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* See also: NIOSH Manual of Sampling Data Sheets (77-159)
** NIOSH Publications Catalog (78-123)

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:

   a. Health counseling and education? Yes ( ) No ( )
   b. Sight and hearing conservation? Yes ( ) No ( )
   c. Prevention of occupational dermatitis (e.g., solvent cleaner burns)? Yes ( ) No ( )
   d. Protection from exposure to harmful physical and chemical agents? Yes ( ) No ( )
   e. Personal hygiene? Yes ( ) No ( )
   f. Instruction in the proper use and fitting of personal protective equipment? Yes ( ) No ( )

4. Is an occupational nurse (RN, LPN) or nurse's aide available? Yes ( ) No ( )

5. Does the nurse periodically visit the actual employee worksite? Yes ( ) No ( )

6. Does a nurse or physician perform the following procedures:

   a. Fit safety glasses? Yes ( ) No ( )
   b. Fit safety shoes? Yes ( ) No ( )
   c. Fit hearing protection? Yes ( ) No ( )
   d. Dispense medication? Yes ( ) No ( )
   e. Administer audiometic exams? Yes ( ) No ( )
   f. Administer physiotherapy (diathermy, ultrasound, whirlpool, etc.)? Yes ( ) No ( )
   g. Suture or tape (butterfly) superficial lacerations? Yes ( ) No ( )
   h. Give first aid training? Yes ( ) No ( )
   i. Provide health education and counseling? Yes ( ) No ( )

7. Is a physician available full-time? Yes ( ) No ( )

8. Is a physician available part-time (if no, go to question 12)? Yes ( ) No ( )

9. Is the physician experienced in occupational medicine (3 years full-time or equivalent)? Yes ( ) No ( )

10. Is the physician consulted for possible medical effects of all new products or processes before proposed changes? Yes ( ) No ( )

11. Does the physician have privileges at the nearest hospital or clinic? Yes ( ) No ( )

12. Is a hospital, clinic, or other service accessible every day, at all hours, and within 15 minutes? Yes ( ) No ( )

13. Is the employee informed of the results of his medical examination and biological monitoring? Yes ( ) No ( )

14. Are the following examinations normally given during preplacement:

    a. Spirometry (pulmonary function--FEV_1/FVC)? Yes ( ) No ( )
    b. Chest X-ray (PA-Lat)? Yes ( ) No ( )
    c. Back X-ray? Yes ( ) No ( )
    d. Physical fitness assessment? Yes ( ) No ( )

15. Are the above medical tests and examinations repeated during periodic follow-ups? Yes ( ) No ( )

16. Do preplacement and periodic examinations include a test for the following:

    a. Visual acuity? Yes ( ) No ( )
    b. Color blindness? Yes ( ) No ( )
    c. Appropriateness of corrective lenses? Yes ( ) No ( )

17. Is preplacement audiometric testing conducted? Yes ( ) No ( )

18. Is audiometric testing conducted periodically? Yes ( ) No ( )

19. Is the assessment based on visual and audiometric testing made available to the:

    a. Worker concerned? Yes ( ) No ( )
    b. Worker's supervisor? Yes ( ) No ( )
    c. Medical (physician) consultant? Yes ( ) No ( )

20. If audiometric testing is performed:

    a. Does the sound booth meet ANSI standards? Yes ( ) No ( )
    b. Is there a certified technician available? Yes ( ) No ( )
    c. Is equipment calibrated on a regular basis? Yes ( ) No ( )
    d. Is the testing acoustical? Yes ( ) No ( )

21. Does the initial or periodic examination consider the ability of the worker to function in high places? Yes ( ) No ( )

22. Does the preplacement examination provide for an assessment of potential vertigo (dizziness)? Yes ( ) No ( )

23. 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 ( )

24. Are all women workers aware of medical policy concerning pregnancy? Yes ( ) No ( )

25. Are all foremen and supervisors aware of the medical policy concerning pregnancy? Yes ( ) No ( )

26. Within the limitations of confi-dentiality, need to know, and consent of the employee, do the following have access to an employee's medical records:

    a. The employee? Yes ( ) No ( )
    b. The employee's private physician? Yes ( ) No ( )
    c. The employee's labor representative? Yes ( ) No ( )

d. The employee's subsequent employers? Yes ( ) No ( )
e. Qualified individual or individuals studying occupational illness? Yes ( ) No ( )
f. Representatives of the Secretaries of Labor and of Health and Human Services? Yes ( ) No ( )

27. If medical records are maintained by a medical facility outside the plant, are there:

a. Copies in the medical department? Yes ( ) No ( )
b. Copies in the personnel office? Yes ( ) No ( )

28. Are employee medical records kept for the length of service plus at least 30 years? Yes ( ) No ( )

29. Are the results of biological monitoring made available, with the consent of the employee, to:

a. The employee? Yes ( ) No ( )
b. Management? Yes ( ) No ( )
c. The appropriate physician? Yes ( ) No ( )

30. Is preventive health education (in the worker's native language) provided for:

a. Vision conservation? Yes ( ) No ( )
b. Hearing conservation? Yes ( ) No ( )
c. Skin hygiene? Yes ( ) No ( )
d. Prompt and accurate reporting of accidents or injury? Yes ( ) No ( )
e. Use of protective equipment for:
Respiration? Yes ( ) No ( )
Vision? Yes ( ) No ( )
Hearing? Yes ( ) No ( )
Skin? Yes ( ) No ( )
f. Good work practices? Yes ( ) No ( )
g. Specific hazards? Yes ( ) No ( )
h. Toxicological and other harmful exposures? Yes ( ) No ( )
i. Personal hygiene, especially in regard to:
Smoking? Yes ( ) No ( )
Cleanliness? Yes ( ) No ( )

31. Are employee safety and preventive health education meetings for all employees held on a regular basis? Yes ( ) No ( )

32. Are attendance records kept at safety and health education meetings? Yes ( ) No ( )

33. Does the educational program include training in:

a. Recognition of warning signs and posters? Yes ( ) No ( )
b. Understanding of safety manuals? Yes ( ) No ( )
c. Good work practices? Yes ( ) No ( )
d. Individual job training? Yes ( ) No ( )
e. First aid? Yes ( ) No ( )

34. Have the first-aiders in each section or each shift received training in senior life saving from the American Red Cross, as military corpsmen, or by equivalent means? Yes ( ) No ( )

35. Are first aid kits inspected and a log kept each week for completeness, appropriateness, and sanitation? Yes ( ) No ( )

36. Are consumable items in the first aid kit replaced immediately after use? Yes ( ) No ( )

37. 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 ( )

38. When used, are the physician's standing orders kept:

a. With each first aid kit? Yes ( ) No ( )
b. At each first aid station? Yes ( ) No ( )
c. With each foreman? Yes ( ) No ( )
d. Other? (Specify)

39. Do the appropriate workers have specific training in the first aid treatment of shock? Yes ( ) No ( )

40. Are first-aiders trained in the recognition and early treatment of poisoning? Yes ( ) No ( )

41. Is an eye wash fountain (with sufficient water for 15 minutes of continuous flow irrigation) available at all sites where caustic substances may be splashed in the eye? Yes ( ) No ( )

42. Have workers or first-aiders been instructed in proper eye flushing technique? Yes ( ) No ( )

43. Are appropriate workers trained in the early recognition of damage to the skin and eyes from:

    a. Electric arc welding? Yes ( ) No ( )
    b. Incandescent lamps? Yes ( ) No ( )
    c. Electric flash? Yes ( ) No ( )

44. Is there training in early recognition of heat exhaustion, heat cramps, and heat stroke? Yes ( ) No ( )

45. Are facilities for immediate treatment of heat stroke victims available? Yes ( ) No ( )

46. Is potable, cool drinking water available for workers exposed to heat stress? Yes ( ) No ( )

47. Are first-aiders trained in the early recognition of the effects of segmental and whole-body vibration? Yes ( ) No ( )

48. Are supervisory employees trained in the early recognition of:

    a. Alcoholism? Yes ( ) No ( )
    b. Drug abuse? Yes ( ) No ( )

49. Are appropriate employees made aware of materials and processes likely to create potential health hazards? Yes ( ) No ( )

PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

Personal protective equipment for eyes, face, head, and extremities; protective clothing; respiratory devices; protective shields and barriers; and fall protection equipment shall be used wherever it is required by reason of hazardous processes, environment, chemicals, or physical agents encountered in a manner capable of causing injury or illness through absorption, inhalation, or physical contact.

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

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

Eye Protection

1. Is wearing approved safety glasses required at all times in the following hazardous locations:

   a. Process areas? Yes ( ) No ( )
   b. Maintenance shops? Yes ( ) No ( )
   c. Shipping areas? Yes ( ) No ( )
   d. Plant roadways and walkways? Yes ( ) No ( )
   e. Mobile equipment operating areas? Yes ( ) No ( )
   f. Mine pits? Yes ( ) No ( )
   g. Laboratories? Yes ( ) No ( )
   h. All work activities or areas which are potentially harmful to the eyes? Yes ( ) No ( )

2. Are employees who use corrective lenses required to use approved industrial safety glasses or to wear protective goggles over their glasses? Yes ( ) No ( )

3. Is the wearing of metal frame glasses prohibited while performing electrical work? Yes ( ) No ( )

4. When opening pressurized valves or when exposed to sources of sulfuric acid, phosphoric acid, ammonia, or steam, are a full-face shield or tight fitting goggles required to be worn? Yes ( ) No ( )

5. When face shields are worn, are the employees required to continue to wear their safety spectacles as an added eye protection? Yes ( ) No ( )

6. When grinding, chipping, or working with compressed air, are employees required to wear either goggles, full-face shield, or safety spectacles with side shields? Yes ( ) No ( )

7. When chipping or breaking concrete with a pick, sledge, or air hammer, are goggles or full-face shield required to be worn? Yes ( ) No ( )

8. When using metal on metal, such as pounding nails with a hammer or using a punch or chisel, are safety spectacles with side shields required? Yes ( ) No ( )

9. When using a wire brush or scraping rust, are goggles or full-face shield required to be worn? Yes ( ) No ( )

10. When cutting or welding with electric arc or oxy-acetylene torch, is the appropriate type of goggles and/or hood required to be worn? Yes ( ) No ( )

11. When using portable power equipment, such as electric drills, saws, chippers, etc., are goggles or safety spectacles with side shields required? Yes ( ) No ( )

12. Are safety spectacles worn when operating forklifts, scoops, scrapers, or working with winches, hoists, and wire ropes? Yes ( ) No ( )

13. Is the wearing of contact lenses prohibited, where appropriate? Yes ( ) No ( )

Head Protection

14. Do hard hats used by employees meet the requirements of American National Standards Institute (ANSI) standard Z89.1? Yes ( ) No ( )

15. Are hard hats required to be worn in all plant and mine work areas (excluding offices, lunch rooms, and control rooms)? Yes ( ) No ( )

16. Are hard hats inspected periodically for damage to the shell and suspension system? Yes ( ) No ( )

Foot Protection

17. Are protective safety shoes (with or without metatarsal shields) worn in all plant and mine work areas, where appropriate? Yes ( ) No ( )

18. Is special protective footwear provided employees exposed to harmful chemicals? Yes ( ) No ( )

19. Is footwear inspected periodically? Yes ( ) No ( )

Hand Protection

20. Are appropriate gloves required to be worn when employees handle wood or metals? Yes ( ) No ( )

21. Are gloves prohibited around rotating machinery? Yes ( ) No ( )

22. Are appropriate gloves provided when handling steam, acids, or caustic materials? Yes ( ) No ( )

23. Are approved rubber protective gloves provided employees who work with electricity? Yes ( ) No ( )

Clothing

24. Is loose fitting or torn clothing prohibited around machinery and moving parts? Yes ( ) No ( )

25. Are rings, watches, bracelets, or other jewelry prohibited where there is a danger of their being caught in or on machinery? Yes ( ) No ( )

26. Are employees required to wear long sleeves where there is a danger of exposure to corrosive chemicals, steam, or hot water? Yes ( ) No ( )

27. Is protective chemical clothing (jackets, pants, aprons) provided employees who work with:

a. Acids? Yes ( ) No ( )
b. Ammonia? Yes ( ) No ( )
c. Hot water? Yes ( ) No ( )
d. Steam? Yes ( ) No ( )

28. For arc or oxy-acetylene welding, are the following protective measures required:

a. Long sleeves worn? Yes ( ) No ( )
b. Breast pockets on clothing prohibited? Yes ( ) No ( )
c. Leather gloves that cover the wrists worn? Yes ( ) No ( )
d. Use of flameproof aprons made of leather or other suitable materials to protect against radiated heat and sparks worn? Yes ( ) No ( )
e. Use of flame resistant leggings, high boots, or other equivalent protection in front of the worker's legs when doing heavy welding or cutting? Yes ( ) No ( )
f. Hearing protection for work in high noise areas such as confined spaces, overhead welding, or plasma torch applications? Yes ( ) No ( )

Fall Protection

29. Are safety belts, harnesses, and lanyards periodically inspected and records kept? Yes ( ) No ( )

30. Are safety belts, harnesses, and lines protected in storage from dust, chemicals, and moisture? Yes ( ) No ( )

31. Do safety belts, harnesses, and lanyards meet the requirements of ANSI A 10.14-1975 for strength and design? Yes ( ) No ( )

Respiratory Protection

32. Do written standard operating procedures govern the selection and use of respirators in accordance with Federal standards? Yes ( ) No ( )

33. Are a medical assessment and proper fitting performed on personnel using respirators? Yes ( ) No ( )

34. Is there an established inspection program for respirators? Yes ( ) No ( )

35. Are records of respirator inspections maintained? Yes ( ) No ( )

36. Are the respirators used certified by the National Institute for Occupational Safety and Health (NIOSH)? Yes ( ) No ( )

37. Are employees who use respiratory equipment instructed in the proper care and use of such equipment? Yes ( ) No ( )

38. Are respirators selected on the basis of the potential hazards to which the worker may be exposed? Yes ( ) No ( )

39. Are respirators cleaned, inspected, and sanitized after each use? Yes ( ) No ( )

40. Are respirators stored in a convenient, clean, dry, and sanitary location? Yes ( ) No ( )

41. Is back-up respiratory equipment provided for workers entering atmospheres that are considered immediately dangerous to life and health? Yes ( ) No ( )

42. Is eating prohibited where harmful concentrations of dusts exist? Yes ( ) No ( )

43. Are change rooms and other facilities provided when working with hazardous dusts? Yes ( ) No ( )

Hearing Protection

44. Do the hearing protection devices provided for your employees comply with OSHA requirements? Yes ( ) No ( )

45. Are hearing protectors individually fitted to the user's ears? Yes ( ) No ( )

46. Are employees who are issued hearing protectors trained in their proper use and required to clean and sanitize this equipment daily or after use? Yes ( ) No ( )

47. Is it mandatory for employees entering or working in noise hazard areas to wear hearing protection? Yes ( ) No ( )

ERGONOMICS and BIOMECHANICS
(Physical Demand and Job Analysis)

By systematically evaluating the physical and psychological stresses employees may face on the job, methods and techniques for minimizing the 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 excessive 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,

-- a preventive medical program involving early diagnosis and treatment of the health effects of stress, and

-- an educational program to acquaint workers with early signs of problems.

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

1. Are there written manual lifting procedures and standards? Yes ( ) No ( )

2. Are employees' physical capacities assessed before being assigned to jobs requiring heavy work? Yes ( ) No ( )

3. Are specific medical records kept for employees engaged in physically heavy or medium work? Yes ( ) No ( )

4. Are employees instructed in the proper manner of lifting heavy objects? Yes ( ) No ( )

5. Are back X-rays given in preplacment screening to detect individuals with back problems? Yes ( ) No ( )

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

6. Are workers placed on equipment that can be adjusted in accordance with the capacity of the operator? Yes ( ) No ( )

7. Are normal verbal communications possible with the existing noise level? Yes ( ) No ( )

8. Are the requirements for precise hand movements considered in placing employees? Yes ( ) No ( )

9. Are employees encouraged to offer suggestions to reduce physical and mental demands and job stresses? Yes ( ) No ( )

10. Is the medical history of injuries and illness reviewed before placing workers? Yes ( ) No ( )

11. Is equipment designed for ease of operation? Yes ( ) No ( )

12. Are tasks designed to minimize stresses? Yes ( ) No ( )

NOISE

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 to protect their hearing.

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. 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 the noise intensity, frequency distribution, and duration. The results of the survey should 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.

Noise is defined as undesirable sound. High noise levels occurring in the occupational environment can cause: (1) noise-induced hearing loss; (2) stress-related illness (physiological and psychological); and (3) decreased job performance. Hearing loss, 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk-through survey, complete this

section with their help. It is important that this section be completed with the physician or nurse. Ideally, the physician or nurse and supervisor will conduct a walk-through survey when answering the questions.

1. Is there a screening program that identifies the employees who have a health condition (e.g., hypertension) which might make the employee more susceptible to an adverse reaction to noise? Yes ( ) No ( )

2. Are employees who are identified by the screening program:

   a. Advised of their health condition? Yes ( ) No ( )
   b. Advised of the added risk in working in a noisy environment? Yes ( ) No ( )
   c. Counseled in job selection to minimize their exposure to noise? Yes ( ) No ( )
   d. Counseled against accepting a position in a noisy environment? Yes ( ) No ( )

3. Have employees exposed to high noise levels received audiometric testing within the past year? 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 noise 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' noise exposure? Yes ( ) No ( )

7. Is there an ongoing preventive health program to educate employees in the following:

   a. Safe levels of noise exposure? Yes ( ) No ( )
   b. Personal protection against excessive noise exposure? Yes ( ) No ( )
   c. Effects of noise exposure on health? Yes ( ) No ( )

8. Have work areas where noise levels make voice communication between employees difficult been identified and posted? Yes ( ) No ( )

9. 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

10. Have noise levels been measured and records kept? Yes ( ) No ( )

11. Are the following monitoring devices used when measuring noise levels:

    a. Sound level meter? Yes ( ) No ( )
    b. Octave band analyzer? Yes ( ) No ( )

12. Are exposure records kept on any employee exposed to noise? Yes ( ) No ( )

13. Have engineering controls been used to reduce noise levels (if no, go to question 15)? Yes ( ) No ( )

14. Which of the following engineering controls have been used to control noise levels:

    a. Acoustical enclosure of noise producing equipment? Yes ( ) No ( )
    b. Acoustical absorption material on ceilings and walls to minimize sound wave reflection? Yes ( ) No ( )
    c. Regular machine maintenance to reduce noise levels? Yes ( ) No ( )

d. Acoustical barriers to interrupt transmission of noise from one area to another? Yes ( ) No ( )

e. Provision of sound-insulated work stations? Yes ( ) No ( )

f. Other (specify)

15. Is a low noise requirement included in specifications for potentially noisy new equipment? Yes ( ) No ( )

16. Which of the following administrative controls have been used to minimize individual employee exposure to noise:

a. Scheduled reassignment? Yes ( ) No ( )

b. Cafeterias and rest areas located in quiet places? Yes ( ) No ( )

c. Only essential work done in noisy areas? Yes ( ) No ( )

17. Is approved hearing protective equipment (noise attenuating devices) available to every employee working in noisy areas? Yes ( ) No ( )

HEAT STRESS
(MEDICAL)

The effects of heat in producing emotional or physiological 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 3 degrees above or 2 degrees below workers' normal body temperature will impair their performances. Moreover, exceeding this 5-degree range presents a hazard to health. Some of the symptoms of heat strain 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk through survey, complete this section with their help. It is important that this section be completed with the physician or nurse. Ideally, the physician or 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 an adverse reaction to heat (if no, go to question 3)? Yes ( ) No ( )

2. Are the employees who are identified by the screening program:

   a. Advised of the added risks in working in a hot environment? Yes ( ) No ( )
   b. Counseled in job selection to minimize their exposure to heat? Yes ( ) No ( )

3. Is drinking water available at hot work sites? Yes ( ) No ( )

4. Are specific medical records kept on employees exposed to heat? Yes ( ) No ( )

5. Is an employee on each shift trained in the recognition and first aid treatment of heat casualities. Yes ( ) No ( )

HEAT

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 exhanges heat with the environment in one of four 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

Evaporation--transfer of heat by evaporation of moisture (sweat) from the skin.

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.)

The questions in this section 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.

Read all of the questions in this section; discuss the questions with those persons 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. Where heat is a problem, have all fixed work areas been provided with spot cooling or air conditioning? Yes ( ) No ( )

3. Are the following administrative controls used to minimize individual exposure to heat:

   a. Rotation of workers? Yes ( ) No ( )

b. Frequent rest periods? Yes ( ) No ( )
c. Heaviest work done during coolest periods? Yes ( ) No ( )
d. Cafeterias and rest areas located in cooler places? Yes ( ) No ( )
e. Only essential work done in hot areas? Yes ( ) No ( )
f. Other (specify)

SANITATION

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 and good housekeeping.

Read all of the questions in this section; discuss the questions with those persons at your establishment who know the most about the areas covered; and, while conducting a walk-through 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 leak proof?	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 nonpotable outlets all separate (i.e., free from cross connections) from the potable system? Yes ( ) No ( )

15. Are 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, kept clean and in good repair? Yes ( ) No ( )

19. Is consuming or storing food and beverages in toilet rooms or near toxic materials prohibited? Yes ( ) No ( )

20. Are the food service facilities, including vending machines, regularly inspected for sanitary conditions? Yes ( ) No ( )

LOCK-OUT PROCEDURES

The purpose of an effective lock-out procedure is to provide maximum safety for employees working in, on, or around equipment that could cause injury by unexpectedly being started, energized, or suddenly releasing pressure, acid, or other substances.

The potential for injury is great, and accident experiences have shown that many serious and often fatal accidents occur each year as a result of either not establishing or not promoting an effective lock-out procedure. Therefore, it is imperative that an effective lock-out procedure be instituted, actively promoted, and constantly monitored for compliance.

Although the lock-out procedure should not be too complicated to be understood by all employees, it should be detailed enough to protect employees from being injured as a result of poor communications, lack of knowledge of equipment being locked-out, or inexperienced workers.

Acceptable lock-out procedures generally include the following points:

-- alerting the operator,

-- disconnecting, locking-out power source, and attaching information tag,

-- pushing the start/stop switch and attempting to energize equipment after making sure equipment is safe to operate and everyone is clear,

-- each person exposed to a hazard personally attaches his own lock and removes it when finished, and

-- training and retraining in proper procedures.

The lock-out procedure for valves should be essentially the same as for electrical equipment.

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

1. Is all electrical equipment provided with a means of locking-out the power source? Yes ( ) No ( )

2. Are all valves provided with a means of locking-out the valve handles? Yes ( ) No ( )

3. Are appropriate employees provided with individually keyed personal safety locks? Yes ( ) No ( )

4. Are employees required to keep their key while the safety lock is being used? Yes ( ) No ( )

5. Is it required that only the employee exposed to the hazard place or remove his lock? Yes ( ) No ( )

6. Is it required that employees check the safety of the lock-out by attempting a start up after making sure no one is exposed? Yes ( ) No ( )

7. Is there a means of written identification of an employee working on the equipment by his lock or an accompanying tag? Yes ( ) No ( )

8. Is there an established substitute safe job procedure for working on equipment that does not have a means of locking-out? Yes ( ) No ( )

9. Does the lock-out procedure require that stored energy (mechanical, hydraulic, air, etc.) be released or blocked before equipment is locked-out for repairs? Yes ( ) No ( )

10. Are only qualified employees allowed to remove fuses? Yes ( ) No ( )

11. Is it required that the cubicle door be locked after fuses are removed for lock-out protection? Yes ( ) No ( )

12. Are lock-out clips (scissors) available that will accommodate several locks for those jobs requiring them? Yes ( ) No ( )

13. Is the locking-out of safety control circuits prohibited? Yes ( ) No ( )

14. Are employees regularly instructed and reminded of lock-out procedures? Yes ( ) No ( )

LINE BREAKING

(See also Lock-Out Procedures)

A number of serious injuries are attributed to improper line-breaking procedures each year. Therefore, appropriate employees must be thoroughly trained and periodically retrained in proper procedures.

Line breaking refers to the separation of pipeline sections for the purpose of repair or inspection.

In a phosphate chemical complex, numerous fluids are transported through lines often at elevated temperatures and pressures. Additionally, the fluids may be hazardous to personnel.

Common fluids encountered in the piping system include molten sulfur, fuel oil, sulfuric acid, steam, phosphoric acid, superphosphoric acid, and anhydrous ammonia.

Safe operating and maintenance practices should include: pumps, valves, pressure relief valves, and fittings as integral parts of the piping system.

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

1. Are maintenance personnel properly equipped with and required to use appropriate protective clothing (rubberwear, goggles, shields, gloves) where necessary? Yes ( ) No ( )

2. Are positive, effective communications established between operation and maintenance personnel prior to line openings? Yes ( ) No ( )

3. Are all lines, pumps, and valves cleared of pressure prior to line breakage? Yes ( ) No ( )

4. Are dual operator/maintenance tag or lock-out systems employed for secure valve closure up- and downstream of the line breakage? Yes ( ) No ( )

5. Are the lines containing ammonia depressurized and water-flushed prior to maintenance? Yes ( ) No ( )

6. Are acid bearing lines cleared and water-flushed prior to maintenance? Yes ( ) No ( )

7. Are electrical lock-out procedures applied to pumps prior to maintenance? Yes ( ) No ( )

8. Are electrical lock-out procedures applied to pumps whose supply lines are to be opened? Yes ( ) No ( )

9. Is a standard safety permit system used which includes supervisory maintenance and operations personnel? Yes ( ) No ( )

10. Is a hazardous work permit system also exercised when appropriate? Yes ( ) No ( )

11. Does the appropriate foreman (maintenance or operator) determine whether the standard or hazardous permit is to apply? Yes ( ) No ( )

12. Is the production operator required to close all block valves to isolate the point of opening and tag or lock-out each valve? Yes ( ) No ( )

13. Is the maintenance mechanic required to check the closed block valves and add his lock or tag? Yes ( ) No ( )

14. Is it required standard practice that anyone who works on the pipeline in question must add his own tag or lock? Yes ( ) No ( )

15. Are electric service pumps disconnected and locked? Yes ( ) No ( )

16. Are areas where line breaking is in progress roped or barricaded with appropriate caution signs? Yes ( ) No ( )

17. After notification of the appropriate personnel concerned with the work to be done, does the shift supervisor check the safety measures taken and sign the permit? Yes ( ) No ( )

18. Does the senior maintenance repairman sign the permit after required personal protective equipment has been acceptably applied and safe procedures established? Yes ( ) No ( )

19. Are workers involved in the repair required to sign the permit? Yes ( ) No ( )

20. If the line breakage involves removal of a piece of equipment for repair (such as a pump or meter), is the flange opening blinded with a blank? Yes ( ) No ( )

21. Are the tags or locks retained in place until the repaired equipment is replaced? Yes ( ) No ( )

22. Are all electrical leads de-energized and taped in addition to locking the main breaker when electrical equipment is removed from the system? Yes ( ) No ( )

23. Are the operations foreman and the maintenance foreman given the latitude to extend and expand the application of safeguards beyond printed standard instructions in the event of an emergency or unpredictable situation? Yes ( ) No ( )

24. When flanges are opened, is it required that bolt pressure be gradually relieved and the flange opened on the side away from the worker? Yes ( ) No ( )

25. Are pipelines carrying hot and/or corrosive materials equipped for double blocking and a bleed valve between them? Yes ( ) No ( )

26. Where single cut-off valves are used, are the broken lines physically separated and blind flanges added to each end? Yes ( ) No ( )

VESSEL ENTRY

The term "vessel," as used in this section, should be understood to include sewers, pipelines, pits, and other confined spaces as well as tanks, vats, bins, dryers, granulators, and other vessels.

Vessel entry can present several different types of hazards, including toxic gases, explosive atmospheres, oxygen deficiencies, and product build-up inside vessels, and hazards created by agitators, mixers, and impellers that have not been locked-out.

These potential hazards apply not only to those workers inside vessels, but also to those who may be called upon to attempt rescues in emergency situations. However, adequate precautions can be taken in advance of working inside vessels to remove most of these potential hazards and to make it a relatively safe work environment.

It should be understood that not all employees are physically or emotionally suited for working inside vessels. Employees who are too large to easily enter or leave a vessel while wearing a harness or other required safety equipment should not be permitted to enter the vessel. Also, employees with a fear about working in confined spaces (claustrophobia) should not be permitted to enter vessels unless they feel comfortable with the arrangement of the particular job to be performed.

It is the purpose of this section to identify the potential hazards associated with working inside vessels and to evaluate the establishment's program to protect its employees from these hazards.

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

1. Are vessels required to be thoroughly emptied of any corrosive or dangerous material, such as acids or caustics, in preparation for vessel entry? Yes ( ) No ( )

2. Are all lines containing inert, toxic, flammable, or corrosive materials valved off and blanked or disconnected and separated first? Yes ( ) No ( )

3. Is it required that all impellers, agitators, or other moving equipment inside vessels be locked-out if they present a hazard? Yes ( ) No ( )

4. Is either natural or mechanical ventilation provided prior to vessel entry? Yes ( ) No ( )

5. Is appropriate atmospheric testing performed for air quality inside the tanks before entry, checking for:

   a. Oxygen deficiency? Yes ( ) No ( )
   b. Toxic substances concentrations? Yes ( ) No ( )
   c. Explosive concentrations? Yes ( ) No ( )

6. Is the atmosphere inside the vessel periodically tested during conduct of work? Yes ( ) No ( )

7. Is a hazardous work permit issued prior to entering vessels? Yes ( ) No ( )

8. Is required, appropriate rescue equipment worn by employees entering vessels? Yes ( ) No ( )

9. Is there an assigned safety watch employee outside of the vessel whose sole responsibility is to watch the work in progress, sound an alarm if necessary, and render assistance? Yes ( ) No ( )

10. Is the safety watch employee appropriately trained and equipped to handle an emergency? Yes ( ) No ( )

11. Is the safety watch employee or other employees prohibited from entering the vessel without lifelines or respiratory equipment if there is any question as to the cause of an emergency? Yes ( ) No ( )

12. Is approved appropriate respiratory equipment required if the atmosphere inside the vessel cannot be made satisfactory? Yes ( ) No ( )

13. Is all portable electrical equipment used inside vessels either grounded and insulated, or equipped with ground fault protection? Yes ( ) No ( )

14. Are these additional precautions for gas welding or burning inside vessels required:

a.	Inspect hoses for leaks?	Yes ( ) No ( )
b.	Forbid placing compressed gas bottles inside vessels?	Yes ( ) No ( )
c.	Require lighting torches outside of vessels only?	Yes ( ) No ( )
d.	Remove torch from vessel when not lit?	Yes ( ) No ( )
e.	Always test for explosive atmosphere prior to re-entering vessel with lit torch?	Yes ( ) No ( )

FIRE PREVENTION AND CONTROL

The potential for loss of life, valuable equipment, and machinery in the phosphate industry makes it imperative that fires be prevented. Therefore, a great deal of attention must be given to plant design, fire protection equipment, housekeeping, self-evaluation, and employee training.

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

-- periodic training of employees in proper methods of fire prevention and use of firefighting equipment,

-- proper storage and handling of combustible and flammable materials,

-- proper temporary storage and prompt disposal of flammable materials,

-- good housekeeping practices,

-- a written plan of action in case of a fire or other emergency, and

-- regular inspection and maintenance of firefighting and rescue equipment, systems, and protective gear.

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

1. Is there a written plan of action for emergencies? Yes ( ) No ( )

2. Are the following disasters considered in the emergency plan:

   a. Fire? Yes ( ) No ( )
   b. Explosion? Yes ( ) No ( )
   c. Entrapment of personnel? Yes ( ) No ( )
   d. Natural disasters (windstorms, floods, earthquakes, etc.)? Yes ( ) No ( )
   e. Chemical storage tank or line rupture? Yes ( ) No ( )
   f. Power failure? Yes ( ) No ( )
   g. Transportation? Yes ( ) No ( )
   h. Other (specify)

3. Is there periodic training to familiarize employees with emergency response and evacuation procedures? Yes ( ) No ( )

4. Have a selected group of employees been trained in and assigned to fire fighting, rescue techniques, and first aid? Yes ( ) No ( )

5. Is there a fire and other emergency alarm signaling system? Yes ( ) No ( )

6. Is the alarm system properly maintained and tested periodically? Yes ( ) No ( )

7. Is there an established procedure for notifying fire, police, and other emergency help? Yes ( ) No ( )

8. Do emergency plans include providing plant personnel to safely direct responding fire or ambulance rigs to the emergency scene? Yes ( ) No ( )

9. Are there specific emergency vehicle routes? Yes ( ) No ( )

10. Is there a regular schedule to orient the following persons to hazardous chemical storage tanks, pipelines, and lines containing explosive gases:

    a. Police and fire? Yes ( ) No ( )
    b. Public officials? Yes ( ) No ( )
    c. Civil defense? Yes ( ) No ( )
    d. Government agencies? Yes ( ) No ( )
    e. Utilities? Yes ( ) No ( )

11. Is the use of water prohibited on electrical fires? Yes ( ) No ( )

12. Do hydrants and/or standpipe and hose systems meet the design requirements of the National Fire Protection Association? Yes ( ) No ( )

13. Are hydrants equipped with wrenches and sufficient hose for fire fighting? Yes ( ) No ( )

14. Are periodic inspections made of hose houses to insure that all hoses and equipment are present and in good condition? Yes ( ) No ( )

15. Are fire hoses stretched and pressure tested annually? Yes ( ) No ( )

16. Is the fire pump inspected, maintained, and tested regularly? Yes ( ) No ( )

17. Is a record maintained of fire pump inspection, maintenance, and testing? Yes ( ) No ( )

18. If there is a sprinkler system (if not, go to question 22):

    a. Is the sprinkler system properly maintained and inspected regularly? Yes ( ) No ( )
    b. Are sprinkler system maintenance records kept? Yes ( ) No ( )
    c. Are there signs on all sprinkler controls stating their function? Yes ( ) No ( )
    d. Are water flow alarms provided on all sprinkler installations? Yes ( ) No ( )

19. If there is a CO_2 extinguishing system (if not, go to question 23):

    a. Are there provisions to ensure prompt evacuation of all employees in the CO_2 discharge areas? Yes ( ) No ( )
    b. Are there provisions to carry out the prompt rescue of employees trapped by CO_2 discharge? Yes ( ) No ( )
    c. Is the CO_2 system thoroughly inspected and tested annually? Yes ( ) No ( )
    d. Are inspection records kept? Yes ( ) No ( )

20. Are an adequate number of fire extinguishers available in all areas of the plant or mine? Yes ( ) No ( )

21. Are fire extinguishers easily accessible in all work areas? Yes ( ) No ( )

22. Are the fire extinguishers maintained in a fully charged and operable condition and inspected annually? Yes ( ) No ( )

23. Are maintenance records of fire extinguishers kept? Yes ( ) No ( )

24. Are fire extinguishers kept at their designated locations when not in use? Yes ( ) No ( )

25. Are appropriate fire extinguishers provided near the hazard they are designated to protect? Yes ( ) No ( )

26. If located in areas of visual obstruction, are extinguisher locations designated by signs or other markings? Yes ( ) No ( )

27. Are fire extinguishers marked for the types of fires for which they are intended? Yes ( ) No ( )

28. Are employees given instructions on how to choose, determine, and use the right type of extinguisher for a particular fire? Yes ( ) No ( )

29. Are all pressure-type portable fire extinguishers hydrostatically tested on a 5-year basis? Yes ( ) No ( )

30. Are fire extinguishers in chemical process and fertilizer storage areas protected against corrosion? Yes ( ) No ( )

31. Are all operating personnel familiar with emergency shut-down procedures? Yes ( ) No ( )

32. Is there adequate positive pressure self-contained respiratory equipment available for fire crews in case of heavy releases of ammonia vapors, acid fumes, or toxic smoke? Yes ( ) No ( )

33. Is there plans for traffic control outside the plant perimeter to allow safe entrance and exit of:

    a. Emergency vehicles? Yes ( ) No ( )
    b. Utilities? Yes ( ) No ( )
    c. Relief persons? Yes ( ) No ( )

34. In the event of toxic fumes or smoke, are there plans to evacuate residences and businesses downwind and to divert traffic? Yes ( ) No ( )

35. For post-fire loss control, are there plans for the following activities:

a. Plans to restore promptly any impaired plant fire protection equipment? Yes ( ) No ( )

b. Plans to make temporary repairs to structures as necessary to protect against further damage from the elements? Yes ( ) No ( )

c. Plans to clean and oil thoroughly all wet machinery or metal stocks to prevent further damage from rust? Yes ( ) No ( )

d. Plans to separate all damaged stock from undamaged stock? Yes ( ) No ( )

e. Plans to prepare an accurate record of loss? Yes ( ) No ( )

36. Is provision made for emergency lighting and electricity for fire and rescue crews in the event of power failure or unlighted areas? Yes ( ) No ( )

37. Are water supplies adequate to meet fire-fighting demands for a duration of not less than 60 minutes? Yes ( ) No ( )

38. Is insulation that is exposed to combustible or explosive sources adequately fireproofed? Yes ( ) No ( )

39. Are load-bearing members of buildings and process structures fireproofed? Yes ( ) No ( )

40. Is there a back-up fire pump or other system to cover power outages or other failures? Yes ( ) No ( )

41. Is all mobile equipment equipped with fire extinguisher(s)? Yes ( ) No ( )

42. Is equipment kept free of excess grease, oil, and dust? Yes ( ) No ( )

43. During refueling procedures, are provisions made for the following:

a. No smoking? Yes ( ) No ( )

b. Grounding? Yes ( ) No ( )

c. Emergency shut-off? Yes ( ) No ( )
d. Ignition control? Yes ( ) No ( )
e. Other (specify)

44. Are main switchgear rooms clean and free of combustible storage? Yes ( ) No ( )

45. Are electric motors inspected and maintained regularly and records kept? Yes ( ) No ( )

46. Is insulation resistance on electric motors checked periodically for deterioration? Yes ( ) No ( )

47. Are all electrical connections tight? Yes ( ) No ( )

48. Is a hot-work permit system in place, where applicable, for all open flame or spark-producing work? Yes ( ) No ( )

49. Are all heating installations inspected and maintained regularly? Yes ( ) No ( )

50. Are easily accessible emergency fuel shut-offs provided for fuel supplies? Yes ( ) No ( )

51. Do fuel storage areas meet the following requirements:

a. Diked when required? Yes ( ) No ( )
b. Protected against physical damage from equipment? Yes ( ) No ( )
c. Protected against lightning strikes? Yes ( ) No ( )
d. Tanks equipped with adequate vents? Yes ( ) No ( )

52. Is specific personal protective clothing and equipment provided firefighters? Yes ( ) No ( )

FLAMMABLE AND COMBUSTIBLE LIQUIDS

Improper storage, handling, and use of flammable and combustible liquids have resulted in numerous serious injuries and deaths and many expensive industrial fires. Proper storage must be provided for these materials, and employees must be trained in approved methods of 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 required 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk-through survey, complete this section with their help.

1. Are flammable and combustible liquids kept in an outside storage room or area (if not, go to question 2)? Yes ( ) No ( )

   Are all containers in a secure position to prevent tipping or spillage? Yes ( ) No ( )
   Is proper drainage provided? Yes ( ) No ( )
   Are weeds and other vegetation kept clear of the area? Yes ( ) No ( )

2. Are flammable and combustible liquids kept in an inside storage room? Yes ( ) No ( )

   Does the storage room conform to National Fire Protection Association requirements? Yes ( ) No ( )
   Are all containers and drums properly grounded? Yes ( ) No ( )
   Are containers of over 30-gallon capacity stacked no more than two high? Yes ( ) No ( )
   Is all dispensing from drums done by transer pump or self-closing valves? Yes ( ) No ( )
   Is fire protection provided? Yes ( ) No ( )
   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 and combustible liquids that are not in safety cans stored in an approved cabinet? Yes ( ) No ( )

7. If there is a 30-day (or more) supply of flammable and combustible paints, thinners, etc., are they kept in approved cabinets? Yes ( ) No ( )

8. Are large containers of flammable liquids diked or curbed so as to contain and 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 ( )

10. Are storage tanks adequately vented to prevent the development of excessive vacuum or pressure as a result of filling, emptying, or atmospheric temperature change? Yes ( ) No ( )

11. Are storage tanks equipped with emergency venting that will relieve excessive internal pressure caused by fire exposure? Yes ( ) No ( )

12. Is special fire extinguishing equipment available where flammable liquids are stored or dispensed? Yes ( ) No ( )

13. Are tank supports installed on firm foundations? Yes ( ) No ( )

14. Is the transfer of flammable and combustible liquids by means of air pressure on the container prohibited? Yes ( ) No ( )

15. In areas in which flammable or combustible liquids are transferred from one tank or container to another container, are the containers separated from other operations by at least 25 feet or by a fire wall with a fire resistance of at least 1 hour? Yes ( ) No ( )

WELDING, CUTTING, AND BRAZING

The use of welding, cutting, and brazing equipment poses potentially great hazardous problems. All persons authorized to use such equipment must be trained in the proper safeguards.

Read all of the questions in this section; discuss the questions with those persons at your establishment who know the most about the areas covered; and, while conducting a walk-through 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 kept away from radiators and other sources of heat? Yes ( ) No ( )

7. When inside buildings, are the cylinders stored in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials? Yes ( ) No ( )

8. Are the cylinders kept away from elevators, stairs, or gangways? Yes ( ) No ( )

9. Are empty cylinders appropriately marked and their valves closed? Yes ( ) No ( )

10. Are signs reading: DANGER--NO SMOKING, MATCHES, OR OPEN LIGHTS, or the equivalent, posted? Yes ( ) No ( )

11. Are acetylene cylinders stored valve-end up? Yes ( ) No ( )

12. 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 ( )

13. Are cylinders, cylinder valves, couplings, regulators, hoses, and apparatus kept free of oily or greasy substances? Yes ( ) No ( )

14. Are provision made 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 ( )

15. When transporting cylinders by crane or derrick, is a cradle, boat, or suitable platform used? Yes ( ) No ( )

16. Are workers trained not to drop or strike cylinders? Yes ( ) No ( )

17. Is it prohibited to lift or pry up cylinders by valve-protection caps? Yes ( ) No ( )

18. Unless secured on special trucks, are regulators removed and valve-protection caps put in place before moving cylinders? Yes ( ) No ( )

19. Do cylinders without fixed hand wheels have keys, handles, or non-adjustable wrenches on stem valves when in service? Yes ( ) No ( )

20. Is care taken to avoid cylinders becoming part of an electrical circuit? Yes ( ) No ( )

21. Is it prohibited to use cylinders as rollers or suppports? Yes ( ) No ( )

22. Is it prohibited to tamper with numbers and markings stamped on cylinders? Yes ( ) No ( )

23. Is it prohibited to tamper with safety devices and valves? Yes ( ) No ( )

24. Are workers trained to handle cylinders carefully to avoid dropping? Yes ( ) No ( )

25. Is it prohibited to use hammers or wrenches to open cylinder valves? Yes ( ) No ( )

26. If trouble is experienced with a cylinder valve, is the supplier notified and are his instructions followed? Yes ( ) No ( )

27. Are fuel-gas cylinders placed with valve-ends up when in use? Yes ( ) No ( )

28. Are liquefied gases stored and shipped valve-end up with valve coveres in place? Yes ( ) No ( )

29. Are provisions made to never crack a fuel-gas cylinder valve near sources of ignition? Yes ( ) No ( )

30. Before a regulator is removed, is the valve closed and gas released from the regulator? Yes ( ) No ( )

31. Are cylinders with leaky valves or fittings removed from sources of ignition, slowly emptied, and appropriately marked? Yes ( ) No ( )

32. Is a warning notice posted near cylinders with leaky valves or fittings before the supplier is notified? Yes ( ) No ( )

33. Is it prohibited to use fuel-gas from cylinders without reducing pressure via a regulator? Yes ( ) No ( )

34. Are workers taught to always slowly open cylinder valves? Yes ( ) No ( )

35. Is it prohibited to open the acetylene cylinder valve more than 1 1/2 turns of the spindle? Yes ( ) No ( )

36. If a special wrench is required, is it left in position? Yes ( ) No ( )

37. Are manifolds of an approved type? Yes ( ) No ( )

38. Are fuel-gas cylinders, connected to one manifold inside a building, limited to 300 pounds of liquefied petroleum gas or 3,000 cubic feet of other fuel-gas? Yes ( ) No ( )

39. If more than one manifold is in the same room, are they at least 50 feet apart or separated by a barrier? Yes ( ) No ( )

40. Is installation of service piping systems in compliance with Federal requirements? Yes ( ) No ( )

41. Are underground pipe and tubing and outdoor ferrous pipe and tubing covered or painted with a material suitable for protection against corrosion? Yes ( ) No ( )

42. Are above ground piping systems marked in accordance with ANSI A13.1-1956, "Scheme for the Identification of Piping Systems"? Yes ( ) No ( )

43. Are station outlets marked to indicate the name of the gas? Yes ( ) No ( )

44. Are piping systems tested and proved gas-tight at 1 1/2 times maximum operating pressure? Yes ( ) No ( )

45. Are piping systems thoroughly purged of air before being placed in service? Yes ( ) No ( )

46. When lines are being purged of gas or air, are sources of ignition removed from uncapped openings? Yes ( ) No ( )

47. Is only approved equipment installed and used as recommended by the manufacturer? Yes ( ) No ( )

48. Are service piping systems protected by pressure relief devices? Yes ( ) No ( )

49. With respect to hose and hose connections:

    a. 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 ( )

b. 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 ( )

c. 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 ( )

d. Do hose connections comply with the Compressed Gas Association "Standard Hose Connection Specifications"? Yes ( ) No ( )

e. Will hose connections withstand twice normal pressure, and no less than 300 p.s.i.? Yes ( ) No ( )

f. Are hoses showing leaks, burns, worn places, or other defects repaired or replaced? Yes ( ) No ( )

50. With respect to pressure-reducing regulators:

a. Are pressure-reducing regulators used only for the gas and pressures for which they are intended? Yes ( ) No ( )

b. Do connections comply with the Compressed Gas Association "Regulator Connection Standards, 1958"? Yes ( ) No ( )

c. Is repair work performed by skilled, properly instructed mechanics? Yes ( ) No ( )

d. Are gauges on oxygen regulators marked "USE NO OIL"? Yes ( ) No ( )

e. Are union nuts and connections on regulators inspected before use and damaged parts destroyed and replaced? Yes ( ) No ( )

Application, Installation, and Operation of Arc Welding and Cutting Equipment

51. 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 ( )

52. Is open circuit (No Load) voltage of arc welding and cutting machines as low as possible and not in excess of the recommended limits? Yes ( ) No ( )

53. Where higher voltages are required, are precautions taken to protect the operator? Yes ( ) No ( )

54. Under wet conditions, are automatic controls for reducing no load voltage used? Yes ( ) No ( )

55. Is the installation of arc welding equipment in compliance with Federal requirements? Yes ( ) No ( )

56. If doing gas-shielded arc welding, are "Recommended Safe Practices for Gas-Shielded Arc Welding," A6.1-1966, American Welding Society, followed? Yes ( ) No ( )

57. Are all connections required to be checked before starting? Yes ( ) No ( )

58. Is welding cable spread out before use? Yes ( ) No ( )

59. Are grounding of the machine frame and safety ground connections of portable machines checked periodically? Yes ( ) No ( )

60. Is equipment checked periodically to make sure there are no leaks of cooling water, shielding gas, or engine fuel? Yes ( ) No ( )

61. Is proper switching equipment (emergency breaker) provided for shutting down the machine? Yes ( ) No ( )

62. Are manufacturer's printed rules and instructions required to be strictly followed? Yes ( ) No ( )

63. Are electrodes removed from the holders when not in use? Yes ( ) No ( )

64. Are provisions made that unused electrode holders cannot make electrical contact? Yes ( ) No ( )

65. Is it required that electric power to the machine be shut off when no one is in attendance? Yes ( ) No ( )

66. Are portable and/or fixed shields used to protect others from injury? Yes ( ) No ( )

67. Is it prohibited to use cables with splices within 10 feet of the holder? Yes ( ) No ( )

68. Is the welder forbidden to coil or loop welding electrode cable around his body? Yes ( ) No ( )

69. Is it prohibited to use defective equipment? Yes ( ) No ( )

70. Are wet machines thoroughly dried and tested before being used? Yes ( ) No ( )

71. Are work and electrode lead cables frequently inspected for wear and damage, and replaced when needed? Yes ( ) No ( )

72. Do means for connecting cable lengths have adequate insulation? Yes ( ) No ( )

73. Is adequate operator training provided? Yes ( ) No ( )

74. Is sufficient supervision provided? Yes ( ) No ( )

Fire Prevention--Fire Protection

75. When the object to be welded or cut cannot be moved, are movable fire hazards in the vicinity removed? Yes ( ) No ( )

76. If the object to be welded cannot be moved and fire hazards cannot be removed, are shields used to confine heat, sparks, and slag? Yes ( ) No ( )

77. Are provisions made to prevent sparks from dropping through floor openings onto combustible materials below? Yes ( ) No ( )

78. Is suitable fire extinguishing equipment available for instant use? Yes ( ) No ( )

79. Are fire watchers assigned when welding or cutting is performed in locations where a serious fire might develop? Yes ( ) No ( )

80. Are fire watchers properly instructed in their duties? Yes ( ) No ( )

81. Are floors in work areas required to be swept clear for a radius of 35 feet from welding? Yes ( ) No ( )

82. Are combustible floors kept wet, covered by damp sand, or protected by fire-resistant shields? Yes ( ) No ( )

83. When floors are wet down, are personnel protected from possible electrical shock? Yes ( ) No ( )

84. Is cutting or welding prohibited in the following situations:

a. In areas not authorized by management? Yes ( ) No ( )
b. In sprinkler-equipped buildings while such protection is impaired? Yes ( ) No ( )
c. In the presence of explosive atmospheres (for example, battery charging areas? Yes ( ) No ( )
d. Near readily ignitable materials? Yes ( ) No ( )

85. Are ducts and conveyor systems that might carry sparks protected or shut down? Yes ( ) No ( )

86. Are nearby combustible walls protected by fire-resistant shields or guards? Yes ( ) No ( )

87. When welding is done on metal walls, are precautions taken to protect combustibles on the other side? Yes ( ) No ( )

88. Is welding prohibited on metal partitions, walls, ceilings, or roofs having combustible coverings, or on walls or partitions of combustible, sandwich-type panel constructions? Yes ( ) No ( )

89. Is cutting or welding prohibited on pipes or metal in contact with combustible walls, partitions, ceilings, or roofs? Yes ( ) No ( )

90. Has management:

a. Established areas for cutting and welding, and procedures for cutting and welding in other areas? Yes ( ) No ( )

b. Designated a responsible individual for authorizing cutting and welding in areas not specifically designated for these operations? Yes ( ) No ( )

c. Required that cutters and welders and their supervisors are suitably trained in safe operations? Yes ( ) No ( )

d. Advised all contractors about flammable materials or hazardous conditions of which they may not be aware? Yes ( ) No ( )

91. 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 ( )

92. Are hollow spaces vented before cutting or welding? Yes ( ) No ( )

93. Is a fire check made of the area no sooner than 1/2 hour nor later than 1 hour after completion of welding? Yes ( ) No ( )

94. 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 ( )

95. After welding operations are completed, is the hot metal marked to provide a warning to other workers? Yes ( ) No ( )

Health Protection and Ventilation

96. Are welders and helpers working on platforms, scaffolds, or runways suitably protected against falling? Yes ( ) No ( )

97. Are welding cables so placed that they are clear of passageways, ladders, and stairways? Yes ( ) No ( )

98. Is it required that eye protection (helmets, hand shields, goggles) meet the Federal standards? Yes ( ) No ( )

99. Are employees exposed to the hazards created by welding, cutting, or brazing operations protected with personal protective equipment and clothing? Yes ( ) No ( )

100. Is a check made for adequate ventilation in and where welding or cutting is performed? Yes ( ) No ( )

101. When working in confined places:

a. Are environmental monitoring tests taken? Yes ( ) No ( )
b. Are cylinders and welding machines left on the outside? Yes ( ) No ( )
c. Is portable equipment on wheels securely blocked? Yes ( ) No ( )
d. Are means provided for quick removal of welders in case of an emergency? Yes ( ) No ( )
e. Is an attendant with a preplanned rescue procedure stationed outside? Yes ( ) No ( )
f. Are unauthorized persons (visitors, observers, passing workers) prohibited around welding, cutting, and brazing? Yes ( ) No ( )
g. Is the use of contact eye lenses prohibited? Yes ( ) No ( )

PHOSPHORIC ACID PLANT MAINTENANCE

Phosphoric acid plants require continuous maintenance and service. Maintenance workers must be constantly alert since they work more directly with potential plant hazards than operating personnel. Maintenance personnel must take extra precautions to insure their personal safety against the high temperatures, corrosive chemicals, harmful fumes, and steam. Safety rules and operating procedures must be followed very closely.

Read all of the questions in this section; discuss the questions with those persons 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 job safety analysis prepared for each hazardous job? Yes ( ) No ( )

2. Have safety procedures been established for opening lines, open flame, or spark producing work? Yes ( ) No ( )

3. Have written safety procedures been established for entry into confined spaces or vessels? Yes ( ) No ( )

4. Is electrically driven equipment locked-out prior to being worked on? Yes ( ) No ( )

5. Are all hoisting devices and monorails inspected regularly and records kept? Yes ( ) No ( )

6. Are temporary hazardous areas roped off or marked, as needed? Yes ( ) No ( )

7. Is approved appropriate protective clothing worn when opening hazardous lines? Yes ( ) No ( )

8. Is it required that walkways and stairways be kept free of hoses, welding leads, and other tripping hazards? Yes ( ) No ( )

9. Are oxygen and acetylene bottles properly stored and secured? Yes ( ) No ( )

10. Is it required that equipment and work areas be made safe and cleaned up as part of normal job completion procedure? Yes ( ) No ( )

11. Are work areas monitored on a regular basis for respiratory and other health hazards? Yes ( ) No ( )

12. Are respirators required to be worn when needed? Yes ( ) No ( )

13. Are portable ladders equipped with non-skid feet? Yes ( ) No ( )

14. Is it forbidden to take apart extension ladders in order to use the extensions separately? Yes ( ) No ( )

15. Are ladders stored properly to keep them in good condition? Yes ( ) No ( )

16. Are ladders inspected by user before use and defective ladders removed from use? Yes ( ) No ( )

17. Does scaffolding meet the Federal safety requirements? Yes ( ) No ( )

18. Are maintenance employees protected against the effects of high noise levels? Yes ( ) No ( )

19. Are defective ladders labeled and prohibited from use? Yes ( ) No ( )

MACHINERY AND MACHINE GUARDING

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 the phosphate industry includes:

-- adequate guarding of the moving parts of all machines,

-- periodic inspection of each machine,

-- formal training for operators and maintenance personnel, and

-- a reporting procedure for defective equipment.

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

1. Is there a regular program of safety inspections for machinery and equipment? Yes ( ) No ( )

2. Are records kept of safety inspections (including follow-up actions)? Yes ( ) No ( )

3. Is there an organized 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, walking, 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 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 approved safety glasses, face shields, or other eye-protective equipment provided and used by machine operators, where required? Yes ( ) No ( )

15. Before new abrasive wheels are mounted, is it required that they be 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 walking, tipping, or other 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 contacting employees? Yes ( ) No ( )

23. When 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. Are the guards secured and do they offer no accident hazard in themselves? Yes ( ) No ( )

27. Where point of operation exposes an employee to injury, is it properly 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 hand tools 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. Do fan guards have openings no larger than 1/2 inch? Yes ( ) No ( )

33. Do arbors and mandrels have firm and secure bearings 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 there a locking-type belt shifter, or equivalent positive device, on a machine driven by belts and shafting? Yes ( ) No ( )

36. Are provisions 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:

    a. Is the saw blade enclosed or guarded except for the working portion? Yes ( ) No ( )
    b. Are bandsaw wheels fully encased? Yes ( ) No ( )
    c. Do guards comply with the Federal requirements? Yes ( ) No ( )
    d. Are automatic brakes provided to stop the wheel in case of blade breakage? Yes ( ) No ( )
    e. Is there a tension control device to indicate proper tension for the saws used on the machine? Yes ( ) No ( )
    f. Do feed rolls of band resaws, provided with a guard, meet the Federal requirements? Yes ( ) No (

39. With respect to profile and swing-head lathes and wood heel turning machines:

    a. Does each profile and swing head lathe have all cutting heads covered by a metal guard? Yes ( ) No ( )
    b. 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 of lost motion and are they well lubricated? Yes ( ) No ( )

42. Is it required that cleanliness be maintained around machinery? Yes ( ) No ( )

43. Are suitable push sticks or push blocks provided? Yes ( ) No ( )

44. Are twists or kinks in bandsaws and ban 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:

a. Is operator training required on all machines? Yes ( ) No ( )
b. Is adequate supervision provided? Yes ( ) No ( )
c. Is "unauthorized-personnel operation" restricted? Yes ( ) No ( )

47. Are machines constructed so as to be free from excessive vibration when the largest size tool is mounted and run idle at full speed? Yes ( ) No ( )

48. Is the use of wooden bandsaw wheels, other than those of commercial manufacture, prohibited? Yes ( ) No ( )

49. Is the 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 worker 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 ripsaws:

a. Are they guarded by a hood? Yes ( ) No ( )
b. Are they furnished with a spreader? Yes ( ) No ( )

c. 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:

a. Are feed rolls and saws on self-feed circular saws protected by a hood or guard? Yes ( ) No ( )
b. 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:

a. Are they mounted above the table and provided with a hood? Yes ( ) No ( )
b. 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 ( )
c. Are limit chains or other devices provided to prevent swing and sliding cutoff saws from swinging beyond edges of the table? Yes ( ) No ( )
d. Are inverted swing cutoff saws provided with a hood? Yes ( ) No ( )

60. With respect to radial saws:

a. Are upper hood and lower guards provided? Yes ( ) No ( )
b. Are radial saws, used for ripping, provided with nonkickback fingers or dogs? Yes ( ) No ( )
c. Is an adjustable stop provided to prevent forward travel of the blade? Yes ( ) No ( )
d. 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 ( )

e. Is ripping and ploughing against the direction in which the saw turns prohibited? Yes ( ) No ( )

f. Is direction of saw rotation marked on the hood? Yes ( ) No ( )

g. 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:

a. 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 ( )

b. Is the opening in the table as small as possible? Yes ( ) No ( )

c. Is the clearance between the edge of the rear table and the cutter head not more than 1/8 inch? Yes ( ) No ( )

d. Is the table throat opening not more than 2 1/2 inches when tables are aligned with each other for zero cut? Yes ( ) No ( )

e. 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 ( )

f. 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:

a. Are feed chains and sprockets completely enclosed except for the portion of chain used for conveying stock? Yes ( ) No ( )

b. Are cutting heads and saws covered by guards? Yes ( ) No ( )

c. When 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:

a. Are safety-bit chucks without projecting set screws used? Yes ( ) No ( )

b. Are boring bits provided with a guard? Yes ( ) No ( )
c. Is the top of the cutting chain and driving mechanism enclosed? Yes ( ) No ( )
d. Is provision made to prevent dropping off of the counterweight? Yes ( ) No ( )
e. Are universal joints on spindles of boring machines completely enclosed? Yes ( ) No ( )
f. Are operating treadles covered by an inverted U-shaped metal guard, and fastened to the floor to prevent accidental tripping? Yes ( ) No ( )

64. With respect to wood shapers and similar equipment:

a. Are cutting heads of equipment that is not of the automatic feed type guarded? Yes ( ) No ( )
b. Are cylindrical heads used whenever possible? Yes ( ) No ( )
c. Are single cutter knives in shaper heads kept properly balanced? Yes ( ) No ( )
d. Are double-spindle shapers provided with a spindle starting and stopping device for each spindle? Yes ( ) No ( )

65. Are knives and cutting heads of woodworking machines kept sharp, properly adjusted, firmly secured, and properly balanced? Yes ( ) No ( )

66. Is sharpening or tensioning of saw blades or cutters performed only by qualified personnel? Yes ( ) No ( )

67. On belt conveyors, are the following requirements being met:

a. Are nip-points at the head, tail, and take-up pulleys completely guarded? Yes ( ) No ( )
b. Are there reach guards enclosing the sides of each belt for at least 36 inches back of the pulley so that no one can reach in, over, or around to contact the pinch between the belt and pulley? Yes ( ) No ( )
c. Are there skirt guards to prevent material falling off conveyors? Yes ( ) No ( )
d. Are skirt plates and chute skirts positioned so as not to create a pinch point with the idlers? Yes ( ) No ( )
e. Are conveyors fitted with mechanical belt cleaners to eliminate manual cleaning hazards? Yes ( ) No ( )

f. Have extension grease lines been installed so that a worker cannot be caught by rollers and bearings when working around them? Yes ( ) No ( )

g. Are belt conveyors passing over designated walkways or work areas where there is less than 7 feet of clearance enclosed underneath with proper shielding material (sheet metal, expanded metal)? Yes ( ) No ( )

h. Are unguarded conveyors fitted with emergency stop cables the entire length of the unguarded area? Yes ( ) No ( )

68. Are all screw conveyors completely enclosed? Yes ( ) No ( )

69. Are all self-propelled track-type or wheeled scrapers, front-end loaders, dozers, tractors, motor graders, and fork-lifts equipped with rollover protective structures which meet the Federal performance standards? Yes ( ) No ( )

HAND AND PORTABLE TOOLS

This section of the Self-Evaluation Instrument is intended to evaluate the effectiveness of the small tool program, whether they are provided by employer or personally owned. Included in this section are:

-- hand tools (nonpowered screwdrivers, hammers, chisels, knives, picks, axes, cutters, etc.),

-- portable power tools (electric, gasoline, pneumatic, hydraulic), and

-- powder-actuated (explosive-actuated) tools.

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 tools,

-- safeguarding the rotating or moving parts (points of operation),

-- use of appropriate protective equipment, as needed, and

-- keeping hand and portable tools sharpened.

Read all of the questions in this section; discuss the questions with those persons at your establishment who know the most about the areas covered; and, while conducting a walk-through 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 tools designed to best do the job and fit the user to reduce injuries and accidents? Yes ( ) No ( )

5. Are poorly maintained or damaged tools taken out of service at the time of inspection? Yes ( ) No ( )

6. Are there designated tool storage facilities or lockers for personally owned tools? Yes ( ) No ( )

7. Is eye protection required when persons use tools on materials producing flying chips or dust? Yes ( ) No ( )

8. Is hand protection required when persons use tools on materials likely to produce splinters, burrs, or sharp edges? Yes ( ) No ( )

9. Is carrying of tools with unprotected sharp edges or points in pockets prohibited? Yes ( ) No ( )

10. Are the points or sharp edges of tools kept sheathed or protected when not in use? Yes ( ) No ( )

11. 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 ( )

12. If power is from an approved source, is this power supply source designed to interrupt at 5 MA or less leakage current? Yes ( ) No ( )

13. Is there an established testing program for the isolated power supply equipment? Yes ( ) No ( )

14. Are records maintained of the isolated power supply tests? Yes ( ) No ( )

15. Is the integrity of the grounding conductor on portable electric tools tested? Yes ( ) No ( )

16. Have procedures been established for turning in tools which require repairs, maintenance, or replacement? Yes ( ) No ( )

17. 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 ( )

18. Are the following portable electrical tools equipped with a switch that requires constant operator pressure for operation:

a. Drills? Yes ( ) No ( )
b. Tappers? Yes ( ) No ( )
c. Fastener drives? Yes ( ) No ( )
d. Grinders? Yes ( ) No ( )
e. Belt sanders? Yes ( ) No ( )
f. Reciprocating, circular, and chain saws? Yes ( ) No ( )
g. Other (specify)

19. Are abrasive wheel grinders equipped with:

a. Throat guards or spark arrestors used to protect against pieces of broken wheel? Yes ( ) No ( )
b. Are these guards adjusted to within 1/4 inch of the wheel? Yes ( ) No ( )

20. If power lawnmowers are used:

a. Is a catcher assembly or stone guard in place? Yes ( ) No ( )
b. Is a shut-off device to stop the motor or engine easily accessible to the operator? Yes ( ) No ( )
c. Is a braking device provided on riding mowers? Yes ( ) No ( )
d. Are dead-man controls provided on riding mowers? Yes ( ) No ( )

21. If jacks are used:

a. Are jacks operated within their rated design limits? Yes ( ) No ( )
b. After a load has been raised by a jack, is it cribbed or blocked in position at once if someone is to work under the load? Yes ( ) No ( )

22. If abrasive blast-cleaning nozzles are used:

a. Are the operating valves of the nozzles equipped with a dead-man control? Yes ( ) No ( )
b. Are NIOSH-certified respirators used? Yes ( ) No ( )

23. If pneumatic-powered tools and hoses are used:

a. Is a retainer provided so that the tool may not be ejected from the hose? Yes ( ) No ( )

b. Before disconnecting the air hose from the line, is the air cut off and the pressure in the line released? Yes ( ) No ( )

c. When used with aerial devices, is the moisture accumulator drained daily? Yes ( ) No ( )

24. If gasoline powered tools are used, is the gasoline dispensed from and stored in Underwriters Laboratories- or Factory Mutual-labeled safety cans? Yes ( ) No ( )

25. Is special training and instruction required before employees are permitted to use powder-actuated tools? Yes ( ) No ( )

26. Are powder-actuated tools always left unloaded until ready for use? Yes ( ) No ( )

27. Is leaving loaded tools unattended at the worksite and transporting them away from the worksite prohibited? Yes ( ) No ( )

28. Is it prohibited to point these tools, loaded or unloaded, at anyone? Yes ( ) No ( )

29. Are all other forms of horseplay with these tools prohibited? Yes ( ) No ( )

30. Are approved safety goggles and face shields worn by the operator and any other persons in range of flying chips? Yes ( ) No ( )

31. 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 ( )

32. 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 the surface? Yes ( ) No ( )

33. Is storing powder-actuated tools in the following locations prohibited:

a. Explosive atmosphere? Yes ( ) No ( )

b. Vicinity of highly flammable materials? Yes ( ) No ( )

34. Is wearing approved leather gloves and eye protection required of the operator during coldweld and thermo-weld explosive-type welding? Yes ( ) No ( )

35. Is a careful inspection made of all wires to be welded to ensure there is no moisture present? Yes ( ) No ( )

36. Are all personnel in the immediate area warned before igniting the charge? Yes ( ) No ( )

37. Are extra charges stored a safe distance away from work in process? Yes ( ) No ( )

38. Are tools inspected, cleaned, and stored in a safe place at the end of each working period? Yes ( ) No ( )

39. Are defective tools marked and removed from service until such defects have been properly corrected? Yes ( ) No ( )

40. 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 ( )

41. Is approved eye protection required when operating a terminal hypress tool? Yes ( ) No ( )

42. Are cable ends effectively secured before cutting cable with hypress tool? Yes ( ) No ( )

43. Are all appropriate workers instructed to use extreme caution concerning the location of fingers and hands when tool cutter and tool press is in operation? Yes ( ) No ( )

44. Is adding gasoline to the pump engine when engine is hot prohibited? Yes ( ) No ( )

45. 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 ( )

CRANES AND HOISTS

Cranes and hoists play a vital role in the phosphate industry, especially in the maintenance, repair, and installation of heavy equipment. They are a potential source of accidents and injuries.

An effective safety program includes the following activities:

-- systematic, periodic inspection of all crane machinery, apparatus, and appliances including ropes, chains, and slings by qualified personnel,

-- formalized training, selection, and refresher program of operators and maintenance personnel, and

-- thorough investigation of each hoisting accident and injury.

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

*1.	Are only designated personnel permitted to operate a crane?	Yes ( ) No ( )
2.	Is it required that only one person give the operator signals at a time?	Yes ( ) No ( )
3.	Are daily inspections and/or tests of the equipment performed on:	
	a. Vehicle brakes?	Yes ( ) No ( )
	b. Oil and grease levels?	Yes ( ) No ( )
	c. Wire or fiber ropes?	Yes ( ) NO ( )
	d. Hydraulic levels (where applicable)?	Yes ( ) No ( )
	e. Safety guards and devices?	Yes ( ) No ( )
4.	Are monthly inspections made on brakes, cranes, hooks, and ropes; and written, dated, and signed inspection records kept?	Yes ( ) No ( )
5.	Is load determined and is it prohibited 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 ( )

* ANSI B30.5 should be consulted for operator training and qualifications.

8. If the crane is re-rated, is the test report readily available? Yes ( ) No ( )

9. Are crane operators prohibited from dragging loads sideways? Yes ( ) No ( )

10. During hoisting, is sudden acceleration, deceleration, and contact with any obstruction prohibited? Yes ( ) No ( )

11. Are employees prohibited from riding the load or hook? Yes ( ) No ( )

12. Is it prohibited to wrap the hoist rope around the load when lifting (except timber hitch)? Yes ( ) No ( )

13. Are following precautions taken when crane is in transit:

    a. Boom carried in line with the direction of motion? Yes ( ) No ( )
    b. Superstructure secured against rotation? Yes ( ) No ( )
    c. Empty hook restrained so that it cannot swing freely? Yes ( ) No ( )

14. When rotating, are sudden starts and stops prohibited and speed reduced to avoid overswinging the load? Yes ( ) No ( )

15. When two or more cranes are lifting one load, is one 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 downgrade side? Yes ( ) No ( )

18. Is wire rope removed from service when any of the following conditions exist:

    a. The rope strength has been significantly reduced due to the corrosion, pitting, or heat? Yes ( ) No ( )
    b. The thickness of the outer wires has been reduced to 2/3 of the original thickness? Yes ( ) No ( )
    c. Damage is apparent from excessive kinking, crushing, or severe twist operation? Yes ( ) No ( )

19. Are tool boxes stored so as not to interfere with access or operation? Yes ( ) No ( )

20. Are cranes equipped with fire extinguishers? Yes ( ) No ( )

21. Are rated-load capacities and hazard warnings posted in view of the operator? Yes ( ) No ( )

22. Is mobile equipment inspected by a qualified person before each use? Yes ( ) No ( )

23. Are mobile cranes inspected annually by a qualified person? Yes ( ) No ( )

24. Are records kept of annual inspections? Yes ( ) No ( )

25. Is repair material in slings of greater strength than the parent material? Yes ( ) No ( )

26. Are knots prohibited in any slings? Yes ( ) No ( )

27. Are deformed or defective hooks, rings, or chain links prohibited? Yes ( ) No ( )

28. Are rope slings free of kinks and twists? Yes ( ) No ( )

29. Are baskets, tubs, or skids or similar containers used for hoisting materials designed so as to not exceed the safe carrying capacity of the crane when fully loaded? Yes ( ) No ( )

30. Are crane operators prohibited from carrying loads over people? Yes ( ) No ( )

31. Are cranes prohibited from operation in close proximity to high voltage lines? Yes ( ) No ( )

32. Will hoist controls automatically return to the "OFF" position when released by the operator? Yes ( ) No ( )

33. Are preventive maintenance programs established for all hoisting equipment? Yes ( ) No ( )

34. Are all electrically operated crane controls plainly marked to indicate their function? Yes ( ) No ( )

35. Are the controlling operating handles located within convenient reach of the operator? Yes ( ) No ( )

36. Is an automatic means provided to stop the boom drum motion when the maximum permissible boom angle is reached? Yes ( ) No ( )

37. Do all travelling cranes have at least 54 inches of clearance between the crane and stationary structure or stacks of materials? Yes ( ) No ( )

38. Are automatic cranes so designed that all motions shall fail-safe if a malfunction of controls occurs? Yes ( ) No ( )

39. Are electric crane hoist brakes designed so that the brake will be applied when the power is cut from the hoist? Yes ( ) No ( )

40. Is at least one braking means directly connected to the hoist drum? Yes ( ) No ( )

41. Are crane operators prohibited from working unless they have a clear view of the work area? Yes ( ) No ( )

42. Are taglines attached to suspended materials? Yes ( ) No ( )

43. Is each crane hoisting cable properly lubricated at all times? Yes ( ) No ( )

44. Are loads suspended for no more than the time needed for transfer or repair? Yes ( ) No ( )

45. Is the hoist required to be centered over the load:

    a. When practicable? Yes ( ) No ( )
    b. If not practicable, are taglines attached and used to control load? Yes ( ) No ( )

46. Are these hoisting tips taught to all employees:

    a. Not more than one person is to pull on the hand chain to avoid overloading the hoist? Yes ( ) No ( )
    b. A "cheater bar" is never to be used on the handle of a lever ratchet hoist? Yes ( ) No ( )
    c. Hoisting equipment is never to be used for lifting the operator or fellow worker? Yes ( ) No ( )
    d. The hoist is inspected before beginning to lift any load, especially the hooks? Yes ( ) No ( )

e. The load is always seated in the proper area of the hook, never on the tip? Yes ( ) No ( )

f. Worn chain or wire rope is replaced immediately or the hoist removed from service? Yes ( ) No ( )

g. Welding is prohibited on the hoist load chain? Yes ( ) No ( )

47. Is there a written procedure for use of aerial baskets? Yes ( ) No ( )

ELECTRICAL WIRING AND SWITCH BOARDS

Questions in this section of the Self-Evaluation Instrument are designed to identify some of the potential hazards to employees working on or near electrical wiring or switchboards, and to evaluate the establishment's program to protect its employees from these hazards. It is not possible to cover all the potential hazards associated with the installation, maintenance, and testing of this equipment due to the many different types of equipment and individual operating circumstances.

The phosphate industry is generally required to install and maintain equipment in accordance with the "National Electrical Code" and reference should be made to that source for detailed information. Whenever there are variances among Federal, state, or local requirements regarding electrical equipment, companies should follow the stricter requirements.

Because of the specialized nature of electrical installation and its inherent dangers, establishments must insist that only thoroughly trained and knowledgeable employees be allowed to work on or near this equipment. For maximum effectiveness, these employees should be trained in the plant's particular electrical system in addition to any other general electrical training.

An effective electrical safety program for the phosphate industry includes:

-- education and training of employees in plant electrical installation and safe work procedures,

-- regular inspection and maintenance of protective equipment and electrical installations,

-- adherence to applicable Federal, state, and local electrical codes, and
-- active involvement by electrical department personnel on the plant safety committee.

Questions 1 through 31 deal with general electrical operations. Questions 32 through 38 deal with transformer locations. Questions 39 through 44 deal with switchboards.

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

1. Are all reasonable means and precautions taken to assure that each employee is knowledgeable and physically qualified to perform his work? Yes ( ) No ( )

2. Are employees regularly working on or around equipment or lines instructed in the cardio-pulmonary resuscitation (CPR) method? Yes ( ) No ( )

3. Are the necessary equipment and devices required for electrical work provided, such as:

   a. Insulating wearing apparel (rubber gloves, sleeves, and boots)? Yes ( ) No ( )
   b. Insulating shields, covers, mats, blankets, stools, and platforms? Yes ( ) No ( )
   c. Appropriate eye, face, and head protection? Yes ( ) No ( )
   d. Safety locks, danger tags, and portable danger signs? Yes ( ) No ( )
   e. Fixed or portable lighting equipment? Yes ( ) No ( )
   f. Proper tools (e.g., hot sticks, etc.)? Yes ( ) No ( )

4. Are proper storage locations provided for all rubber protective equipment? Yes ( ) No ( )

5. Are users of rubber protective equipment responsible for its care? Yes ( ) No ( )

6. Are employees required to wear gloves of cotton or other fabric inside the rubber glove to absorb perspiration and prevent it from running down the outer surface of the rubber glove? Yes ( ) No ( )

7. Are leather protectors worn over rubber gloves for protection against damage? Yes ( ) No ( )

8. Is rubber protective equipment visually inspected prior to beginning each job? Yes ( ) No ( )

9. Are rubber gloves "air tested" prior to beginning each job for cuts and weak spots by rolling up the cuff tightly toward the palm so the trapped air will stretch the rubber? Yes ( ) No ( )

10. Are dielectric tests made on rubber gloves at regular, frequent intervals? Yes ( ) No ( )

11. Are employees prohibited from working alone on energized lines or equipment over 600 volts? Yes ( ) No ( )

12. Are employees required to report as soon as practicable any obvious hazards to life or property observed in connection with any electrical equipment or lines? Yes ( ) No ( )

13. Are all imminently dangerous conditions immediately guarded until they can be made safe? Yes ( ) No ( )

14. Are employees instructed to treat electrical equipment and lines as being energized unless they are positively known to be de-energized? Yes ( ) No ( )

15. Are employees instructed to make preliminary inspections and/or tests to determine what conditions exist before starting work? Yes ( ) No ( )

16. Are disconnecting switches opened before fuses are replaced? Yes ( ) No ( )

17. Are joints and loose ends of wires either taped or otherwise protected? Yes ( ) No ( )

18. Are employees forbidden from touching any energized wire, cable, guard rail, or energized metal frame or case while in contact with the ground? Yes ( ) No ( )

19. Are portable cables inspected for unsafe conditions at least once daily during the period of their use? Yes ( ) No ( )

20. Are bare conductors prohibited during the wiring of any temporary circuit? Yes ( ) No ( )

21. Are all temporary circuits protected by suitable disconnecting switches or plug connectors at the junction with permanent wiring? Yes ( ) No ( )

22. Are employees familiar with all conditions of equipment or lines to be tested before making any change to this equipment? Yes ( ) No ( )

23. When equipment or lines are to be disconnected from any source of electric energy, are necessary switches opened and locked-out and tagged whenever possible? Yes ( ) No ( )

24. Are employees instructed not to rely on the insulating covering of wires for safety? Yes ( ) No ( )

25. Are metal measuring tapes, ropes, hand-lines, or other equipment with metal threads woven into the fabric prohibited around electrical equipment? Yes ( ) No ( )

26. Is the use of metal ladders by your electrical department personnel prohibited? Yes ( ) No ( )

27. Are all switches and disconnects properly labeled? Yes ( ) No ( )

28. Are insulated fuse tongs used in testing or changing fuses? Yes ( ) No ( )

29. Do all interior wiring systems include an equipment grounding conductor which is connected to all metal parts of electrical equipment and continuously identified throughout the system? Yes ( ) No ( )

30. Are all energized parts of electrical equipment operating at 50 volts or more guarded against accidental contact by approved cabinets or other forms of approved enclosures, or by any of the following means:

    a. By location in a room, vault, or similar enclosure which is accessible only to qualified personnel? Yes ( ) No ( )
    b. By suitable, permanent, and substantial partitions or screens, so arranged that only qualified persons will have access to the space within reach of the live parts? Yes ( ) No ( )
    c. By standard guard rail, provided the location is such as to make contact with live parts unlikely? Yes ( ) No ( )
    d. By location on suitable balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons? Yes ( ) No ( )
    e. By elevation at least 8 feet above the floor or other working surface? Yes ( ) No ( )

f. In locations where electrical equipment would be exposed to physical damage, enclosure or guards shall be so arranged and of such strength as to prevent such damage? Yes ( ) No ( )

g. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous standard warning signs forbidding unqualified persons to enter? Yes ( ) No ( )

h. Where current carrying parts of more than 150 volts to grounding must necessarily be exposed (unguarded) within 8 feet from the floor, are all surrounding conducting floors and other conductive surfaces within reach covered with suitable insulating platforms, mats, or other insulating devices? Yes ( ) No ( )

31. Is sufficent access and working space provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment? Yes ( ) No ( )

32. Are exposed, non-current-carrying metal parts of transformer installations (including fences, guards, etc.) grounded? Yes ( ) No ( )

33. Are transformers mounted on arms or poles at least 10 feet above walkways and not less than 15 feet above roadways? Yes ( ) No ( )

34. Is material storage inside transformer vaults or rooms forbidden? Yes ( ) No ( )

35. Are warning signs forbidding entrance to unauthorized personnel displayed at all transformer room locations? Yes ( ) No ( )

36. Are warning labels affixed to all transformers with Askarels containing polychlorinated bi-phenols (PCB) advising employees that it is a suspect cancer-causing agent? Yes ( ) No ( )

37. Is training provided in the following areas for employees whose work may require that they come in contact with PCB:

a. Protective clothing?	Yes ( ) No ( )
b. Eye protection?	Yes ( ) No ( )
c. Respiratory protection?	Yes ( ) No ( )
d. First aid requirements?	Yes ( ) No ( )

38. In eliminating use of PCB from operations, are the disposal requirements of the Toxic Substances Control Act (TSCA) required to be followed? Yes ( ) No ( )

39. Is the required working space behind and around switchboards kept clear? Yes ( ) No ( )

40. Is matting provided behind switchboards to insulate employees from standing on a ground? Yes ( ) No ( )

41. If the switchboards exceeded 48 inches in width, can employees exit from either end of switchboard compartments? Yes ( ) No ( )

42. Depending upon voltage, when parts are energized on one or both sides of a switchboard, is there safe clearance (to a grounded surface) between sides? Yes ( ) No ( )

43. Are readily accessible fire extinguishers provided for all switchboard locations? Yes ( ) No ( )

ELECTRICAL GROUNDING

The extensive use of electrical apparatus in the phosphate industry requires that systems and procedures be developed to protect employees from electric shock caused by faults occurring in the apparatus. This protection is best afforded through the installation and maintenance of effective grounding circuits in all electrical installations.

It is not possible for written grounding procedures to cover every possible grounding application, however, if the principles of grounding are applied by those persons qualified to work on and around electrical equipment, safe working conditions will result. Article 250 of the "National Electrical Code" covers the general requirements for the grounding of electrical installations and all installations should meet requirements.

This section of the Self-Evaluation Instrument is intended to evaluate installation, maintenance, and testing procedures for grounding circuits and to identify potential hazards to employees, and evaluate the establishment's program to protect employees from these hazards.

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

1. Are all exposed, noncurrent-carrying metal parts of fixed or portable electrical equipment (such as frames of motors, frames of portable electric tools, switchboards, and enclosures for switches and transformers) effectively grounded regardless of the voltage or surrounding conditions? Yes ( ) No ( )

2. Are conductor armor, metallic conductor raceways, and all equipment supplied directly by metal encased wiring, grounded? Yes ( ) No ( )

3. Is the use of grounding conductors for dual grounding capacities, such as a common ground for a welding circuit and an equipment frame, prohibited? Yes ( ) No ( )

4. Do grounding conductors meet National Electric Code requirements and have sufficient current-carrying capacity to operate the circuit overload device of the equipment? Yes ( ) No ( )

5. Do earth grounds conform to one or more of the following approved systems:

   a. A buried cold water pipe system that is not wrapped or insulated from the earth? Yes ( ) No ( )
   b. A local metallic underground piping system, metal well casing, etc., except those systems for gas or combustible liquids or vapors? Yes ( ) No ( )
   c. A solid steel ground rod at least 5/8-inch diameter, driven to a depth of at least 8 feet and having a resistance to ground not to exceed 5 ohms? Yes ( ) No ( )

6. Is bare copper prohibited from being used as a buried ground (because of reaction and corrosion)? Yes ( ) No ( )

7. Is sufficient distance maintained between buried electrical grounds and underground piping for gas or combustible liquids or vapors? Yes ( ) No ( )

8. Are ground fault circuit interrupters (GFCI) placed on 120-volt, 15-20 ampore circuits where three prong outlets have not been installed? Yes ( ) No ( )

9. Are GFCI's used in areas where the existing integrity of ground connections is questionable? Yes ( ) No ( )

10. Are the GFCI's of an approved type? (Tripped by 5 milliampers or less within 25 milliseconds or less.) Yes ( ) No ( )

11. In addition to GFCI's, is a ground continuity monitor for high voltage mobile equipment required? Yes ( ) No ( )

12. Is there a regular schedule for testing grounding systems? Yes ( ) No ( )

13. Are ground wire(s) in power cables in full contact with the metal shielding? Yes ( ) No ( )

14. Is it forbidden to connect the substation ground to the equipment ground (to avoid the possibility of energizing the equipment by a fault in the power supply system)? Yes ( ) No ( )

15. Are all portable hand-held electrical tools either double insulated or effectively grounded? Yes ( ) No ( )

16. Are all portable electrical tools periodically tested for effective grounding? Yes ( ) No ( )

17. Are GFCI's used with portable 110-120 volt power tools? Yes ( ) No ( )

HIGH VOLTAGE LINE WORK

Accidents and injuries involving high voltage line work most frequently result from electrical contact and falls.

In order to prevent accidents involving high voltage line work, each establishment must have a safety program that includes the identification of potential hazards and establishes safe work procedures regarding this type of work.

This section of the Self-Evalution Instrument is intended to identify the establishment's potential hazards and to evaluate its program to protect its employees from these hazards.

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

1. Are poles, ladders, scaffolds, and other elevated structures inspected prior to climbing? Yes ( ) No ( )

2. Are tests required to establish that lines and equipment are de-energized? Yes ( ) No ( )

3. Are proper clearances from exposed energized parts maintained? Yes ( ) No ( )

4. Are lines and equipment to be de-energized clearly identifed and isolated from all sources of voltage? Yes ( ) No ( )

5. 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 ( )

6. Are safety harnessess required to be worn by employees working on poles, towers, or other elevated structures? Yes ( ) No ( )

7. Are personal tools inspected daily to determine their safe working condition? Yes ( ) No ( )

8. Are ropes and measuring tapes used near energized lines or equipment of non-conductive type? Yes ( ) No ( )

9. Are employees working on the ground while high voltage line work is in progress made aware of the overhead hazard? Yes ( ) No ( )

10. Is lifting equipment around high voltage line work considered energized and is contact with it forbidden? Yes ( ) No ( )

11. Are unattended pole holes covered or guarded? Yes ( ) No ( )

12. Are tension reels, guard structures, tielines, or other means used to prevent accidental contact with energized circuits? Yes ( ) No ( )

13. When stringing wire adjacent to energized lines, is all pulling and tensioning equipment isolated, insulated, or grounded? Yes ( ) No ( )

14. Are employees protected from any other conductive object at different potential while doing live-line work? Yes ( ) No ( )

15. Is a clear hot stick distance enforced for linemen doing live-line work as required by Federal standards? Yes ( ) No ( )

16. Are hot sticks:

    a. Of approved design? Yes ( ) No ( )
    b. Tested at regular intervals? Yes ( ) No ( )
    c. Visually inspected before each use? Yes ( ) No ( )
    d. Taken out of service immediately when defective? Yes ( ) No ( )
    e. Properly stored? Yes ( ) No ( )

17. Are crew members taught the correct use and limitations of hot-line tools? Yes ( ) No ( )

18. Are rubber gloves worn while working on high voltage equipment? Yes ( ) No ( )

19. Are leather gloves worn over rubber gloves to protect the rubber from damage? Yes ( ) No ( )

20. Is a rubber glove safety factor required that is sufficiently higher than the highest voltage to be worked with rubber gloves? Yes ( ) No ( )

21. Are rubber gloves tested at regular intervals and replaced if there is any question of their insulating ability? Yes ( ) No ( )

22. Is an on-the-job test performed prior to each use by forcing air into each glove and rolling up the cuff to check for tears or punctures? Yes ( ) No ( )

23. When different crews are working on the same line section at different locations, are reliable communications established? Yes ( ) No ( )

24. Are spotlights or portable lights provided so that night work can be performed safely? Yes ( ) No ( )

25. Are periodic (at least monthly) safety meetings held with employees? Yes ( ) No ( )

26. Are electricians instructed in the Cardio Pulmonary Resuscitation (CPR) method? Yes ( ) No ( )

24. Are leather protectors required with the use of rubber gloves? Yes ( ) No ( )

25. Are approved rubber protective gloves electrically tested at least once every 90 days? Yes ( ) No ( )

26. Are personnel required to visually inspect and "air" test rubber gloves at least daily before use? Yes ( ) No ( )

27. Is the wearing of appropriate cotton liners under rubber gloves required when an employee's hands are being treated with medication that may be harmful to rubber? Yes ( ) No ( )

28. Are protective bags provided for rubber protective gloves? Yes ( ) No ( )

29. Are rubber gloves placed in the bag with cuffs toward bottom and properly protected from damage when not in use? Yes ( ) No ( )

30. Is the use of rubber protective gloves prohibited as work gloves or for any purpose other than protection from electrical shock? Yes ( ) No ( )

31. When rubber gloves fail during testing, are they immediately destroyed or properly marked to avoid the possibility of reuse for electrical purposes? Yes ( ) No ( )

32. Is the wearing of rings, watches, bracelets, etc. prohibited while using rubber protective gloves? 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 ( )

WALKING AND WORKING SURFACES

All places of employment, passageways, storerooms, and service rooms must be kept clean, orderly, and, as far as possible, in a dry condition. Where mechanical handling equipment is used, safe clearances must be allowed. Aisles and passageways must be kept clear and properly marked. Covers or guardrails must be provided to protect personnel from the hazards of open pits, tanks, floor or wall openings, elevated platforms, and other potential dangers. Also, dock boards must be designed correctly and positioned securely for safe material handling from docks.

Scaffolds and manually propelled mobile ladder stands are elevated work platforms that support people and materials. Some 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.

-- 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk-through 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 protruding objects, loose material, rock, or any material that could cause a bumping into, 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 toe-boards and guardrails, as required? Yes ( ) No ( )

9. Are open sided floors, platforms, and runways 4 feet or more above floor or ground level guarded by a standard railing on all open sides with toe-boards? Yes ( ) No ( )

10. Is every wall opening from which there is a drop of more than 4 feet guarded by a rail, picket fence, half door, or equivalent? Yes ( ) No ( )

11. Are walkways that are subject to water or other liquids provided with nonslip surfaces? Yes ( ) No ( )

12. Are mats provided inside entrance doors so people can wipe snow, ice, and water from their shoes before walking onto a floor that is slippery when wet (e.g., terrazzo or varnished concrete)? Yes ( ) No ( )

13. Are walkways and/or exitways kept clear at all times of snow, ice, and water? Yes ( ) No ( )

14. Are there standard stair rails or handrails on all stairways having four or more risers? Yes ( ) No ( )

15. Are all stairs at least 22 inches wide? Yes ( ) No ( )

16. Is all stair construction uniform? Yes ( ) No ( )

17. Are all stairs well illuminated? Yes ( ) No ( )

18. Are all treads made of nonslip material? Yes ( ) No ( )

19. Do stairs have at least a 7-foot overhead clearance? Yes ( ) No ( )

20. Do stairs angle no more than 50° and no less than 30° from horizontal? Yes ( ) No ( )

21. If there are elevators at this establishment (if not, go to question 23):

    a. Are all elevators inspected regularly? Yes ( ) No ( )
    b. Does this establishment have a current elevator inspection certificate for each elevator? Yes ( ) No ( )
    c. Are all elevators kept in good working condition? Yes ( ) No ( )

22. Is only one person at a time permitted on ladders designed for one-man operation? Yes ( ) No ( )

23. Are the joints between ladder side rails and steps tight? Yes ( ) No ( )

24. Are ladders free from improvised repairs and from modifications to make them longer? Yes ( ) No ( )

25. Are ladders sturdy and strong enough for their intended use? Yes ( ) No ( )

26. 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 ( )

27. Are rung spacings uniform for fixed ladders? Yes ( ) No ( )

28. Are clearances adequate for fixed ladders? Yes ( ) No ( )

29. Do fixed ladders have at least 3 feet of extension at the top of ending? Yes ( ) No ( )

30. 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 ( )

31. Do all fixed ladders have a preferred pitch of 75°-90°? Yes ( ) No ( )

32. 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 ( )

33. Are portable ladders free of cracks, splinters, burrs, and bent rungs or frames? Yes ( ) No ( )

34. On two-section ladders, is height adjustment prohibited unless user is at the bottom of the ladder? Yes ( ) No ( )

35. Is it prohibited to use the top of an ordinary step ladder as a step? Yes ( ) No ( )

36. 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 ( )

37. Are guardrails 36 to 42 inches high? Yes ( ) No ( )

38. Are toeboards a minimum 4 inches high? Yes ( ) No ( )

39. Whenever there is danger of material falling off the scaffold onto persons below, is a wire mesh enclosure or equivalent provided between the guard-rail and the toeboard? Yes ( ) No ( )

40. Are scaffolds erected on solid ground and fastened or anchored to prevent accidental movement? Yes ( ) No ( )

41. Are walking surfaces of nonskid materials? Yes ( ) No ( )

42. Are walking surfaces kept clear of snow, ice, and puddles? Yes ( ) No ( )

43. Are employees prohibited from altering or horizontally moving fixed scaffolds? 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 ( )

46. Are employees prohibited from working on scaffolds during storms or high winds? Yes ( ) No ( )

47. Is overhead protection provided for men on scaffolds exposed to overhead hazards? Yes ( ) No ( )

48. Do materials being hoisted onto a scaffold have a tag line? Yes ( ) No ( )

49. Are portable dockboards secured in position by anchoring? Yes ( ) No ( )

50. Are handholds or other effective means provided on portable dockboards to permit safe handling? Yes ( ) No ( )

EXITS

Every building or structure, new or old, designed for human use 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 one single safeguard.

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

1. Is more than one accessible exit provided and marked? 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 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 exit doors from rooms with a capacity for more than 50 people swing with exit traffic? Yes ( ) No ( )

9. Are all exits marked with an exit sign and illuminated by a reliable light source? Yes ( ) No ( )

10. Is the direction to exits, when not immediately apparent, marked with visible signs? Yes ( ) No ( )

11. 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 ( )

12. Are all paths to exits and employees' aisles kept sufficiently illuminated whenever employees are present? Yes ( ) No ( )

13. Is some means of emergency lighting provided? Yes ( ) No ( )

AMMONIUM PHOSPHATE
(LIQUID)

Two ammonium phosphate solutions are produced, "10-34-0" and "11-37-0," each in the same process. The most commonly used technology is the pipe reactor system. Raw materials are superphosphoric acid, anhydrous ammonia, and water.

The acid and ammonia are reacted in a vertical pipe and the heat generated produces a temperature of 600°F to 700°F. The product of reaction is dispersed in cool "10-34-0" or "11-37-0" (solution), at which point water and final ammonia are added.

Safety focuses upon the handling of hot superphosphoric acid, anhydrous ammonia (liquid and gaseous) under pressure, and hot process equipment. The final products are nearly neutral, cool, and only mildly corrosive to the skin.

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

1. Are employees properly instructed in the safe procedures for handling superphosphoric acid? Yes ( ) No ( )

2. Are employees appropriately equipped with personal protective gear, (such as rubber-wear, goggles, face shields, gloves, etc.) when working around superphosphoric acid? Yes ( ) No ( )

3. Are personnel properly instructed in the safe methods of handling anhydrous ammonia, in both the liquid and gaseous forms? Yes ( ) No ( )

4. In the event of an ammonia leak, is respiratory protective equipment readily available for immediate use? Yes ( ) No ( )

5. Are employees properly and thoroughly instructed in the safe procedures for starting up the pipe reactor plant? Yes ( ) No ( )

6. To insure support in case of an emergency, do personnel work in pairs while the plant is operating? Yes ( ) No ( )

7. Is there a whole-body safety shower and eye wash station, capable of 15 minutes continuous flow, located so that it can be immediately used? Yes ( ) No ( )

8. Are showers and eye wash fountains checked periodically (daily or more often in freezing weather) to ensure reliability? Yes ( ) No ( )

9. Is the high temperature zone of the reactor shielded from contact? Yes ( ) No ( )

10. Are pressure gauges properly located and maintained throughout the ammonia system to provide safe process control? Yes ( ) No ( )

11. Is good lighting provided in the plant for safe traffic and working conditions at night and low visibility? Yes ( ) No ( )

12. Are personnel fully trained in methods for spill disposal, by water flushing and/or neutralization? Yes ( ) No ( )

13. In the event of acid spillage, is a supply of lime or limestone readily available for neutralizing the spill? Yes ( ) No ( )

14. Are emergency telephone numbers prominently posted for:

    a. Fire and police? Yes ( ) No ( )
    b. Emergency services (ambulance-rescue)? Yes ( ) No ( )
    c. Public officials? Yes ( ) No ( )
    d. Relief personnel? Yes ( ) No ( )

15. Are there properly equipped, customized first aid kits available? Yes ( ) No ( )

16. Are storage tanks diked to contain their contents in the event of leakage? Yes ( ) No ( )

AMMONIUM PHOSPHATE
(SOLID)

Solid ammonium phosphates (AP) are produced by the chemical reaction of ammonia and orthophosphoric acid. Two types are made for fertilizer: monoammonium phosphate (MAP) and diammonium phosphate (DAP). A variety of grades of each material are available, such as:

10-50-0	MAP
11-54-0	MAP
13-52-0	MAP
16-48-0	DAP
18-46-0	DAP

The pH of MAP is about 5.0 and that of DAP about 7.5. Each end product is essentially harmless, therefore, primary emphasis on safety is directed towards the raw materials and manufacturing process.

DAP is hygroscopic, absorbing moisture and thus making passageways, stairs, and working areas slippery and hazardous. MAP has a much lower affinity for atmospheric moisture. Housekeeping is of major importance to prevent accidents and injuries.

The ammonium phosphate process usually consists of large rotating units of equipment such as a granulator, a dryer, and a cooler. Protective physical and thermal guards are important. The presence of dust and fumes may require the use of face masks in certain areas.

Pile-set in storage is characteristic of all ammonium phosphates. Removal of the material often creates tall, sheer faces of product which can suddenly cascade and endanger personnel near the pile.

Although the products are chemically relatively harmless, manufacturing and handling techniques are extremely important for the safety of personnel.

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

1. Are employees properly instructed in safe handling practices for anhydrous ammonia in the AP plant? Yes ( ) No ( )

2. Since AP plants are multi-storied, are escape routes planned and marked in the event of an emergency (such as rupture of an ammonia line)? Yes ( ) No ( )

3. Are employees appropriately equipped with personal protective gear when working with ammonia and phosphoric acid? Yes ( ) No ( )

4. Is respirator equipment, such as an air pack or fresh air line mask, readily available in case of ammonia escape? Yes ( ) No ( )

5. Are periodic safety meetings (monthly or more often) held with employees to review the potential hazards of ammonia and acid, and to refresh workers on safe work techniques? Yes ( ) No ( )

6. Are safety showers and eye washers (capable of 15 minutes copious flow) effectively located throughout the plant on all decks for prompt use? Yes ( ) No ( )

7. Are the showers and washers checked frequently (daily or more often in freezing weather) to insure that they are in working order? Yes ( ) No ( )

8. Are plant employees properly instructed in methods to dispose of acid spills by neutralization and/or water flushing? Yes ( ) No ( )

9. Is good lighting provided throughout the plant for safe traffic and working conditions at night or in decreased visibility? Yes ( ) No ( )

10. Are the power drives for the rotating units caged or otherwise shielded during operation? Yes ( ) No ( )

11. Is housekeeping directed toward minimizing the collection of ammonium phosphates as dust or spills (in order to reduce the risks of slipping)? Yes ( ) No ( )

12. Are danger signs prominently displayed in areas prone to be slippery? Yes ( ) No ( )

13. Are valve blocks and electrical lock-out systems applied for maintenance or repair of ammonia and acid system components? Yes ( ) No ( )

14. Are valve block and lock-out systems coordinated closely between operating and maintenance personnel? Yes ( ) No ( )

15. Are personnel instructed in safe temperature limits within the units prior to entry to rotating units for inspection or maintenance? Yes ( ) No ( )

16. Are approved respirators available for personnel in the presence of fumes (ammonia or fluoride) in the working area? Yes ( ) No ( )

17. In the storage building, are specific techniques used to cause pile collapse under safe conditions, such as dozers on the pile or ram extensions at ground level? Yes ( ) No ( )

18. Is the vaporizer depressurized and are valve lock-outs applied prior to maintenance in the ammoniator? Yes ( ) No ( )

19. Are line breakage techniques applied to ammonia and acid systems when appropriate for equipment entry? Yes ( ) No ( )

20. Are danger signs, mirrors, or flashing lights used at blind corners for the safe entry and exit of mobile equipment? Yes ( ) No ( )

21. Is there an emergency, battery-powered, automatic lighting system at strategic locations throughout the plant that automatically activates in the event of a power outage? Yes ( ) No ( )

22. Are noise level surveys made periodically around high speed equipment? Yes ( ) No ( )

23. Are high noise level areas roped off and marked? Yes ( ) No ( )

24. Are valve packing shields used on ammonia and acid pumps? Yes ( ) No ( )

25. Are flange covers used where personnel may be exposed to leaks? Yes ( ) No ( )

26. Are pipes carrying ammonia and acid color-coded for prompt ease of identification? Yes ( ) No ( )

FLUOSILICIC ACID
(H_2SiF_6)

Fluosilicic acid is a by-product of phosphoric acid manufacture. It is a chemical combination of hydrogen fluoride (HF) and silicon tetrafluoride (SiF_4). Its primary use is for municipal water fluoridation.

During the manufacture of weak phosphoric acid, small amounts of HF and SiF_4 are liberated in the process and removed by scrubbers. During concentration of the weak phosphoric acid to merchant grade (54% P_2O_5), the major part of the fluoride evolves and is recovered in evaporator scrubbers. The concentration of the marketed product is about 25% H_2SiF_6.

The H_2SiF_6 is classed as a strong acid, corrosive to metals, and highly corrosive to the skin. Skin burn activity is similar to sulfuric acid and particular precautions are necessary. Its vapor pressure causes it to be a respiratory, eye, and nose irritant. It will cause severe burns to sensitive tissue such as the eyes and should be flushed immediately with copious quantities of fresh water for 15 minutes. Prolonged exposure to the vapors may cause fluorosis of the lungs.

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

1. Are there safety showers and eye washers (capable of 15 minutes of copious flow) located at appropriate acid production and load-out points in the system? Yes ( ) No ( )

2. Are these units inspected frequently (daily or more often in freezing weather) to insure reliable operation? Yes ( ) No ( )

3. Is protective clothing (such as rubber suits, gloves, face shields, goggles, and hard hats) required at each acid handling point in the system? Yes ( ) No ( )

4. Are appropriate respirators furnished and required for operators exposed to the acid vapors? Yes ( ) No ( )

5. Are the hazards of and first aid measures for H_2SiF_6 exposure periodically reviewed with plant personnel? Yes ( ) No ( )

6. Are well supplied first aid stations located at appropriate acid handling points in the production system? Yes ( ) No ( )

7. Are tanks and other enclosed process equipment units safely ventilated and the air quality checked prior to personnel entry? Yes ( ) No ( )

8. Are emergency spill procedures established and personnel trained in their execution? Yes ( ) No ( )

9. Are neutralizing agents readily available in case of a spill? Yes ( ) No ( )

PHOSPHORIC ACID

The most common form of phosphoric acid produced for use in fertilizers is identified as wet process acid. It is formed by the chemical reaction of sulfuric acid and phosphate rock.

Small tonnages of a purified phosphoric acid also find application in fertilizers. This acid is produced by the thermal decomposition of phosphate rock, volatilizing the phosphorus, which is then absorbed in water.

Concentrations of wet-process phosphoric acid vary from 30% P_2O_5 (filter acid) to 54% P_2O_5 (merchant acid) to 70% P_2O_5 (superphosphoric acid). Usual thermal acid concentrations are 54% P_2O_5, 61% P_2O_5, and 78% P_2O_5.

Phosphoric acid is classified as a corrosive and may cause burns about the body, particularly sensitive tissue such as the eyes. It is much less hazardous in this respect than other mineral acids such as sulfuric and nitric.

Phosphoric acid is not flammable; however, it can react with metal to liberate hydrogen (H_2), a flammable gas.

Wet-process phosphoric acid, due to its low vapor pressure, is not an eye or nose irritant; but it contains fluoride which evolves in small quantities, especially at elevated temperatures. Fluoride fumes, as either hydrogen fluoride or silicon fluoride, are eye and nasal irritants.

It is to be noted that the relatively mild corrosive and burn effects of phosphoric acid (compared to sulfuric and nitric acid) should not lessen the attention given to safe handling practices. During production, acid throughout the process is at elevated temperatures, as high as 350-400°F. The hot acids are significantly more corrosive and can cause severe tissue burns.

Safety in handling phosphoric acid depends, to a great extent, upon the effectiveness of employee education, following proper safety instructions, intelligent supervision, and the use of safe equipment.

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

1. Are employees properly instructed and trained in the safe handling procedures for sulfuric acid in the phosphoric acid plant? Yes ( ) No ( )

2. Are employees appropriately equipped with personal protective gear (such as rubber-wear, goggles/face shields, gloves, etc.) when working around or on the sulfuric acid feed system? Yes ( ) No ( )

3. Are safety showers (capable of 15 minutes copious flow) effectively located on all decks in the plant for prompt use? Yes ( ) No ( )

4. Are the showers of the deluge type with quick opening valves which remain open? Yes ( ) No ( )

5. Are the showers checked frequently (daily or more often in freezing weather) to insure they are in working order? Yes ( ) No ( )

6. Have eye washes (capable of 15 minutes copious flow) been placed throughout the plant on all levels for fast usage? Yes ( ) No ( )

7. Are there fully equipped, supplied, and customized first aid kits available in the plant? Yes ( ) No ( )

8. Are first aid supplies replaced after use and frequently checked to insure a continuing full inventory? Yes ( ) No ( )

9. Are operators properly instructed in methods to dispose of spills either by water flushing or neutralization? Yes ( ) No ( )

10. Is good lighting provided throughout the plant? Yes ( ) No ( )

11. During maintenance or inspection, are the reactor compartments properly fenced or blocked off? Yes ( ) No ( )

12. Is power equipment in the plant shielded from personnel? Yes ( ) No ( )

13. Are electrical lock-out procedures applied during maintenance or inspection of equipment units? Yes ( ) No ( )

14. Are stairways and catwalks kept free of spills, tools, and miscellaneous equipment? Yes ( ) No ( )

15. Are there planned escape routes from upper decks in the event of inadvertant dust, steam, or acid ruptures or releases? Yes ( ) No ( )

16. Is there an emergency warning system in the event of sudden plant shut-down? Yes ( ) No ( )

17. Are there shields in place and warning signs posted for high temperature piping, ducts, evaporators, and steam lines? Yes ( ) No ( )

18. For inspection and/or maintenance, are adequate ventilation and lighting provided for safe entry into reactor tanks, ducts, filters, etc.? Yes ( ) No ( )

19. Are such units thoroughly washed and checked for air quality prior to entry? Yes ( ) No ( )

20. Are entry-ways to normally closed systems sufficiently large to permit rescue passage of a person wearing a safety harness, life line, and respiratory equipment? Yes ( ) No ( )

21. Are frequent (monthly or more often) safety meetings held with plant employees to review and to remind each of the personal values of safety? Yes ( ) No ( )

22. For overhead conveyors moving solid material (i.e., phosphate rock), are protective screens mounted beneath the belt over personnel passageways to contain falling materials? Yes ( ) No ( )

23. Are conveyor belts which are exposed to personnel traffic (working or passing) equipped with warning signs that the belt may be put in motion or stopped without notice? Yes ( ) No ( )

24. Are conveyor belt drives equipped with remote control switches to provide immediate stoppage in case of an emergency? Yes ( ) No ( )

25. Are noise surveys periodically made and high level areas cordoned or guarded with appropriate exposure signs? Yes ( ) No ( )

26. Is effective hearing protection provided for those personnel exposed to high noise levels? Yes ( ) No ( )

27. Are emergency (battery-operated or emergency power) lights positioned on each deck and particularly for exit stairway illumination? Yes ( ) No ( )

28. Are emergency stretchers stored at strategic locations and readily available? Yes ( ) No ( )

29. Are phosphate rock screw conveyors kept fully enclosed when in use? Yes ( ) No ( )

30. Are standard vessel entry practices followed during maintenance and inspection procedures? Yes ( ) No ( )

STEAM

Extremely high temperatures and pressures such as steam are found in fertilizer manufacturing plants, both in the processes and at steam cleaning stations. Numerous potential hazards are:

-- uninsulated steam pipes,

-- invisible high pressure steam leaks,

-- steam traps which may release scalding hot water,

-- explosions from high pressure in steam generating equipment,

-- worn steam hoses bursting from pressure,

-- uncontrolled steam hoses under pressure,

-- slippery surfaces in steam cleaning areas,

-- poor visibility in steam cleaning areas, and

-- build-up of static electricity.

Good maintenance, the use of personal protective equipment, and the application of correct work procedures can avoid damage or injury from the use of steam.

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

1. Are all steam lines within 8 feet of floors or platforms insulated and clearly identified? Yes ( ) No ( )

2. Are all valve handles clearly identified? Yes ( ) No ( )

3. Are all steam leaks repaired as soon as practical and shielded when appropriate in the meantime? Yes ( ) No ( )

4. Are all steam hoses specially reinforced and designed for high pressures? Yes ( ) No ( )

5. Are steam hoses color coded and fitted with special connections so that they cannot be interchanged with other types of hose? Yes ( ) No ( )

6. When steam is used for cleaning purposes, is the following protective equipment worn?

a.	Head covering?	Yes ( ) No ( )
b.	Face shield?	Yes ( ) No ( )
c.	Heavy rubber apron?	Yes ( ) No ( )
d.	Oilskin or rubber trousers?	Yes ( ) No ( )
e.	Heavy rubber coat?	Yes ( ) No ( )
f.	Rubber gloves covering canvas gloves?	Yes ( ) No ( )
g.	Rubber boots with slip resistant soles?	Yes ( ) No ( )

7. Are all steam and water lines used for cleaning purposes equipped with check valves so that pressure will not reverse the flow and cause steam or water to back up into the cold water system? Yes ( ) No ( )

8. Are steam hose connections to pipelines installed so that the discharge is directed toward the floor and as close to it as possible? Yes ( ) No ( )

9. Are all steam lines fitted with globe or needle valves? (Globe or needle valves are recommended for throttling steam lines rather than plug valves which do not have sufficient volume control.) Yes ( ) No ( )

10. Is the high pressure steam hose inspected regularly for cracks, wear, blisters, and loose connections? Yes ( ) No ( )

11. Are steam nozzles equipped with insulating grips for coolness? Yes ( ) No ( )

12. Is the steam hose rolled up and stored on racks or reels to prevent being run over by equipment, damaged by oil or grease, or tripped over? Yes ( ) No ( )

13. Is floor drainage adequate in the steam cleaning area to keep water from standing on the floor? Yes ( ) No ( )

14. Is all electrical equipment in the steam cleaning area of the moisture-proof type or at least completely covered so that water cannot enter it? Yes ( ) No ( )

15. When using steam to clean tanks or other containers in which flammable vapors may be present, are precautions taken to prevent static electricity accumulations? (High velocity steam may generate considerable static electricity.) Yes ( ) No ( )

16. Is there adequate ventilation during steam cleaning operations to dissipate steam clouds, to lessen the possibility of discomfort from detergents in the mist, and to prevent excessive humidity? Yes ( ) No ( )

17. Are employees required to wear face shield or chemical goggles when entering confined work areas and rooms where there are high pressure steam lines and steam traps? Yes ( ) No ( )

(Note: Safety spectacles are not designed to protect against steam or chemical splashes; therefore, they should not be considered a substitute for chemical goggles or face shields.)

SULFURIC ACID
(H_2SO_4)

Most of the sulfuric acid used in the fertilizer industry is produced by the combustion of elemental sulfur and the absorption of the sulfur oxide gases in water.

Usual concentrations are 77%, 93%, and 98% H_2SO_4.

Due to its corrosive, oxidizing, and sulfonating properties, sulfuric acid produces rapid destruction of skin and severe burns on contact with body tissues. The acid is odorless, but its mists are detected as a "dusty air" sensation when inhaled.

The acid is not flammable, but at its higher concentrations, it may cause ignition by contact with combustible liquids and solids. A highly flammable and explosive gas, hydrogen, is generated by action of the acid on most metal.

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

1. Are operators instructed and trained in safe procedures and practices for handling molten sulfur? Yes ( ) No ( )

2. Are molten sulfur pits effectively covered, fenced, or otherwise guarded from personnel? Yes ( ) No ( )

3. Are appropriate acid plant start-up or restart procedures available for easy reference by the operator? Yes ( ) No ( )

4. Are inter-lock or lock-out systems fully integrated with safe start-up procedures? Yes ( ) No ( )

5. Is the process inspected during and after start-up to insure against steam and acid leaks? Yes ( ) No ( )

6. Are first aid procedures prominently posted throughout the plant as reminders and for ready reference? Yes ( ) No ( )

7. Is there a sufficient number of safety showers strategically located on all floors and throughout the plant for immediate use in case of emergency? Yes ( ) No ( )

8. Are the showers clearly marked and controlled by quick-opening valves that remain open? Yes ( ) No ( )

9. Do the safety showers have deluge-type heads capable of supplying large quantities of fresh water under moderately high pressure? Yes ( ) No ( )

10. Are eye wash fountains positioned for quick access throughout the plant? Yes ( ) No ( )

(Note: Whole-body showers and eye wash fountains must be of a type capable of 15 minutes of copious flow with approved valves.)

11. Are showers and eye washers inspected frequently (preferably daily or more often in freezing weather) to insure they are in good working condition? Yes ( ) No ( )

12. Are blankets available at each safety shower? Yes ( ) No ( )

13. Are training classes and drills for both new and experienced employees conducted periodically to maintain a high degree of safety in first aid and acid handling procedures? Yes ( ) No ( )

14. Does instruction include a periodic review of the locations, purpose, and use of emergency fire fighting equipment, fire alarms, emergency phone numbers, and emergency shut down equipment such as valves and switches? Yes ( ) No ( )

15. Is sufficient, approved protective equipment provided, such as: hard hats, chemical safety goggles, face shields, rubber gloves, aprons, and shoes? Yes ( ) No ( )

16. Are NIOSH-approved respiratory protective devices available in the event of acid mist or sulfur dioxide gas leaks? Yes ( ) No ( )

17. In areas such as acid storage tanks and load out points where hydrogen may be formed, are smoking and open flames prohibited and so marked? Yes ( ) No ( )

18. Are standard cleaning and ventilation techniques, followed by air quality checks, applied prior to welding or other maintenance on and inspection of an acid container? Yes ( ) No ( )

19. Are sampling ports located throughout the production process to permit internal air quality checks? Yes ( ) No ( )

20. Are employees instructed and retrained in the proper procedures for handling an acid spill? Yes ( ) No ( )

21. Are acid neutralizing agents readily available for treatment of a spill? Yes ( ) No ( )

22. Are there source points and hoses available for large quantities of water in the event of a major spill? Yes ( ) No ( )

23. Is adequate ventilation provided in enclosed areas such as control rooms, rest rooms, and storage rooms? Yes ( ) No ( )

24. Is good artificial lighting provided throughout the unit operations for safe movement and work at night? Yes ( ) No ( )

25. Are safety meetings held monthly? Yes ( ) No ( )

26. Are pipes carrying hazardous materials (such as steam, sulfuric acid, fuel oil, molten sulfur) color-coded and clearly labeled for immediate identification? Yes ( ) No ( )

27. Are overhead pipe racks properly guarded and identified to protect personnel? Yes ( ) No ( )

28. Are flange covers used where personnel may be exposed in the event of leaks? Yes ( ) No ( )

29. Are valve packing shields used on pumps handling hazardous fluids? Yes ( ) No ( )

30. Are hazardous areas such as overhead leaks roped off or barricaded and marked during equipment malfunction or maintenance? Yes ( ) No ( )

31. Are noise level measurement surveys made periodically? Yes ( ) No ( )

32. Are high noise level areas roped off and posted with appropriate signs regarding exposure and hearing protection? Yes ( ) No ( )

33. Are sulfuric acid storage tanks properly diked to impound the contents in the event of leakage? Yes ( ) No ( )

34. Are all decks, aisles, doorways, catwalks, and stairways kept clear of spills, waste, tools, and other equipment to provide emergency escape? Yes ( ) No ( )

35. Are steam and water outlets of separate design to avoid interchanging hose connections? Yes ( ) No ( )

SULPHUR

Sulphur is a primary raw material in the production of fertilizer grade phosphoric acid. It is converted by combustion to sulfuric acid.

Sulphur is a solid at ambient temperature; however, it is handled as a solid and as a liquid in fertilizer production. The molten form is the most predominant for fertilizer. Sulphur dust suspended in air is readily ignited by flame, static electricity, or friction spark. Molten sulphur, by reason of its low ignition temperature, presents a potential fire hazard. Improper handling of molten sulphur may result in personnel burns. Hydrogen sulfide, a toxic flammable gas, may also be evolved from molten sulphur. As molten sulphur cools in transit, it releases hydrogen sulfide, which accumulates in the vapor space of tank cars or vessels. Inhalation of the concentrated vapors is extremely hazardous.

Personnel should be aware of all the potential hazards associated with sulphur and be equipped with the approved personal protective gear for its handling.

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

1. Do safety meetings include a review of the properties of sulphur and safe practices for its handling? Yes ( ) No ( )

2. Are safety showers and eye washers (capable of 15 minutes copious flow) strategically located for prompt use in the event of a sulphur burn? Yes ( ) No ( )

3. Are training classes for new and experienced employees conducted periodically to maintain a high degree of safety in handling procedures? Yes ( ) No ( )

4. Are "No Smoking" signs posted at loading, unloading, and other points where solid or molten sulphur is handled? Yes ( ) No ( )

5. Is fire protection equipment readily available at storage, transfer, or use points? Yes ( ) No ( )

6. Is there an alarm system or an effective communication system (phone, bell, radio) available to personnel handling sulphur in the event of a fire, explosion, or burn? Yes ( ) No ( )

7. Are steam-traced lines properly identified to protect against burns, and are pressure-relief valve emissions diverted to safe ground points? (Molten sulphur is normally kept in the fluid state with steam.) Yes ( ) No ( )

8. Upon receipt of molten sulphur, is storage space assured prior to unloading? Yes ( ) No ( )

9. During molten sulphur unloading, is there a safe valve opening and closure procedure established to avoid excessive pumping pressures? Yes ( ) No ( )

10. In areas of exposure to sulphur, are motors, lights, and switch gear of explosion-proof design? Yes ( ) No ( )

11. Are molten sulphur storage tanks properly cleaned and ventilated prior to internal maintenance? Yes ( ) No ( )

12. Are empty storage tanks tested with an air quality meter prior to maintenance? Yes ( ) No ( )

13. Are lines made safe by draining and locking valves prior to maintenance? Yes ( ) No ( )

14. Are formal work permits required from authorized safety and production supervisors prior to sulphur equipment maintenance? Yes ( ) No ( )

15. Are self-contained respirators readily available in case of emergency? Yes ( ) No ( )

16. Following an acceptable air quality test, is special (clean/fresh) ventilation used during the entire time men are cleaning, repairing, or inspecting sulphur tanks? Yes ( ) No ( )

17. When samples of molten sulphur are taken, are personnel properly equipped with high-cuffed gloves, face shields, and appropriate rubber equipment? Yes ( ) No ( )

18. Are emergency fire, rescue, and first aid telephone numbers prominently displayed within all sulphur handling areas? Yes ( ) No ( )

19. Are employees required to wear life jackets on and around vessels and on the unloading slip when sulphur is received by water transport? Yes ( ) No ( )

20. During connection and unloading, particularly in remote areas, are employees required to work in pairs? Yes ( ) No ( )

21. Prior to fitting the transport vessel (barge, car, etc.) for unloading, is an electrical static ground connected to the vessel? Yes ( ) No ( )

22. Are all sulphur pipelines color-coded and prominently labeled for immediate identification? Yes ( ) No ( )

23. Before opening and unloading sulphur cars, are the following required:

    a. A warning device placed at each end of the car? Yes ( ) No ( )
    b. The hand brake set on the car? Yes ( ) No ( )
    c. The wheels chocked? Yes ( ) No ( )

24. When climbing on the car to open the manway cover:

    a. Is the employee wearing a properly fitted air supplied respirator to protect against hydrogen sulfide gases? Yes ( ) No ( )
    b. Are spark-resistant tools used to loosen the bolts on the manway covers? Yes ( ) No ( )

25. Are molten sulphur storage tanks properly diked to impound contents in the event of leakage? Yes ( ) No ( )

TRIPLE SUPERPHOSPHATE

Triple superphosphate (TSP) is produced by the chemical reaction of phosphoric acid and ground phosphate rock. Two physical forms are marketed: Run-of-Pile (pulverized) and granular. Both contain about 46% available TSP (P_2O_5).

TSP is moderately acidic (pH about 4) and will cause irritation to tissues; otherwise, the product is essentially harmless. The handling of ground phosphate rock generates small quantities of fugitive dust in the plant. The chemical reaction of acid and rock also generates minimal quantities of fluoride vapor which is nearly all captured in absorbing systems. Safety practices are directed primarily at the raw materials and the manufacturing process for TSP.

Pile-set in storage often occurs and precautions for safely managing pile collapse are essential.

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

1. Are employees properly trained and periodically retrained, as necessary, in the safe handling practices for phosphoric acid? Yes ( ) No ( )

2. Are employees appropriately equipped with personal protective gear when working with phosphoric acid? Yes ( ) No ( )

3. Are face masks available for use to control fugitive dust and fluoride? Yes ( ) No ( )

4. Are frequent safety meetings (monthly or more often) held with plant employees to review the hazards of acid and the safe technique required in its use? Yes ( ) No ( )

5. Are safety showers and eye washers (capable of 15 minutes copious flow) effectively located throughout the plant, on all decks, for prompt use? Yes ( ) No ( )

6. Are the showers and washers checked frequently (daily or more often in freezing weather) to insure that they are in working order? Yes ( ) No ( )

7. Are plant employees properly instructed in methods to dispose of acid spills by neutralization and water flushing? Yes ( ) No ( )

8. Is good lighting provided throughout the plant for safe traffic and working conditions at night and during times of decreased visibility? Yes ( ) No ( )

9. Are the power drives for the rotating units properly caged or otherwise shielded during operation? Yes ( ) No ( )

10. For maintenance and repair work on the acid system components, are valve blocks and electrical lock-out systems applied? Yes ( ) No ( )

11. Are valve block and lock-out systems coordinated closely between operating and maintenance personnel? Yes ( ) No ( )

12. Prior to entry to rotating units for inspection or maintenance, are personnel instructed to check for safe temperature limits within the units? Yes ( ) No ( )

13. In the storage building, are specific techniques used to cause pile collapse under safe conditions such as dozers on the pile or ram extensions at ground level? Yes ( ) No ( )

14. Are line breakage techniques applied to the acid system when appropriate to equipment entry? Yes ( ) No ( )

15. Are signs or flashing lights used at blind corners for the safe entry and exit of mobile equipment? Yes ( ) No ( )

16. Is there an emergency (battery-powered or emergency power) automatic lighting system at strategic locations throughout the plant that activates in the event of a power outage? Yes ( ) No ( )

17. Are noise levels around the screens and mills measured periodically? Yes ( ) No ( )

18. Are high noise levels roped off and posted with appropriate signs regarding exposure and hearing protection? Yes ( ) No ( )

19. Are valve packing shields used on acid pumps? Yes ( ) No ( )

20. Are flange covers used where personnel may be exposed to leaks? Yes ( ) No ( )

21. Are acid pipes color-coded for easy identification? Yes ( ) No ( )

WATER TREATMENT CHEMICALS

Three primary types of water treatment are practiced in phosphate fertilizer production facilities:

-- boiler water,
-- acid pond water, and
-- drinking (potable) water.

Boiler feed water is treated to reduce hardness by two methods. The first is zeolite softening of calcium and magnesium deposits on an ion-exchange bed which is cleansed by flushing with brine. This method is safe and free of personnel health hazards from chemicals.

Boiler feed water is also treated with hot lime solutions which may also contain magnesium oxide or soda ash, and scale control additives. The lime, magnesia, and soda ash are dry, fine-particle solids, alkaline in nature. Dust ingestion and inhalation, and tissue exposure to dust from these chemicals are to be avoided.

The scale control additives contain organic conditioning agents, such as hydrazine, which is corrosive to the skin. These materials, including inorganics such as sodium sulfite, are employed to remove oxygen from the feed water.

Acid pond water is treated with slaked lime in order to raise its quality to acceptable levels for reuse or disposal. Lime neutralizes the acidity and causes the physical separation of undesirable components.

Raw ground water is normally made potable by treatment with hypochlorite or chlorine solutions. Chlorine in most of its forms is a skin irritant.

Appropriate protective clothing and gear should be worn when handling water treatment chemicals. Neutralizing agents for both the alkaline and acidic chemicals should be readily available in the event of spills.

Read all the questions in this section; discuss the questions with those persons at your establishment who know the most about the areas covered; and, while conducting a walk-through 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 acid 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. Is protective clothing or equipment, (suit, boots, gloves, face shield, acid goggles, respirator, hard hat, apron), readily available at acid and caustic locations? Yes ( ) No ( )

6. Are employees required to use protective equipment when working with or around acids and caustics? Yes ( ) No ( )

7. Is the wearing of contact lens prohibited? Yes ( ) No ( )

8. 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? Yes ( ) No ( )

9. Are all chemical spills promptly cleaned up using approved methods? Yes ( ) No ( )

10. Are selected employees trained in emergency and rescue work in the event of major chemical spills or leaks? Yes ( ) No ( )

11. Are all storage areas posted with appropriate warning signs? Yes ( ) No ( )

12. Are employees trained and retrained to understand the potential hazards associated with water treatment chemicals and proper procedures for working with them? Yes ( ) No ( )

13. Are ventilation measures used in areas where water treatment chemicals are being handled? Yes ( ) No ( )

14. Are the same precautionary measures used when working with hydrazine and morpholine as with other treatment chemicals? Yes ( ) No ( )

15. Are two units of approved self-contained breathing apparatus readily available at chlorine locations? Yes ( ) No ( )

16. When dry chlorine is used, is it stored in an area where it will not be mixed or contaminated with anything but water? Yes ( ) No ( )

TANK FARMS

Tank farms provide plant storage for phosphoric acid. The acid may vary considerably in concentration and temperature. Tanks must be inspected periodically for structural safety. Also, the farm must be provided with adequate lighting and safe walkways and ladders. Approved personal protective equipment and clothing must be worn when there is an exposure risk to avoid injury from the corrosiveness and, in some instances, high temperature of the acid.

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

1. Are the walkways above the tanks kept free of hoses, welding leads, or other tripping hazards? Yes ( ) No ( )

2. Are the drive shafts of all pumps guarded? Yes ( ) No ( )

3. Is there an assigned housekeeping program established to clean up acid spills and leaks? Yes ( ) No ( )

4. Have safety procedures been established for opening hazardous lines? Yes ( ) No ( )

5. Have safety procedures been established for entry into the tanks? Yes ( ) No ( )

6. Have safety procedures been established for cutting, welding, or applying any heat to a line, pump, or tank containing phosphoric acid? Yes ( ) No ( )

7. Is approved respiratory protection required to be worn when hazardous fumes or mist exist? Yes ( ) No ( )

8. Is protective clothing required to be worn when there is a possibility of exposure to the acid? Yes ( ) No ( )

9. Is all electrical equipment grounded? Yes ( ) No ( )

GYPSUM/ACID POND

Gypsum is a by-product of wet-process phosphoric acid production. It is removed from the filter as a wet, slightly acidic cake, slurried with pond water and the slurry pumped to a storage pile.

The slurry is moved to the top of the pile which is diked to temporarily impound the mixture and permit separation of the solids by settling. Formation of a shallow pond permits relatively clear acidic water to be decanted to a lake several dozen acres in size.

The gypsum slurry and subsequent pond water are acidic in nature and should be handled as weak phosphoric acid. The fresh slurry temperature is about 100°F.

Safety requirements involve large slurry pumps, pressurized piping, slurry distribution atop the gypsum pile, diking the pile with dozers and cranes, and acid pond management.

Once the solid gypsum has been stacked and weathered, it is a harmless, nontoxic solid. Most or all of the acid pond water is recycled in the chemical processes.

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

1. Is the gypsum slurry surge tank properly enclosed to avoid splashing and spillage? Yes ( ) No ( )

2. Are the large, high-volume slurry pumps guarded and caged from personnel? Yes ( ) No ( )

3. Are the pressurized slurry lines (often over long distances) properly coded and marked for easy identification? Yes ( ) No ( )

4. Is vehicular traffic carefully controlled near these lines to avoid accidents? Yes ( ) No ( )

5. Are crane and bulldozer operators thoroughly instructed in safe procedures for heavy equipment and stacking techniques on the pile? Yes ( ) No ( )

6. Are heavy equipment operators (working alone) in continuous contact (radio or visual) with their associates? Yes ( ) No ( )

7. Where small boats are required for slurry and water management, are personnel required to work in pairs? Yes ( ) No ( )

8. Are personnel required to wear life jackets at all times when aboard small boats? Yes ( ) No ( )

9. Are first aid kits containing acid neutralizing agents readily available on the equipment in the remote gypsum and pond areas? Yes ( ) No ( )

10. Are regular safety meetings (monthly or more often) held to review and remind operators of safety practices on and around the gypsum pile and acid ponds? Yes ( ) No ( )

MATERIAL HANDLING AND STORAGE

Material is moved, either by hand or mechanical means, in the phosphate industry. The questions in this section are designed to identify potential hazards to employees resulting from improper 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,
-- proper use of equipment and tools, and
-- protective equipment to reduce personal injury.

A portion of this self-evaluation instrument 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk-through survey, complete this section with their help.

1. Are there uniform work standards for lifting? Yes ( ) No ( )

2. Are workers employed in manual materials handling trained and retrained in proper lifting techniques? Yes ( ) No ( )

3. Is there a preplacement medical assessment of workers applying for manual material handling jobs? Yes ( ) No ( )

4. Is machinery available for lifting excessive loads? Yes ( ) No ( )

5. Is machinery available for pulling and carrying heavy loads? Yes ( ) No ( )

6. Are special devices provided to employees when moving drums or barrels? Yes ( ) No ( )

7. Is all material storage stable and secure from collapse? Yes ( ) No ( )

8. Are derail or bumper blocks or both provided on all spur railroad tracks to prevent cars from entering a work area? Yes ( ) No ( )

9. Are all dockboards for trucks and railroad cars anchored or equipped with devices to prevent their slipping? Yes ( ) No ( )

10. Are all dockboards strong enough to carry the loads imposed on them? Yes ( ) No ( )

11. Is riding on conveyors prohibited? Yes ( ) No ( )

12. Is all material kept at least 2 feet from a fire door? Yes ( ) No ( )

13. Is all stored material kept at least 3 feet away from and below sprinkler heads? Yes ( ) No ( )

14. Are flammable and combustible materials stored separately from other storage? Yes ( ) No ( )

15. Are hazardous materials kept where they will not create a dangerous condition? Yes ( ) No ( )

16. Are all permanent aisleways properly identified? Yes ( ) No ( )

17. Are aisleways kept clear of materials? Yes ( ) No ( )

18. Are the appropriate fire extinguishers readily available for the different flammable and combustible materials? Yes ( ) No ( )

19. Are flammable and combustible materials stored only in areas designed for their storage? Yes ( ) No ( )

20. Is all combustible waste kept in closed-cover, metal containers? Yes ( ) No ( )

21. Are all persons except the operator prohibited from riding on industrial trucks (except where a passenger seat is part of the design)? Yes ( ) No ( )

22. 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 ( )

23. Are backrest extensions provided to prevent loads from sliding off the back of the lift? Yes ( ) No ( )

24. Are all industrial trucks equipped with a horn or other warning device? Yes ( ) No ( )

25. Are the brakes of highway trucks set, and chocks placed under (against) the rear wheels while they are being loaded and unloaded? Yes ( ) No ( )

26. Are equipment or procedures provided to prevent movement of railroad cars during loading and unloading operations? Yes ( ) No ( )

27. Are spinner knobs prohibited on steering wheels of trucks? Yes ( ) No ( )

28. Are the following precautions required to be taken by operators when they leave their trucks unattended:

    a. Load engaging or lifting mechanism fully lowered? Yes ( ) No ( )
    b. All controls neutralized? Yes ( ) No ( )
    c. Brakes set? Yes ( ) No ( )
    d. All power shut off? Yes ( ) No ( )
    e. Wheels blocked when parked on an incline? Yes ( ) No ( )

29. Are trucks that are equipped with permanently mounted LP gas containers required to be refueled outdoors? Yes ( ) No ( )

30. Are operators required to stop engines during refueling? Yes ( ) No ( )

31. Are workers trained and retrained to avoid damage to fuel containers and valve assemblies? Yes ( ) No ( )

32. Are no more than two LP gas containers used on an industrial truck? Yes ( ) No ( )

33. Are the following precautions taken for storing fuel cylinders:

    a. Cylinders stored only in assigned areas? Yes ( ) No ( )
    b. Cylinders protected from being hit and/or knocked over? Yes ( ) No ( )
    c. Cylinders stored only in approved containers? Yes ( ) No ( )
    d. Cylinders properly marked and identified? Yes ( ) No ( )
    e. Cylinders secured from unauthorized persons? Yes ( ) No ( )

34. Is smoking prohibited in fueling, refueling, and battery charging areas? Yes ( ) No ( )

35. Are there formal training programs for all truck operators? Yes ( ) No ( )

36. Is each operator's proficiency periodically reviewed? Yes ( ) No ( )

37. Are the following subjects covered during training and reviews:

    a. Operation within rated load limits? Yes ( ) No ( )
    b. Operation with insecure loads? Yes ( ) No ( )
    c. Loads that cause wheels to be lifted off the ground? Yes ( ) No ( )
    d. Safeguarding of personnel working or walking near this equipment? Yes ( ) No ( )
    e. Proper placement of forks during various operations? Yes ( ) No ( )

38. Is there a systematic, periodic inspection program for all industrial trucks? Yes ( ) No ( )

39. Are inspection records kept? Yes ( ) No ( )

40. Is there a regular preventive maintenance program for all industrial trucks? Yes ( ) No ( )

41. Are preventive maintenance records kept? Yes ( ) No ( )

42. Is the manufacturer's written approval obtained before modifying any industrial truck? Yes ( ) No ( )

43. Are aisles and doorways wide enough for safe passage of trucks? Yes ( ) No ( )

44. Are storage locations for material and equipment situated somewhere other than under energized bus bar, lines, or near energized equipment? Yes ( ) No ( )

45. Are employees instructed in the hazards of working around loads suspended by a crane, an A-frame, or similar equipment? Yes ( ) No ( )

46. Is approved personal protective clothing and equipment required to be worn when loading or unloading hazardous chemicals (i.e., sulfur or phosphoric acid)? Yes ( ) No ( )

47. Are all hazardous material shipments properly secured, placarded, and labeled for delivery? Yes ( ) No ( )

48. Are materials which, when mixed, would create a hazard, stored separately? Yes ( ) No ( )

RAILWAY EQUIPMENT

Railway equipment is meant to include locomotives, trackmobiles, railroad cars, and car-pullers commonly used in the phosphate industry.

Although the operation of railway equipment is incidental to phosphate production, the heavy reliance on this equipment to transport phosphate rock and phosphate products requires that safe procedures be established to protect employees from the potential hazards associated with this equipment. These potential hazards, to a large degree, are the result of unsafe operation of the equipment.

In addition to the hazards of being caught between cars, falls, and strains, the unsafe operation of railway equipment may result in a disaster caused by the release of toxic gases or chemical substances. For this reason, an effective accident prevention program for railway equipment must stress the safe operation as well as the condition of the equipment. It is recommended that establishments provide thorough training and retraining programs for employees whose duties involve working with railway equipment.

This section of the Self-Evaluation Instrument is intended to identify the potential hazards to employees and evaluate the establishment's program to protect employees.

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

1. Are all employees engaged in railroad operations required to know proper hand and whistle signals common to general railroad practice? Yes ( ) No ( )

2. Are train movements prohibited without proper signal? Yes ( ) No ( )

3. Are employees forbidden to stand in front of an approaching engine or car for the purpose of boarding? Yes ( ) No ( )

4. Is a flagman required to ride on the end of the train in the direction of movement to signal the engineer? Yes ( ) No ( )
   Is he required to ride on the side ladder at the rear of the car with both feet on the ladder? Yes ( ) No ( )

Is he forbidden to ride on the side of the car while passing through loading areas or other areas without proper clearance? Yes ( ) No ( )

5. Are all close clearances posted and are employees familiar with these areas? Yes ( ) No ( )

6. Are employees instructed to stop rail equipment if there is any doubt about the signal given, if the signals disappear from view, or if contact is lost? Yes ( ) No ( )

7. Are employees instructed to always walk outside of the tracks? Yes ( ) No ( )

8. Are employees instructed to not step on the ball of rails when walking or crossing tracks? Yes ( ) No ( )

9. Is free wheeling of cars prohibited except when weighing or making up a train? Yes ( ) No ( )

10. Is it forbidden for anyone to cross between coupled cars? Yes ( ) No ( )

11. Are employees instructed to never contact draw heads while train is in motion? Yes ( ) No ( )

12. Is smoking or open flames prohibited around locomotives being fueled? Yes ( ) No ( )

13. Are all unauthorized employees prohibited from riding on rail equipment? Yes ( ) No ( )

14. Is riding on top of boxcars prohibited? Yes ( ) No ( )

15. Is riding on the end sills of cars prohibited? Yes ( ) No ( )

16. Are employees prohibited from getting on or off moving equipment if visibility or footing is poor (i.e., heavy fog, snow or sleet, slick ice, mud)? Yes ( ) No ( )

17. Is all rail equipment required to be moved at a slow speed (not faster than a normal walking pace) before allowing employees to get on or off moving rail equipment? Yes ( ) No ( )

18. Are engineers instructed to interpret any violent motions from anyone near the tracks as an emergency stop signal? Yes ( ) No ( )

19. Is head end protection (leading or point protection) required by means such as riding the lead car, preceding it on foot, or assuming a position to observe the area and signal operator when cars are moved more than one car length when loading or unloading? Yes ( ) No ( )

20. Are couplings tested or stretched (reverse travel) before shoving cars or moving them down grade? Yes ( ) No ( )

21. In placing cars on a track section equipped with bumpers, is the last car placed against the bumper so that no passageway is permitted between the car and the bumper? Yes ( ) No ( )

22. Are fuses (flares) required at crossings where visibility is doubtful due to conditions of darkness, weather, steam, etc.? Yes ( ) No ( )

23. Are crossings cleared if an emergency vehicle is heard or seen? Yes ( ) No ( )

24. Is rail movement prohibited on any track protected by an approved track flag, track light, or derail? Yes ( ) No ( )

25. Is it required that tensions applied to a hand brake be applied by pulling rather than pushing? Yes ( ) No ( )

26. Is it required that all cars be coupled, brakes set, and/or cars chocked when cars are spotted on a grade? Yes ( ) No ( )

27. Are only approved wheel chocks, with handles allowed for placement under wheels, used to block cars? Yes ( ) No ( )

28. Are employees prohibited from placing any part of their bodies in a line between couplers when opening, aligning, or otherwise adjusting couplers? Yes ( ) No ( )

29. Are "Tank Car Connected" signs posted in clear view, wheels chocked, and hand brakes set during tank car loading or unloading operations? Yes ( ) No ( )

30. Are employees instructed to double check to make sure all hoses and ramps are removed before moving railroad cars? Yes ( ) No ( )

31. Are employees instructed about the danger of bar slippage in opening bottom dump railroad cars? Yes ( ) No ( )

32. In car shaker operations, is employee exposure to noise monitored and steps taken to reduce it to within permissible limits? Yes ( ) No ( )

33. Is positive ventilation provided and respiratory protection required for employees during RR car loading operations? Yes ( ) No ( )

34. Are employees instructed to stand outside of box car doors while attempting to open them? Yes ( ) No ( )

35. Are there at least five turns of the car-puller cable around the draw head before starting the car-puller? Yes ( ) No ( )

36. Are cables and hooks regularly inspected? Yes ( ) No ( )

37. Are cables required to be disconnected after a move has been made? Yes ( ) No ( )

38. Are employees prohibited from stepping over car-puller cable while it is under load? Yes ( ) No ( )

39. Are protective screens provided to guard a car-puller operator from injury if a cable should break and whip back? Yes ( ) No ( )

40. Are employees instructed and retrained to keep hands and fingers clear of pinch points? Yes ( ) No ( )

41. Is the foot switch for the car-puller protected against accidental starting? Yes ( ) No ( )

42. Are records kept of training programs that emphasize safe operating procedures? Yes ( ) No ( )

BOILERS

A boiler is a vessel in which water is heated by combustion of fuel to form steam, hot water, or high temperature water under pressure.

Boilers have many potential hazards including the potential for fire and explosion. Design, construction, testing, and installation should be in compliance with the applicable sections of the American Society of Mechanical Engineers "Boiler and Pressure Vessel Code" (ASME Code), and any Federal, state, and local governing codes.

The minimum requirements for the installation of high pressure boilers are covered in the "Life Safety Code," National Fire Protection Association Standard #101.

Installation and maintenance of boilers should be in accordance with the manufacturer's instruction, and operating personnel should be trained not only to operate the equipment properly but also to make regular safety checks and to know when to obtain more qualified maintenance personnel for assistance.

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

1. Is the boiler fully enclosed in a fire-resistive room or in fire protection? Yes ( ) No ( )

2. Are combustible materials kept clear of boiler room walls? Yes ( ) No ( )

3. Are boilers equipped with water and pressure gauges? Yes ( ) No ( )

4. Are water and pressure gauges guarded? Yes ( ) No ( )

5. Are water and pressure gauges placed so that they can be observed easily either directly or with mirrors? Yes ( ) No ( )

6. Are water gauges and pipe passages to the gauges kept clean and free of scale and rust? Yes ( ) No ( )

7. Are boilers equipped with automatic pressure-relief valves? Yes ( ) No ( )

8. Are the pressure-relief valves tested manually at frequent intervals to ensure their readiness to function? Yes ( ) No ( )

9. Are the boilers fitted with fail-safe devices to protect against the hazards of flameouts, fuel interruptions, and low water levels? Yes ( ) No ( )

10. Are blowoff valves piped to the outside of buildings and with outlets located or protected so that persons passing by, near, or under them will not be scalded? Yes ( ) No ( )

11. Are boilers inspected internally at least once a year by licensed inspectors? Yes ( ) No ( )

12. Are records kept of inspections by licensed inspectors? Yes ( ) No ( )

13. Is a program established to test and service all operating controls, safety controls, and safety and relief valves at regular intervals? Yes ( ) No ( )

14. Are repairs or replacements made immediately upon any indication of malfunction or leakage of operating controls, safety controls, or safety and relief valves? Yes ( ) No ( )

15. Is a boiler log maintained to insure that necessary tests, maintenance, and services are performed, and that records are available at all times? Yes ( ) No ( )

16. Are exhaust stacks equipped with grounded lightning arrestors? Yes ( ) No ( )

17. When a boiler is taken out of service for a prolonged period, is it promptly cleaned and inspected for defects by a qualified person? Yes ( ) No ( )

18. For boilers in continuous service, is there a planned shutdown at least once a year to inspect and service the boiler, ignition system safety, and other safety controls? Yes ( ) No ( )

19. When boilers are entered, are the following precautions taken (see Vessel Entry Section):

a. Temperature in boiler low enough not to cause heat stress and danger of burns? Yes ( ) No ( )
b. Ventilated thoroughly? Yes ( ) No ( )
c. Atmosphere checked for oxygen deficiency and for toxic, flammable, or combustible vapors? Yes ( ) No ( )
d. Lock-out procedure for switches and valves? Yes ( ) No ( )
e. Lines entering the boiler blocked or sealed? Yes ( ) No ( )
f. Protection provided workmen from overhead falling hazards? Yes ( ) No ( )
g. Portable lights and tools grounded? Yes ( ) No ( )
h. Employees entering boilers reminded to wear safety hats, glasses, safety shoes, respirators, and any other protective equipment necessary? Yes ( ) No ( )
i. Employees required to wear a lifeline? Yes ( ) No ( )
j. Employees inside the boiler kept under constant surveillance by a safety watcher outside the vessel equipped the same as the inside worker? Yes ( ) No ( )

20. Are boiler room floors adequately drained? Yes ( ) No ( )

21. Does the boiler room have adequate illumination to view gauges and operate controls? Yes ( ) No ( )

22. Does the boiler room have a source of emergency lighting? Yes ( ) No ( )

23. Are exits identified and well illuminated? Yes ( ) No ( )

24. Are there at least two exits from boiler rooms? Yes ( ) No ( )

25. Does each boiler have stairs, ladders, and runways installed around it, extending 10 feet or more above floor level, for safe operation and servicing of the boiler? Yes ( ) No ( )

26. Do stairs, ladders, and runways have standard guardrails, handrails, and toeboards? Yes ( ) No ( )

27. Are rules for both routine and emergency boiler operation posted permanently and legibly in the boiler room? Yes ( ) No ( )

COMPRESSORS AND COMPRESSED AIR

Air compressors are designed to supply air for instrument control, air conditioning, transfer of material, etc. With proper maintenance and inspection, they provide safe and trouble-free operations.

It is especially important that compressors be kept clean. It is easier and safer to prevent the accumulation of oil, dust, dirt, and carbonaceous materials than it is to clean out such accumulations after they have formed. Cleanliness ensures both efficient operation and the prevention of explosions.

Explosions may arise from improper lubrication, intake of contaminated air, excessive air cylinder temperature, or poor interstage or after-cooling of the air.

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

1. Are compressors equipped with automatic, temperature-activated shutoff mechanisms set for 400°F, or with fusible plugs installed in the compressor discharge lines as near the compressor as possible? Yes ( ) No ( )

   (Note: Fusible plugs should melt at temperatures 50° less than the flash point of the lubricating oils.)

2. Are compressors and compressed-air receivers equipped with:

   a. Automatic pressure release valves? Yes ( ) No ( )
   b. Pressure gauges? Yes ( ) No ( )
   c. Drain valves? Yes ( ) No ( )

3. Are compressor air intakes installed and equipped so as to ensure that only clean, uncontaminanted air enters the compressor? Yes ( ) No ( )

4. Are air filters installed on the compressor intake? Yes ( ) No ( )

5. Are compressors operated and lubricated in accordance with the manufacturer's recommendations? Yes ( ) No ( )

6. Are compressor discharge pipes cleaned periodically? Yes ( ) No ( )

7. Are safety devices on compressed air systems checked frequently? Yes ( ) No ( )

8. Is a regular inspection program established to:

   a. Inspect and clean valves? Yes ( ) No ( )
   b. Inspect and clean the compressor? Yes ( ) No ( )
   c. Inspect and clean the lines? Yes ( ) No ( )
   d. Inspect and clean the cooling system? Yes ( ) No ( )
   e. Inspect and clean the air receivers? Yes ( ) No ( )
   f. Drain the air receivers? Yes ( ) No ( )

9. Before any repair work is done on the pressure system of a compressor, are the following precautions taken:

   a. Pressure bled off? Yes ( ) No ( )
   b. System locked-out? Yes ( ) No ( )

10. Are signs posted to warn of the automatic starting feature of the compressors? Yes ( ) No ( )

11. Is the belt drive system totally enclosed to provide protection for the front, back, top, and sides? Yes ( ) No ( )

12. Is it strictly prohibited to direct compressed air towards a person? Yes ( ) No ( )

13. Are employees prohibited from using highly compressed air to clean off their clothing or any part of their body? Yes ( ) No ( )

14. If compressed air is used for cleaning purposes, is the pressure reduced to less than 30 p.s.i.? Yes ( ) No ( )

15. When using compressed air for cleaning, do employees wear effective chip guarding and personal protective equipment? Yes ( ) No ( )

16. Are all new air receivers constructed to the ASME Boiler and Pressure Vessel Code--1968? Yes ( ) No ( )

17. Are safety chains or other suitable locking devices used at couplings to machines of high pressure hose lines of 3/4 inch inside diameter or larger, and between high-pressure hose lines of the same size, where a connection failure would create a hazard? Yes ( ) No ( )

AIR RECEIVERS

Air receivers require regular inspection and maintenance to ensure safe and efficient operation. The receiver and its piping system must be kept free of oil, dust, dirt, and carbonaceous build-up to prevent a fire or explosion. During inspection or cleaning, employees may be injured through oxygen deficient atmospheres or toxic, flammable, or by combustible vapors; improper handling of tools; or the use of flammable cleaning compounds. Only qualified persons should be assigned to the inspection and maintenance of air receivers.

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

1. Is every air receiver equipped with an indicating pressure gauge and with one or more automatic, spring-loaded safety valves? Yes ( ) No ( )

2. Is the total relieving capacity of the safety valve capable of preventing pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10%? Yes ( ) No ( )

3. Is every air receiver provided with a drain pipe and valve at the lowest point for the removal of accumulating oil and water? Yes ( ) No ( )

4. Are compressed-air receivers periodically drained of moisture and oil? Yes ( ) No ( )

5. Does each compressed-air receiver have an inspection opening for internal inspections? Yes ( ) No ( )

6. Are all air receivers periodically inspected externally for corrosion, dents, etc.? Yes ( ) No ( )

7. Are all safety valves tested frequently and at regular intervals to determine whether they are in good operating condition? Yes ( ) No ( )

8. Is each compressed air-receiver inspected internally at least once a year by a qualified inspector? Yes ( ) No ( )

9. Are records kept on each inspection? Yes ( ) No ( )

10. Are the external surfaces of air receivers kept free of oil accumulation and dust? Yes ( ) No ( )

11. Is the inlet of air receivers and piping systems kept free of the accumulation of oil and carbonaceous materials? Yes ( ) No ( )

12. Have the following safety procedures been established for the internal cleaning or inspection of air receivers:

    a. All starting and control equipment tagged and locked-out? Yes ( ) No ( )
    b. The air pressure released from the vessel? Yes ( ) No ( )
    c. Removal of all manhole covers to improve ventilation? Yes ( ) No ( )
    d. When the manholes are the externally bolted type, are they first pried loose from their seats before entirely removing all of the bolts or nuts? Yes ( ) No ( )
    e. Is the tank air tested for oxygen and carbon dioxide concentrations and toxic, flammable, or combustible gases and vapors before employees are permitted to enter the tank? Yes ( ) No ( )
    f. If a hazardous atmosphere is present, is respiratory equipment required to be used (supplied-air type)? Yes ( ) No ( )
    g. Is the employee entering the tank required to be equipped with a lifeline, and is a safety watcher positioned at the tank opening? Yes ( ) No ( )
    h. Are employees required to wear proper eye, face, hand, and foot protection to prevent injuries? Yes ( ) No ( )
    i. Are portable electric lamps or tools, used inside the tank, explosion-proof and grounded? Yes ( ) No ( )
    j. After cleaning, is the inside inspected for loose scale, wiping rags, tools, or pieces of lint? Yes ( ) No ( )
    k. Are new gaskets placed on the manhole covers? Yes ( ) No ( )

COMPRESSED GASES

There are several different compressed gases that are used in the phosphate industry. 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 and injuries.

Some of the gases have properties that are hazardous in ways other than just being pressurized, 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 persons at your establishment who know the most about the areas covered; and, while conducting a walk-through survey, complete this section with their help.

1. Are compressed gas cylinders required to be secured to prevent upset? Yes ( ) No ( )

2. Are compressed gas cylinders used and stored in an upright position? Yes ( ) No ( )

3. Are oxygen and fuel gas cylinders separated by at least 20 feet, or is there a 5-foot, noncombustible barrier with a half-hour fire rating between them? Yes ( ) No ( )

4. Is oxygen kept far enough from welding and cutting operations so that sparks and slag cannot reach it? Yes ( ) No ( )

5. Is oxygen kept at least 20 feet from combustible materials (such as oil or grease)? Yes ( ) No ( )

6. Are valve-protection caps required to be kept on cylinders that are not in use? Yes ( ) No ( )

7. Are empty cylinders so marked and are their valves closed? Yes ( ) No ( )

8. Are "No Smoking" signs displayed near fuel gas and oxygen storage areas? Yes ( ) No ( )

9. Is a Class A; B fire extinguisher kept in the vicinity of welding and cutting operations? Yes ( ) No ( )

10. Is there an automatic CO_2 fire extinguishing system within the plant (if not, go to question 15)? Yes ( ) No ( )

    a. Is there a predischarge alarm on the CO_2 extinguishing system? Yes ( ) No ( )
    b. Is rescue equipment available for immediate use? Yes ( ) No ( )
    c. Are CO_2 cylinders inspected regularly? Yes ( ) No ( )

11. If hydrogen is in use (if not, go to question 16):

    a. Is the hydrogen storage 20 feet from flammable materials or oxidizing gases? Yes ( ) No ( )
    b. Is the storage such that it will always be 25 feet from open fires or ordinary electrical equipment? Yes ( ) No ( )
    c. Is the storage 50 feet from other flammable gas storage? Yes ( ) No ( )
    d. If stored outside, are weeds and vegetation kept away from the area? Yes ( ) No ( )
    e. Is a sufficient quantity of CO_2 readily available to purge the hydrogen from the generator? Yes ( ) No ( )
    f. Are nonsparking tools used in hydrogen areas? Yes ( ) No ( )

12. Are employees prohibited from using oil or grease for lubricating valves, gauge connections, or other parts of an oxygen system? Yes ( ) No ( )

13. Are cylinder storage areas well ventilated? Yes ( ) No ( )

14. Are employees prohibited from using cylinders (even empty ones) as rollers? Yes ( ) No ( )

15. Are all cylinders required to be approved, properly marked, and properly identified? Yes ( ) No ( )

16. Do all CO_2 cylinders, including those in an automatic fire extinguishing system, receive a hydrostatic test every 5 years? Yes ( ) No ( )

17. Are cylinders kept away from sources of heat? Yes ( ) No ( )

18. When hoisting cylinders to upper levels in the plant, is a proper cradle or other safe lifting device provided? Yes ( ) No ( )

19. Are workers prohibited from taking gas cylinders into tanks or confined spaces? Yes ( ) No ( )

20. Are workers prohibited from using low pressure regulators, hoses, couplings, etc., for any gas that is under high pressure? Yes ( ) No ( )

21. Are cylinders prohibited from being stored where they could become part of an electrical circuit and, through electrical arcing, cause a fire? Yes ( ) No ( )

22. Are employees prohibited from hoisting cylinders by protective caps? Yes ( ) No ( )

23. Are employees cautioned about dropping cylinders? Yes ( ) No ( )

CALCINERS

Calciners are facilities designed to heat the phosphate ore to extremely high temperatures, burning out the organic material contained in the ore.

All employees must be aware that they are working around high temperature hazards as well as around respirable hazards from the dust particles which may be released through leaks in the system.

It is important that safety rules and work procedures be followed exactly.

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

1. Have safe work procedures been established for opening hot cyclones and aftercoolers? Yes ( ) No ( )

2. Are checks made regularly to determine if the on-stream explosimeter in the electrostatic precipitator is functioning properly? Yes ( ) No ( )

3. Is it required that electrical lock-out procedures be strictly adhered to when clearing product elevators, working on conveyors, or entering any electrically energized equipment or machinery? Yes ( ) No ( )

4. Are respirators required to be worn whenever the calciner work area contains a hazardous amount of respirable dust as determined by atmospheric sampling? Yes ( ) No ( )

5. Are walkways, stairways, and work areas kept free of tripping hazards such as air hoses, welding cables, and welding hoses? Yes ( ) No ( )

6. When maintenance work is being done on an upper level of the calciner, are lower areas directly below roped off to prevent entry? Yes ( ) No ( )

7. Is the control room designed to protect the operator from vibration and noise? Yes ( ) No ( )

8. Is there a preventive maintenance program to ensure good dust seals in the elevators and piping systems? Yes ( ) No ( )

9. Is entry to the calciner prohibited except to authorized persons? Yes ( ) No ( )

10. Are noise level measurements made in potential high noise level areas? Yes ( ) No ( )

11. Are high noise areas posted to warn employees that protective hearing equipment is required? Yes ( ) No ( )

12. Are inrunning nip and pinch points at the head and tail pulleys adequately guarded? Yes ( ) No ( )

13. Are catwalks required to be kept clear of spilled product, tools, and pry bars? Yes ( ) No ( )

14. Are screw conveyor covers kept in place? Yes ( ) No ( )

15. Are emergency stop cords tested regularly? Yes ( ) No ( )

16. Are all walkways and platforms fitted with handrails, guardrails, and toeboards? Yes ( ) No ( )

17. Is a special safety permit required for opening lines or performing open flame- or spark-producing work? Yes ( ) No ( )

18. Is a special safety permit required before entry into an enclosed space or vessel? Yes ( ) No ( )

19. Are employees protected against blowback of hot rock when using air lances in the calciner windboxes (e.g., shields, protective clothing)? Yes ( ) No ( )

PHOSPHATE ORE BENEFICIATION

Upgrading of mine-run phosphate ore is accomplished by a combination of attritioning and washing processes. The ore is water washed to liberate the fines, or "slimes," from the ore matrix. This is followed by grinding, further washing, and finally classification using wet cyclones. The cyclone underflow, or beneficiated ore, may be fed to a rotary dryer and then transported to storage.

The process equipment includes a trommell, hammer, rod mills, wet cyclones, gas-fired rotary dryer, and an assortment of transfer belts, pumps, and associated equipment.

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

1. Are procedures established for entry into dryers and enclosed space? Yes ( ) No ( )

2. Is electrically powered equipment locked-out before being worked upon? Yes ( ) No ( )

3. Are all drive systems, conveyor belts, and other moving parts permanently guarded? Yes ( ) No ( )

4. Is hearing protection required to be worn in high noise areas? Yes ( ) No ( )

5. Are walkways and stairways required to be kept free of debris, hoses, and other tripping hazards? Yes ( ) No ( )

6. Is lighting adequate in all work areas? Yes ( ) No ( )

7. Are good housekeeping assignments in evidence throughout the plant? Yes ( ) No ( )

8. Are employees instructed and retrained in proper handling of floatation chemicals (sulfuric acid, fatty acid, and ammonia)? Yes ( ) No ( )

MILLS

In the mills, the phosphate rock is ground to a fine powder so that the ore can be reacted with sulfuric acid in the phosphoric acid plant to produce phosphoric acid.

It is important that safety rules and work procedures be followed closely. Employees must also be protected against noise and dust hazards and moving parts of machinery.

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

1. Are the mill drives locked-out before opening the doors? Yes ( ) No ( )

2. Are feeder guards lowered before starting the mill? Yes ( ) No ( )

3. Is the lock-out procedure supervised before cleaning a plugged feeder? Yes ( ) No ( )

4. Are walkways and platforms required to be kept clean of hoses, welding leads, and other tripping hazards? Yes ( ) No ( )

5. Has a job safety analysis been prepared for each potentially hazardous repair job? Yes ( ) No ( )

6. Are approved respirators required to be worn when work areas contain hazardous amounts of respirable dust? Yes ( ) No ( )

7. Is hearing protection required in high noise areas? Yes ( ) No ( )

PIPING SYSTEMS AND SETTLING AREAS

The heavy reliance by many phosphate companies on piping systems and settling areas to distribute phosphate rock, water, and the by-products of mining and processing requires that attention be paid to the safety aspects of installing and maintaining these systems.

Most potential hazards associated with these systems are related to the following areas:

-- installation and removal of pipe,
-- work often performed in remote areas under varying conditions, and
-- confined space work in spillways.

This section of the Self-Evaluation Instrument is designed to identify the potential hazards associated with piping systems and settling areas, and to evaluate the establishment's program to protect employees from these hazards.

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

1. When lubricating or repairing pump assemblies, are they locked-out? Yes ( ) No ( )

2. On pipelines with a series of pumps in line, are measures taken, in addition to locking-out a pump for repairs, to prevent product flow from rotating pump? Yes ( ) No ( )

3. Are pit suction line pumps disconnected and locked-out prior to cleaning? Yes ( ) No ( )

4. In laying pipe, are equipment operators instructed to use extreme care while operating around a pipeline crew? Yes ( ) No ( )

5. Has the equipment operator been instructed to receive signals from only one person? Yes ( ) No ( )

6. Are pipe sections required to be securely loaded or tied to mobile equipment prior to being transported to prevent shifting or swinging? Yes ( ) No ( )

7. Are all pipelines, surge tanks, and pumps required to be cleared of pressure before breaking line? Yes ( ) No ( )

8. Are employees instructed to use no more force than they can control when attempting to loosen flange bolts with wrenches? Yes ( ) No ( )

9. Are workers instructed not to use "cheaters" on pipe wrenches? Yes ( ) No ( )

10. In draining surge tanks, are employees required to stand to one side when loosening flange bolts? Yes ( ) No ( )

11. Are all dikes maintained and regularly inspected for weak spots? Yes ( ) No ( )

12. Are life jackets required to be worn if the access to spillways is by boat or unguarded walkways? Yes ( ) No ( )

13. Before entering a spillway, are the following precautions required:

    a. Check the bottom of spillway for hydrogen sulfide gas? Yes ( ) No ( )
    b. Require employee to wear safety harness and lifeline? Yes ( ) No ( )
    c. Require that an employee with breathing apparatus act as a safety watch? Yes ( ) No ( )
    d. Check inside spillway for poisonous snakes and vermin? Yes ( ) No ( )

14. Are customized first aid supplies readily available to employees located away from the plant site? Yes ( ) No ( )

15. Are employees instructed to be aware of the slipping and tripping hazards associated with strip mining locations? Yes ( ) No ( )

16. Is potable water available at these locations? Yes ( ) No ( )

17. Are restroom facilities available? Yes ( ) No ( )

18. Are remote areas patrolled where employees are working or are they provided with communications in case of an emergency? Yes ( ) No ( )

19. Are all mine roads required to be maintained adequately? Yes ( ) No ( )

20. Are all pathways to remote work areas free of heavy underbrush? Yes ( ) No ( )

DRILLING

Drilling in the phosphate mining industry may be for exploration purposes, to determine where ore reserves are located, or it may be for the purpose of plotting the phosphate ore formations on maps and for final calculations of recoverable ore--"control drilling." Also, there is blast-hole drilling where the hard rock must be blasted before stripping of the ore can begin.

The drill crews must be well trained in safe operating procedures and constantly alert to operational hazards. Approved personal protective equipment must be worn at all times to protect against noise, dirt, and flying debris.

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

1. Is the drilling rig completely inspected at the start of each work shift? Yes ( ) No ( )

2. Is the surrounding work area inspected frequently for hazardous conditions? Yes ( ) No ( )

3. Is adequate lighting provided for drilling at night time and periods of decreased visibility? Yes ( ) No ( )

4. Is the lighting inspected regularly? Yes ( ) No ( )

5. Are wrenches provided to remove detachable drill bits from the drill steel? Yes ( ) No ( )

6. Are the drillers required to have visual contact with the drill helper before moving the drill? Yes ( ) No ( )

7. Is there a standard procedure for prompt reporting of equipment defects? Yes ( ) No ( )

8. Are safety chains or locking devices required to be used at air hose couplings? Yes ( ) No ( )

9. While the drill is in operation, is the operator required to be at the controls of the drill at all times? Yes ( ) No ( )

10. Are hoisting lines inspected and maintained in good condition? Yes ( ) No ( )

11. Are warm-up fires properly guarded and kept at a safe distance from any part of the drill? Yes ( ) No ( )

12. Are employees prohibited from dusting clothing, hands, or face with compressed air? Yes ( ) No ( )

13. Are employees prohibited from cleaning drill bit jets while the bit is under pressure? Yes ( ) No ( )

14. Are air hoses protected from damage? Yes ( ) No ( )

15. Are air hoses inspected periodically for defects and possible damage? Yes ( ) No ( )

16. Are safety relief valves checked at least daily? Yes ( ) No ( )

17. Are air receiver tanks drained at least daily? Yes ( ) No ( )

18. Before repairs are attempted, is the air turned off and bled from the hose? Yes ( ) No ( )

19. Are drill operators (including drill helpers) instructed and retrained in emergency shutdown procedures? Yes ( ) No ( )

20. Is approved hearing protection worn where it is required? Yes ( ) No ( )

21. Is approved respiratory protection worn when conditions require? Yes ( ) No ( )

22. Are drill crew members required to wear eye and head protection around drilling operations? Yes ( ) No ( )

23. Are drill crews instructed and retrained to stay clear of moving shafts, rods, steels, kelly bars, tables, and hoisting units? Yes ( ) No ( )

24. Are crew members prohibited from passing over or under a moving stem or auger? Yes ( ) No ( )

25. Is it prohibited to leave tools or other objects loose on drill mast or platform? Yes ( ) No ( )

26. Are safety belts required for employees working on the mast when it is in a raised position? Yes ( ) No ( )

27. Are drill operators instructed and retrained in safe operating procedures? Yes ( ) No ( )

28. Are drill controls left in the neutral position in the event of power failure or breakdown so as to guard against unexpected movement when power operation resumes? Yes ( ) No ( )

29. Are large drill holes covered, filled, or guarded where they are a potential hazard? Yes ( ) No ( )

30. On each drilling operation, is good housekeeping practiced and:

    a. Oil and fuel spills cleaned up? Yes ( ) No ( )
    b. Tools and air hoses kept in proper place? Yes ( ) No ( )
    c. Drill deck kept clean of debris? Yes ( ) No ( )
    d. Walkways and catwalks in safe condition? Yes ( ) No ( )
    e. Handrails and steps in safe condition? Yes ( ) No ( )

31. Are all control levers clearly marked and identified to aid in emergency shutdown? Yes ( ) No ( )

Rotary Jet Piercing Drilling:

32. Is the operator's cab of the jet drill pressurized? Yes ( ) No ( )

33. Is the oxygen flow indicator provided with a protective cover? Yes ( ) No ( )

34. Are safety chains or locking devices used across connections on high pressure oxygen lines of 1 inch diameter or more? Yes ( ) No ( )

35. Are adequate precautions required to be taken to protect the employees when lighting the burner? Yes ( ) No ( )

36. Is smoking or open flame prohibited near the oxygen supply and storage area? Yes ( ) No ( )

37. Are signs warning against smoking and open flames posted at oxygen supply and storage areas? Yes ( ) No ( )

38. Is the oxygen intake coupling constructed such that only the oxygen hose can be connected to it? Yes ( ) No ( )

39. Is the combustion chamber of a jet drill stem, that has been sitting inoperative in a drill hole, flushed with a suitable solvent after the stem is pulled up? Yes ( ) No ( )

EXPLOSIVES

In some areas of a phosphate mine, rock must be blasted before scrapers can begin to remove the overburden to get at the ore. Blast holes are drilled in the rock and the holes charged with explosives.

A competent, qualified person should always be in charge of explosives and should be held responsible for enforcing all recommended and required safety precautions.

Accidents and injuries occuring with explosives generally can be prevented.

Considerable caution must be given to the storage, transportation, and use of explosive material, and adherence to appropriate regulations.

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

Storage of Explosives:

1. Are detonators and explosives, other than blasting agents, stored in separate magazines? Yes ( ) No ( )

2. Is the area surrounding magazines and facilities for the storage of blasting agents kept clear of rubbish, brush, and dry grass for a distance of not less than 25 feet in all directions, and other unnecessary combustible materials for a distance of not less than 50 feet? Yes ( ) No ( )

3. Is smoking and open flame prohibited within 25 feet of the explosives or detonator storage? Yes ( ) No ( )

4. Are explosives, detonators, and related materials, such as safety fuse and detonating cord, stored in a manner to assure that the oldest stocks will be used first? Yes ( ) No ( )

5. Are the ammonium nitrate-fuel oil blasting agents physically separated from the other explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the other explosives, safety fuse, or detonating cord? Yes ( ) No ( )

6. Are the following storage rules followed:

   a. Cases of explosives stored right side up--not on their ends or sides? Yes ( ) No ( )
   b. Cases of explosives stacked not more than 6 feet high? Yes ( ) No ( )

7. Are all explosive materials removed from storage facilities prior to any internal or external repair of such facilities? Yes ( ) No ( )

   (NOTE: The explosives removed from storage facilities for this purpose shall be either placed in approved-type storage or placed a safe distance from the facilities under repair where they shall be properly guarded and protected until repairs have been completed.)

8. Does the magazine meet the following requirements:

   a. Located in accordance with the current American Table of Distances for storage of explosives? Yes ( ) No ( )
   b. Constructed substantially of non-combustible material or covered with fire-resistant material? Yes ( ) No ( )
   c. Reasonably bullet proof? Yes ( ) No ( )
   d. Electrically bonded and grounded if constructed of metal? Yes ( ) No ( )
   e. Made of nonsparking materials on the inside, including floors? Yes ( ) No ( )
   f. Provided with adequate and effective screen ventilation openings near the floor and ceiling? Yes ( ) No ( )
   g. Locked securely when unattended? Yes ( ) No ( )
   h. Posted with suitable danger signs located so that a bullet passing through the face of a sign will not strike the magazine? Yes ( ) No ( )
   i. Used exclusively for storage of explosives or detonators and kept free of all extraneous materials? Yes ( ) No ( )
   j. Clean and dry in the interior, and in good repair? Yes ( ) No ( )
      (Exposure to moisture damages most kinds of explosives, especially dynamite and caps.)
   k. Unheated, unless heated in a manner that does not create a fire or explosion hazard? Yes ( ) No ( )
      (Electrical heating devices shall not be used inside a magazine.)

Transportation of Explosives:

9. Are explosives and detonators transported in separate vehicles unless separated by 4 inches of hardwood or the equivalent? Yes ( ) No ( )

10. When explosives and detonators are hauled by trolley locomotive, are covered, electrically insulated cars used? Yes ( ) No ( )

11. Are self-propelled vehicles, which are used to transport vehicles or detonators, equipped with suitable fire extinguishers? Yes ( ) No ( )

12. Are vehicles containing explosives or detonators placarded with proper warning signs? Yes ( ) No ( )

13. When vehicles containing explosives or detonators are parked, are the following requirements met:

    a. Brakes set? Yes ( ) No ( )
    b. Motor power shut off? Yes ( ) No ( )
    c. Vehicle wheels blocked securely against moving? Yes ( ) No ( )

14. Are vehicles containing explosives or detonators forbidden entry into any repair shop or garage? Yes ( ) No ( )

15. Are vehicles containing explosives or detonators:

    a. Maintained in safe condition? Yes ( ) No ( )
    b. Operated at a safe speed and in accordance with all safe operating practices? Yes ( ) No ( )
    c. Metal truck beds lined with wood or other nonsparking material? Yes ( ) No ( )
    d. Truck beds equipped with side racks and tailgates? Yes ( ) No ( )
    e. Explosives piled no higher than the side or end enclosures? Yes ( ) No ( )

16. Are vehicles containing explosives or detonators directed over routes and at times that expose a minimum number of persons? Yes ( ) No ( )

17. Are explosives or detonators that are in open-bodied vehicles covered with fire-retardent covering? Yes ( ) No ( )

18. Are metal objects or other supplies (except for safety fuse or nonsparking equipment) prohibited from being in the same cargo as explosives or detonators? Yes ( ) No ( )

19. Are the following transportation requirements met:

a. Explosives or detonators shall not be transported on railroad locomotives? Yes ( ) No ( )

b. No person shall smoke while transporting or handling explosives or detonators? Yes ( ) No ( )

c. Only the necessary attendants shall ride on or in vehicles containing explosives or detonators? Yes ( ) No ( )

d. Explosives or detonators shall not be transported on mantrips (trips on which men are transported to and from a work area)? Yes ( ) No ( )

e. Explosives or detonators transported promptly without undue delays in transit? Yes ( ) No ( )

f. Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress? Yes ( ) No ( )

20. Are substantial, nonconductive containers with tight fitting covers used to transport explosives, capped fuses, and electric detonators to the blasting site? Yes ( ) No ( )

21. Are employees instructed and retrained in the safe storage, transportation, and use of explosives, detonators, and blasting agents? Yes ( ) No ( )

22. Are all blasting operations under the direct control of competent, qualified, and authorized persons? Yes ( ) No ( )

23. Are all damaged or deteriorated explosives and detonators destroyed promptly in a safe manner? Yes ( ) No ( )

24. Are boreholes cleared of obstructions before charging? Yes ( ) No ( )

25. Are holes to be blasted charged as near to blasting time as practical? Yes ( ) No ( )

(NOTE: In no case shall the time elapsing between the completion of charging to the time of blasting exceed 72 hours unless prior approval has been obtained from the Mine Safety and Health Administration.)

26. Are persons prohibited from smoking within 25 feet of explosives or detonators? Yes ( ) No ( )

27. Are explosives kept physically separated from detonators until charging is started? Yes ( ) No ( )

28. Do capped primers meet the following requirements:

    a. Made up at the time of charging? Yes ( ) No ( )
    b. Made up as close to the blasting site as conditions allow? Yes ( ) No ( )
    c. Prepared so that the detonator is contained securely and is completely embedded within the explosive cartridge? Yes ( ) No ( )

29. Are only wooden or other nonsparking implements used to punch holes in an explosive cartridge? Yes ( ) No ( )

30. Are tamping pole requirements met:

    a. Made of wood or other material acceptable to Mine Safety and Health Administration? Yes ( ) No ( )
    b. Couplers made of nonspark material? Yes ( ) No ( )

    (Note: Special instructions--no tamping shall be done directly on a capped primer.)

31. Are unused explosives and detonators moved to a safe location as soon as charging operations are completed? Yes ( ) No ( )

32. Are areas in which charged holes are awaiting firing adequately guarded or barricaded, and posted or flagged against unauthorized entry? Yes ( ) No ( )

33. When a safety fuse has been fired, are persons prohibited from returning to misfired holes for at least 30 minutes? Yes ( ) No ( )

34. When electrical blasting caps are used, are persons prohibited from returning to misfired holes for at least 15 minutes? Yes ( ) No ( )

35. Are faces and muckpiles examined for undetonated explosives after each blast, and are undetonated explosives that are found disposed of safely and promptly? Yes ( ) No ( )

36. Is the drilling of holes prohibited where there is danger of intersecting a charged or misfired hole? Yes ( ) No ( )

37. Are fuse and igniters stored in a cool, dry place away from oils or grease? Yes ( ) No ( )

38. Is it prohibited to use a fuse that has been kinked, bent sharply, or mishandled in such a manner that the train or deflagration may be interrupted? Yes ( ) No ( )

39. Are fuses cut and capped in safe, dry locations posted with "No Smoking" signs? Yes ( ) No ( )

40. When crimping blasting caps to fuses, is the implement designed specifically for that purpose used? Yes ( ) No ( )

41. Is the burning rate of the fuse posted in a conspicuous location for employees to read? Yes ( ) No ( )

42. When firing from 1 to 15 blastholes with safety fuses ignited individually using hand-held lighters, are the fuses of such lengths as to provide the minimum burning time specified in the following table for a particular size round? Yes ( ) No ( )

Number of holes in a round	Minimum burning time in minutes
1	2
2-5	2 2/3
6-10	3 1/3
11-15	5

(NOTE: In no case shall any 40-second-per-foot safety fuse less than 36 inches long, or any 30-second-per-foot safety fuse less than 48 inches long, be used.)

43. Are at least two persons present when fuses are ignited? Yes ( ) No ( )

44. Are carbide lamps prohibited as an ignition source for fuses? Yes ( ) No ( )

(Note: Fuse shall be ignited with hot-wire lighters, lead spitters, igniter cord, or other such devices designed for this purpose; but not carbide lamps.)

45. Is it required that the following ignition procedures be followed:

    a. The fuse shall not be ignited before the primer and the entire charge are securely in place? Yes ( ) No ( )
    b. Timing should be such that the fuse in the last hole to fire is burning within the hole before the first hole fires. Yes ( ) No ( )

46. Are permanent blasting lines properly supported, insulated, and kept in good repair? Yes ( ) No ( )

47. Are the following rules for the use of electric detonators required:

    a. Different brands of detonators shall not be used in the same round? Yes ( ) No ( )
    b. Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round (except when being tested with a blasting galvanometer)? Yes ( ) No ( )
    c. Wired rounds shall be kept shunted until they are being connected to the blasting line (except when being tested with a blasting galvanometer)? Yes ( ) No ( )
    d. Blasting lines shall be kept shunted until immediately before blasting (except when being tested with a blasting galvanometer)? Yes ( ) No ( )

48. Are completely wired rounds tested with a blasting galvanometer before connections are made to the blasting line? Yes ( ) No ( )

49. When electric detonators are used, is charging stopped immediately when the presence of static electricity or stray current is detected? Yes ( ) No ( )

    (Note: The condition must be remedied before charging is resumed.)

50. When electric detonators are used, is charging suspended in surface mining, shaft sinking, and tunneling; and are employees withdrawn to a safe location upon the approach of an electrical storm? Yes ( ) No ( )

51. If branch circuits are used when blasts are fired from power circuits, are safety switches provided at safe distances from the blast area in addition to the main blasting switch? Yes ( ) No ( )

52. Are blasting switches kept locked in the open position, except when closed to fire and blast? Yes ( ) No ( )

(Note: Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.)

53. Is the key or other control to an electrical firing device entrusted only to the person designated to fire the round or rounds? Yes ( ) No ( )

54. Are the following circuit procedures required:

a. Electric circuits from the blasting switches to the blast area are not to be grounded? Yes ( ) No ( )

b. At least a 5-foot air gap is provided between the blasting circuit and the power circuit? Yes ( ) No ( )

c. Power sources are suitable for the number of electric detonators to be fired and for the type of circuits used? Yes ( ) No ( )

d. Delay connectors for firing detonating cord is treated and handled with the same safety precautions as blasting caps and electric detonators? Yes ( ) No ( )

e. If any part of a blast is connected in parallel and is to be initiated from power lines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating an arcing control device in the blasting circuit or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap? Yes ( ) No ( )

55. Are tools used for opening metal or nailed wooden containers of explosives and detonators made of nonsparking materials? Yes ( ) No ( )

56. Are holes prohibited from being collared in bootlegs? Yes ( ) No ( )

57. Is black powder prohibited for blasting (except when a desired result cannot be obtained with another type of explosive)? Yes ( ) No ( )

58. Are the following procedures for the use of black blasting powder required:

a. Containers shall not be opened in or within 50 feet of any magazine; within any building in which a fuel-fired or exposed element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within 50 feet of any open flame? Yes ( ) No ( )

b. Granular powder shall be transferred from containers only by pouring? Yes ( ) No ( )

c. Spills of granular powder shall be cleaned up promptly with nonsparking equipment, contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules? Yes ( ) No ( )

d. Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container? Yes ( ) No ( )

e. Containers of powder transported by vehicles shall be in a wholly enclosed cargo space? Yes ( ) No ( )

f. Misfires shall be disposed of by washing the stemming and powder charge from the borehole and removing and disposing of the initiator as a damaged explosive? Yes ( ) No ( )

g. Boreholes of shots that fire but fail to break, or fail to break properly, shall not be recharged for at least 12 hours? Yes ( ) No ( )

59. Are the following procedures for powder chests required:

a. Substantially constructed of nonsparking material on the inside? Yes ( ) No ( )
b. Posted with suitable warning signs? Yes ( ) No ( )
c. Located out of the blast area and out of the line of blasts? Yes ( ) No ( )
d. Emptied and their contents returned to the main magazine at the end of each shift unless the powder chest is located within the area continually attended by employees during shift changes? Yes ( ) No ( )
e. Separate chests for detonators and explosives unless separated by 4 inches of hard wood or the equivalent? Yes ( ) No ( )
f. Kept locked and secured when unattended? Yes ( ) No ( )

60. Is suitable warning given before blasts are fired? Yes ( ) No ( )

61. Are all persons cleared and removed from the blasting area unless approved blasting shelters are provided? Yes ( ) No ( )

62. If explosives are suspected of burning in a hole, are all persons in the endangered area required to move to a safe location and no one allowed to return to the hole until the danger has passed (but in no case within 1 hour)? Yes ( ) No ( )

63. Are lead wires and blasting lines protected from sources of static or other electrical contact (radio energy)? Yes ( ) No ( )

64. Are lead wires and blasting lines prohibited from being strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines? Yes ( ) No ( )

65. Are the following procedures for detonating cord blasting required:

a. A double-trunk or loop system is being used? Yes ( ) No ( )
b. Trunklines, in multiple-row blasts, shall make one or more complete loop with crossties between loops at intervals of not over 200 feet? Yes ( ) No ( )

c. All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunk lines? Yes ( ) No ( )

d. Detonating cord should not be used if it has been kinked, bent, or otherwise handled in such a manner that the train of detonation may be interrupted? Yes ( ) No ( )

e. Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other work is performed in that blasting area? Yes ( ) No ( )

66. Are blastholes in "hothole" areas and holes that have been sprung prohibited from being charged until tests have been made to ensure that the heat has dissipated to a safe extent? Yes ( ) No ( )

67. Where electric blasting is to be performed, are the electric circuits to equipment in the immediate area to be blasted de-energized before electric detonators are connected to the blasting circuit? Yes ( ) No ( )

68. Is adequate priming used to guard against misfires, increased toxic fumes, and poor performance when using blasting agents? Yes ( ) No ( )

69. Are adequate steps being taken, including grounding and bonding of conductive parts of pneumatic loading equipment, to eliminate all hazards of static electricity before the use of blasting agents is commenced? Yes ( ) No ( )

70. Are precautions taken to ensure that pneumatic loading equipment is <u>not</u> grounded to waterlines, airlines, rails, or the permanent electrical grounding system? Yes ( ) No ( )

71. Are hoses used in connection with pneumatic loading machines of the semi-conductive type having a total resistance low enough to permit the dissipation of static electricity, and high enough to limit the flow of stray electric currents to a safe level? Yes ( ) No ( )

72. Are plastic tubes prohibited as hole liners where blasting agents are loaded pneumatically into holes containing an electric detonator? Yes ( ) No ( )

DRAGLINES

The questions in this section of the Self-Evaluation Instrument are designed to identify the potential hazards to employees working on or near draglines and to evaluate the establishment's program to protect employees from these hazards.

An effective safety program dealing with draglines includes:

-- regular inspection of equipment,
-- routine maintenance schedule,
-- use of personal protective devices, and
-- training of employees in safe practices.

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

1. Are only qualified operators allowed to operate equipment? Yes ( ) No ( )

2. Is safe access provided to mount equipment? Yes ( ) No ( )

3. Is it required that employees notify the operator before attempting to board equipment? Yes ( ) No ( )

4. Is boarding equipment prohibited while it is swinging or walking? Yes ( ) No ( )

5. Is swinging the bucket, shovel, or boom over employees prohibited? Yes ( ) No ( )

6. Is at least one groundman required to be present when walking equipment? Yes ( ) No ( )

7. Are operations within 10 feet of energized high voltage lines prohibited? Yes ( ) No ( )

8. Is there an alarm on draglines with oilers (oil persons) to signal a warning prior to starting equipment? Yes ( ) No ( )

9. Are decks, ladders, stairs, walkways, and work areas required to be kept free of oil, grease, and other slippery materials? Yes ( ) No ( )

10. Are employees prohibited from walking the dragline boom while it is in motion? Yes ( ) No ( )

11. Are inspections made (at least daily) of the equipment? Yes ( ) No ( )

12. Is adequate fire protection equipment readily available for use? Yes ( ) No ( )

13. Are containers with tightly covered lids provided for disposal of oily waste and rags? Yes ( ) No ( )

14. Is equipment provided with adequate lighting during the night and periods of decreased visibility? Yes ( ) No ( )

15. Are employees required to wear leather gloves when handling wire rope cables? Yes ( ) No ( )

16. Can lubrication operations be performed without exposing employees to pinch points? Yes ( ) No ( )

17. Are dragline operators working in remote areas furnished:

    a. A customized first aid kit? Yes ( ) No ( )
    b. A communication system, or are they frequently patrolled? Yes ( ) No ( )
    c. A safe means of access to the equipment? Yes ( ) No ( )

18. Is there a training program for operators that emphasizes safe operating procedures to eliminate serious and frequent accidents? Yes ( ) No ( )

19. Do you require preplacement and periodic medical assessment for operators? Yes ( ) No ( )

SHOVELS
(POWER)

Safe operation of power equipment such as shovels requires a great amount of skill and training. Maintenance and repairmen should be instructed in the correct procedures for lubrication, adjustments, and repair.

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

1. Are operators and maintenance repairmen required to wear hard hats, safety glasses, and safety shoes? Yes ( ) No ( )

2. Are oil, water, and hydraulic levels checked before starting any rig? Yes ( ) No ( )

3. Is it prohibited to start a shovel under load without a proper warmup? Yes ( ) No ( )

4. Is a periodic check made of the bucket teeth? Yes ( ) No ( )

5. Are the track rollers checked frequently to ensure that they are free? Yes ( ) No ( )

6. Are hydraulic lines checked frequently for leaks? Yes ( ) No ( )

7. Is it prohibited to operate a unit with hoist brake or swing bands? Yes ( ) No ( )

8. When operating hydraulic units, are operators instructed to avoid lifting a heavy load from the side? Yes ( ) No ( )

9. On hydraulic units, does the operator engage the safety lever for the hydraulic system when he leaves the unit for any reason? Yes ( ) No ( )

10. Are operators prohibited from "sweeping" with shovels unless specifically authorized? Yes ( ) No ( )

11. Are haul unit drivers instructed to understand the operator's signals for loading? Yes ( ) No ( )

12. Does the operator require all units to be clear before swinging or backing up? Yes ( ) No ( )

13. Is lubrication prohibited while equipment is in operation? Yes ( ) No ( )

14. Is undercutting high banks or faces prohibited? Yes ( ) No ( )

15. Are only trained and qualified persons permitted to operate this equipment? Yes ( ) No ( )

16. On electricially powered units, is provision made to protect workers from electrical faults:

    a. In the trailing cables? Yes ( ) No ( )
    b. At the machine itself? Yes ( ) No ( )

17. Is provision made to protect trailing cables from physical damage? Yes ( ) No ( )

18. Are the windows of the operator's cab required to be clean and free of objects which may reduce the operator's view? Yes ( ) No ( )

19. Is each unit equipped with a suitable fire extinguisher? Yes ( ) No ( )

20. Are inspections, at least daily, of the equipment performed on:

    a. Vehicle brakes? Yes ( ) No ( )
    b. Oil and grease levels? Yes ( ) No ( )
    c. Wire ropes? Yes ( ) No ( )
    d. Hydraulic levels (where applicable)? Yes ( ) No ( )
    e. Safety guards and devices? Yes ( ) No ( )

PIT AND DUMP SAFETY

The pits, dumps, and stockpiles provide a high degree of exposure to heavy machinery and haulage equipment. There must be strict adherence to safe operating procedures.

Read all questions in this section; discuss the questions with those persons at your establishment who know the most about the area covered; and, while conducting a walk-through survey, complete this section with their help.

1. Is a horn or other type of signal used before moving equipment forward or backward? Yes ( ) No ( )

2. Are excessive speeds prohibited? Yes ( ) No ( )

3. Are unsafe conditions reported immediately to a supervisor? Yes ( ) No ( )

4. Are light signals used at night to direct trucks? Yes ( ) No ( )

5. Are only authorized persons permitted in areas of loading or dumping operations? Yes ( ) No ( )

6. Have standards been established for the safe control of pit walls? Yes ( ) No ( )

7. Are precautions taken to keep the faces of a pit free from loose materials? Yes ( ) No ( )

8. Are employees prohibited from working near or under high banks? Yes ( ) No ( )

9. Are employees prohibited from working between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank? Yes ( ) No ( )

10. Is loose material stripped for a safe distance, but in no case less than 10 feet, from the top of pit walls? Yes ( ) No ( )

11. Is loose material sloped to the angle of repose? Yes ( ) No ( )

12. Are the top areas of pits, where work is performed, adequately protected to prevent falls of men or equipment? Yes ( ) No ( )

13. Are abandoned pits fenced or posted? Yes ( ) No ( )

14. Are workers instructed to use extreme caution during night operations? Yes ( ) No ( )

15. Are flares, fuses, or lighted lamps used when equipment is broken down and parked in the mine area at night? Yes ( ) No ( )

16. Are loaded haul units given the right-of-way? Yes ( ) No ( )

17. Are traffic patterns for the pit and dump areas clearly established and understood by all operators? Yes ( ) No ( )

18. Are loose objects prohibited in equipment cabs? Yes ( ) No ( )

19. Are vehicle operators prohibited from parking in the blind spots of other equipment? Yes ( ) No ( )

20. Are only authorized and qualified operators permitted to operate equipment? Yes ( ) No ( )

21. Are trucks, patrols, front-end loaders, and rubber tired dozers equipped with parking brakes separate and independent of regular braking systems? Yes ( ) No ( )

22. Are employees instructed to:

    a. Never stand near a truck that is being loaded or dumped? Yes ( ) No ( )
    b. Stay away from high walls when walking or parking equipment? Yes ( ) No ( )
    c. Never walk under shovels or front-end loader buckets? Yes ( ) No ( )
    d. Always use steps and hand rails provided when mounting or dismounting equipment? Yes ( ) No ( )
    e. Never sit under or next to high bank or pit walls or under equipment? Yes ( ) No ( )

23. Are employees required to wear hard hats, safety glasses, and safety shoes at all times in the pit area? Yes ( ) No ( )

EARTHMOVING EQUIPMENT

In the phosphate industry, earthmoving equipment includes payloaders, motorgraders, and bulldozers. Experience has shown that a carefully planned program of driver selection, training, and supervision, and equipment maintenance can greatly reduce the injury potential of operating earthmoving equipment.

It is important to be aware that the cause of 85 to 90% of all accidents involving earthmoving equipment can be traced back to the unsafe acts of drivers or poor maintenance of equipment. Only 10 to 15% are due to mechanical failure. For this reason, an effective accident prevention program for earthmoving equipment must stress safe operation, as well as the condition of the equipment.

This section of the Self-Evaluation Instrument is intended to identify the potential hazards associated with operating earthmoving equipment and to evaluate the establishment's program to protect its employees from these hazards.

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

1. Are only qualified operators allowed to operate earthmoving equipment? Yes ( ) No ( )

2. Is earthmoving equipment equipped with Roll-Over Protective Structures (ROPS)? Yes ( ) No ( )

3. Are seat belts required to be worn on earthmoving equipment equipped with ROPS? Yes ( ) No ( )

4. Is there an ABC-type fire extinguisher mounted and readily available for use on each piece of equipment? Yes ( ) No ( )

5. Are safety inspections required to be made of equipment prior to being used? Yes ( ) No ( )

6. Are operators required to use available handrails, ladders, or steps provided as access on or off equipment? Yes ( ) No ( )

7. Is operating equipment with greasy hands or muddy feet prohibited? Yes ( ) No ( )

8. Is the use of the steering wheel or other controls as hand holds prohibited when getting on or off equipment? Yes ( ) No ( )

9. Are the directional and speed shift levers required to be placed in neutral, the bucket or blade lowered to the ground, parking brake set, and the engine shut off before the operator dismounts the equipment? Yes ( ) No ( )

10. Do you prohibit operators from jumping to the ground when getting off equipment? Yes ( ) No ( )

11. Is equipment required to be started in neutral to avoid sudden movement? Yes ( ) No ( )

12. Is the starting of equipment without the operator sitting in his seat prohibited? Yes ( ) No ( )

13. Are operators required to check around their equipment to make sure it is clear before proceeding? Yes ( ) No ( )

14. Are riders prohibited on equipment (unless a seat is provided)? Yes ( ) No ( )

15. Is the carrying or lifting of employees with the equipment bucket or blade prohibited? Yes ( ) No ( )

16. Are operators prohibited from driving equipment over unprotected powerlines, hoses, or pipes? Yes ( ) No ( )

17. Are operating compartments kept clean and free of all nonessential objects such as chains, tools, etc.? Yes ( ) No ( )

18. Are operators required to bring their equipment to a full stop before proceeding at all doorways and blind corners? Yes ( ) No ( )

19. Are operators required to keep attachments on equipment as low as possible when traveling for better vision and stability, but high enough to clear obstructions? Yes ( ) No ( )

20. Are loads that are not centered or secured for safe transportation forbidden to be moved? Yes ( ) No ( )

21. Is the use of a flagman or groundman required for signaling when using equipment to move railroad cars? Yes ( ) No ( )

22. Are operators prohibited from allowing their equipment to coast in neutral? Yes ( ) No ( )

23. Is a procedure established for reporting all accidents ? Yes ( ) No ( )

24. Are operators prohibited from driving in reverse or looking over their shoulders any longer than necessary? Yes ( ) No ( )

25. Are operators instructed to always give pedestrians the right-of-way? Yes ( ) No ( )

26. Are operators required to know the rated load capacity of their equipment and are they instructed to not exceed it? Yes ( ) No ( )

27. Are the following precautions taken before fueling operations:

    a. Engine shut off? Yes ( ) No ( )
    b. No smoking or open flames? Yes ( ) No ( )
    c. Filling nozzle in contact with filler neck before starting fuel flow to prevent a static spark? Yes ( ) No ( )

28. Are the following precautions taken before beginning repairs on equipment:

    a. Bucket or attachment lowered to ground or securely locked to prevent movement? Yes ( ) No ( )
    b. Engine shut off? Yes ( ) No ( )
    c. Hydraulic or air pressure relieved by working controls in both directions with the engine off? Yes ( ) No ( )

29. Are sparks, flames, matches, etc., prohibited around or close to battery compartments or fuel tanks? Yes ( ) No ( )

30. Is a tow bar required for towing equipment? Yes ( ) No ( )

31. On equipment being towed with the engine off, are passengers prohibited? Yes ( ) No ( )

32. Is engine coolant below the boiling point before loosening the radiator cap? Yes ( ) No ( )

33. Is all equipment equipped with audible back-up warning devices? Yes ( ) No ( )

34. Are warning devices required to be properly maintained and kept in good repair? Yes ( ) No ( )

35. Are tires required to be deflated before any repairs are made to them or to the rims? Yes ( ) No ( )

36. Is there a means of preventing the hazard of wheel locking rims accidently blowing off rims during tire inflation; such as, chains, cables, or an inflation cage? Yes ( ) No ( )

37. Are slow moving vehicles (SMV) signs required on equipment used in roadway? Yes ( ) No ( )

38. Are bulldozer operators made aware of the hazard to themselves and other workmen of falling limbs when pushing down trees? Yes ( ) No ( )

39. Are dozers equipped with rear mounted winches provided with a wire mesh guard for rear of operator's compartments? Yes ( ) No ( )

40. Are winch cables and hooks regularly inspected? Yes ( ) No ( )

41. Are operators instructed to use extreme care while operating around other employees? Yes ( ) No ( )

42. Are operators required to wear hearing protection if equipment does not have a sound-suppressed cab? Yes ( ) No ( )

HAULAGE VEHICLES

Heavy-duty haulage trucks are used extensively in open pit phosphate mining to transport the phosphate ore. These will have a capacity of up to 200 tons or more. To prevent accidents, operators and maintenance personnel must be adequately trained and obey all safety rules.

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

1. Does each driver wear personal protective equipment such as a safety hat, safety shoes, and safety spectacles? Yes ( ) No ( )

2. Is a complete check made of each vehicle before it is put into operation? Yes ( ) No ( )

3. Is the way clear before backing any vehicle? Yes ( ) No ( )

4. Are excessive speeds prohibited? Yes ( ) No ( )

5. Is a horn or some other type of signal used to alert other personnel in the area before a truck is moved? Yes ( ) No ( )

6. Is driving restricted during conditions of low visibility and icy or slick conditions? Yes ( ) No ( )

7. Is it prohibited to pass another haul unit when in a normal work cycle? Yes ( ) No ( )

8. Do operators use extreme caution when following behind other units? Yes ( ) No ( )

9. Are cab windows and mirrors kept clean for good visibility? Yes ( ) No ( )

10. Are all loaded haul units given the right-of-way? Yes ( ) No ( )

11. When a vehicle is out of order, is it so tagged or marked to warn other operators against using the unit until it is repaired? Yes ( ) No ( )

12. Are loose objects prohibited in the cabs? Yes ( ) No ( )

13. Are trucks equipped with parking brakes separate and independent of regular braking systems? Yes ( ) No ( )

14. Are all cab windows equipped with safety glass? Yes ( ) No ( )

15. Are unsafe conditions reported immediately to a supervisor or other responsible person? Yes ( ) No ( )

16. Do signalmen work from the driver's side of the truck? Yes ( ) No ( )

17. Are trucks equipped with suitable fire extinguishers? Yes ( ) No ( )

18. After dumping a load, is the truck bed fully lowered before pulling away from the dumping area? Yes ( ) No ( )

19. Are vehicles equipped with approved emergency stopping systems? Yes ( ) No ( )

20. Is each vehicle's braking system capable of holding the vehicle stationary on any grade which the vehicle can climb under its own power? Yes ( ) No ( )

21. Are vehicles of 50,000 pounds or over equipped with power steering and emergency secondary power steering system? Yes ( ) No ( )

22. Where they do not create a hazard, are berms or guards provided on the outer banks of elevated roadways, dumps, and stockpiles? Yes ( ) No ( )

23. Are seat belts provided and their use required on all vehicles equipped with roll-over protection? Yes ( ) No ( )

24. Are haulage roadways regularly patrolled and maintained? Yes ( ) No ( )

25. When parking, are wheel chocks set under the wheels to protect against brake failure? Yes ( ) No ( )

26. Are operators required to follow vehicle shutdown procedures? Yes ( ) No ( )

27. 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 ( )

28. Are bulldozer and scraper blades, end loaders, and dump-body vehicles required to be fully lowered or blocked when not in use? Yes ( ) No ( )

29. Do dump trucks have adequate cab protection to protect the operator from shifting or falling materials? Yes ( ) No ( )

30. Are all accidents reported to the supervisor whether or not property damage or injuries have occurred? Yes ( ) No ( )

31. Are all accidents promptly investigated and actions instituted to prevent a recurrence? Yes ( ) No ( )

32. Are newly assigned drivers carefully selected on the basis of their driving record and physical and mental health? Yes ( ) No ( )

33. Are newly assigned drivers properly trained for the particular equipment they will operate? Yes ( ) No ( )

HIGH VOLTAGE CABLES

High voltage cables are used extensively in the phosphate industry to power heavy mobile mining equipment. These high voltage cables (usually called trailing cables) may be subjected to much abuse by being pulled around, exposed to all weather conditions, and inadvertently being run over by equipment. This abuse of trailing cables can easily lead to a fatality if proper care, maintenance, and inspection is not routinely performed on cables that are in use. Therefore, it is necessary to develop and follow safe procedures to control the potential hazards associated with the use of high voltage cables.

It is the purpose of this section to identify these potential hazards and to evaluate the establishment's program to protect its employees from these hazards.

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

1. Are all high voltage cables of the shielded and grounded (SHD) type? Yes ( ) No ( )

2. Is it forbidden to move energized power cables by hand ? Yes ( ) No ( )

3. Are wide band slings required to move cables with mobile equipment? Yes ( ) No ( )

4. Is it required to use rubber gloves and hot sticks if cables have to be moved by hand while energized? Yes ( ) No ( )

5. Is it forbidden to walk on power cables? Yes ( ) No ( )

6. Is it forbidden to drive mobile equipment over unprotected cable? Yes ( ) No ( )

7. Are cables bridged or otherwise protected against damage where they cross roads? Yes ( ) No ( )

8. Are cables regularly inspected for jacket damage? Yes ( ) No ( )

9. Is positive attachment of plug to cable jacket provided? Yes ( ) No ( )

10. Is a positive connection made between the shield, ground wire, and plug housing? Yes ( ) No ( )

11.	Is waterproofing in or around cable entrance into plug housing provided?	Yes ( ) No ( )
12.	Is waterproofing gasket seal around socket collar regularly checked?	Yes ( ) No ( )
13.	Is the socket coupler housing connected to the ground conductor?	Yes ( ) No ( )
14.	Is adequate ground clearance provided for all plug and socket attachments, including cable couplers?	Yes ( ) No ( )
15.	Is all temporary splicing and patching work done by qualified electricians using approved repair kits?	Yes ( ) No ( )
16.	Is care taken to insure the integrity of the shielding and ground conductor(s) after repair work?	Yes ( ) No ( )
17.	Are permanent repairs made to cables with temporary repairs within a reasonably short period of time?	Yes ( ) No ( )
18.	Is additional protection provided under power cables laying on pipelines, transformer sleds, or other objects?	Yes ( ) No ( )
19.	Are all plug, socket, and coupler connections provided with end cap covers for protection when not in use?	Yes ( ) No ( )
20.	Are cables not allowed to remain in standing water?	Yes ( ) No ( )
21.	Is making or breaking cable connections prohibited while cable is under load?	Yes ( ) No ( )

PORTABLE TRANSFORMER SLEDS

The use of portable transformer sleds in the phosphate industry is extensive and the potential for injury is inherent in the use of almost any high voltage electrical apparatus. The frequent movement of portable transformer sleds increases this inherent danger and necessitates the development of safe procedures dealing with their installation, operation, and movement.

This section will enable you to identify the potential hazards to employees resulting from the improper installation, operation, and movement of portable transformer sleds and to evaluate the establishment's program to protect employees from these hazards.

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

1. Are all transformer sleds surrounded with a substantial fence or enclosure at least 6 feet high and at least 3 feet from any energized part? Yes ( ) No ( )

2. Are transformer enclosures kept locked to protect against unauthorized entry? Yes ( ) No ( )

3. Is the enclosure and the frame effectively grounded? Yes ( ) No ( )

4. Is the enclosure posted with suitable danger signs? Yes ( ) No ( )

5. Are all transformer sleds provided with fused disconnects? Yes ( ) No ( )

6. Are disconnects provided for the line side of all portable transformer sleds? Yes ( ) No ( )

7. Is work inside of transformer sled enclosures while transformers are energized forbidden? Yes ( ) No ( )

8. Are transformer sleds kept level and on high ground? Yes ( ) No ( )

9. Are disconnects on distribution boxes labeled as to what they control? Yes ( ) No ( )

10. Is it forbidden to disconnect transformers under load except in emergencies, and only then with transformers that safely permit disconnecting under load? Yes ( ) No ( )

11. Are fuses replaced only by qualified employees using fuse tongs or hot line tools? Yes ( ) No ( )

12. Are sleds never located under overhanging objects? Yes ( ) No ( )

13. Are areas around sleds kept clean and free of underbrush? Yes ( ) No ( )

14. Are sleds furnished with a safe means of towing that prevents damage to equipment and enclosure? Yes ( ) No ( )

15. Are sleds regularly inspected? Yes ( ) No ( )

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