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SUPPLEMENT

Please note that API Recommended Practice 2005 is a STEP publication and the following language pertains to this document:

STEP

One of the most significant long-term trends affecting the future vitality of the petroleum industry is the public's concerns about the environment. Recognizing this trend, **API** member companies have developed a positive, forward looking strategy called STEP: Strategies for Today's Environmental Partnership. This program aims to address **public** concerns by improving industry's environmental, health and safety performance; documenting **performance** improvements; and communicating them to the public. The foundation of STEP is the **API** Environmental Mission and Guiding Environmental Principles. API standards, by promoting the use of sound engineering and operational practices, are an important means of implementing **API's** STEP program.

API ENVIRONMENTAL MISSION AND GUIDING ENVIRONMENTAL PRINCIPLES

The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. The members recognize the importance of efficiently meeting society's needs and our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to these principles:

- To recognize and to respond to community concerns about our raw materials, products and operations.
- To operate our plants and facilities, and to handle our raw materials and products in a manner that protects the environment, and the safety and health of our employees and the public.
- To make safety, health and environmental considerations a priority in our planning, and our development of new products and processes.
- To advise promptly appropriate officials, employees, customers and the public of information on significant industry-related safety, health and environmental hazards, and to recommend protective measures.
- To counsel customers, transporters and others in the safe use, transportation and disposal of our raw materials, products and waste materials.
- To economically develop and produce **natural** resources and to conserve those resources by using energy efficiently.
- To extend knowledge by conducting or supporting research on the safety, health and environmental effects of our raw materials, products, processes and waste materials.
- To commit to reduce overall emissions and waste generation.
- To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.
- To **participate** with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment.
- To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

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Service Station Safety

API RECOMMENDED PRACTICE 2005
SIXTH EDITION, SEPTEMBER 1996

American
Petroleum
Institute

API RP*2005 96 ■ 0732290 0559923 T15 ■

Service Station Safety

Health and Environmental Affairs Department
Safety and Fire Protection Subcommittee

API RECOMMENDED PRACTICE 2005
SIXTH EDITION, SEPTEMBER 1996

American Petroleum Institute

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FOREWORD

This publication provides guidelines for the protection of personnel and property during the operation of service stations. This publication also provides information and recommendations for the employer (service station manager or designated site operator) on the basic principles of safety and fire protection. The types of service station operations covered in this publication include: full service and self service (with or without repair bays); car washes, convenience stores and food kiosks with fuel services; truck stops and quick-lubes.

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Suggested revisions are invited and should be submitted to the director of the Safety and Fire Protection Subcommittee, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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Service Station Safety

SECTION 1—GENERAL SERVICE STATION SAFETY

1.1 General

This publication provides information and recommendations for the service station (facility) manager (employer) or designated site operator (employer) on the basic principles of safety and fire protection. The types of service station operations covered in this publication include: full service and self service, with or without repair bays; car washes; convenience stores; food kiosks; and also truck stops and quick-lubes.

This publication is presented in two sections. Section 1, General Service Station Safety Measures, addresses issues common to all types of service station (facility) operations. Section 2, Service Stations With Repair Bay Operations, covers the unique concerns of service stations (facilities) with these types of operations.

Prevention of accidents and injuries can be best achieved by establishing and following safe practices and procedures applicable to the service station and work performed. Employers can reduce or eliminate accidents by training employees to recognize potential hazards and take corrective action and by establishing appropriate safe work procedures and practices.

When developing service station safety programs, consideration must be given to the type, frequency, and severity of previous incidents. This publication does not address every potential hazard of service station operations. As a guide, a few of the more frequent types of incidents that have occurred at service stations are listed below.

Fires and environmental exposures have resulted when:

a. Spills and overflows are caused by customers, employees, tank truck drivers or improperly maintained fuel dispensing equipment.
b. Flammable or combustible materials are handled and stored improperly.
c. Engines are left running in the fueling area.
d. Smoking is not restricted near the fueling area.
e. Failure to guard against accidental fuel releases during fuel system repairs.
f. Changing fuel filters on dispensers.
g. Use of improper/unprotected work lights.
h. Failure to understand and/or properly use fire extinguishers and spill cleanup kits.

Employee injuries have resulted from:

a. Using hand tools, equipment and ladders improperly.
b. Not wearing required personal protective equipment.
c. Falling on slippery or uneven walking surfaces.
d. Tripping on tools and equipment.
e. Working in awkward positions.
f. Lifting or carrying cases of motor oil, soda, beverages or other materials incorrectly.
g. Failure to observe safe practices when working on hot radiators and other equipment or machinery.
h. Robbery and assault.
i. Horseplay.
j. Electrical shock/burns by failing to disconnect equipment prior to maintenance or repair.
k. Improper use of cleaning chemicals.
l. Scraping decals from equipment or vehicles.

1.2 Emergency/Incident Response Plan and Procedures

It is important to plan for emergencies as even the safest service station could have an incident. Regulations require development of emergency/incident plans and procedures and employee training to implement the plans and assist in a safe and orderly emergency evacuation, if necessary. OSHA 1910.38, ***Employee Emergency Plans and Fire Prevention Plans,*** requires that such emergency plans be in writing (except for employers with 10 or fewer full and part-time employees).

The employer is responsible to review the service station emergency plan with each employee upon hire and whenever the employee's responsibilities change, the service station's hazards change and/or the emergency plan changes.

Examples of the types of incidents to be covered by emergency plans include, but are not limited to, the following:

a. Fires.
b. Spills and leaks.
c. Robberies and other security threats.
d. Employee and customer injuries/illnesses.
e. Natural disasters.
f. Civil disturbances.

Elements to be considered in emergency plans, as a minimum, include:

a. Emergency evacuation procedures and escape routes.
b. Procedures to account for all employees after the emergency evacuation has been completed.
c. Emergency response, rescue and first aid.
d. The preferred means of reporting fires, spills, releases and other emergencies.
e. An employee alarm/warning system (automatic or manual alarm or voice).

f. How and when to activate emergency shutdown switches and (where provided) fixed fire suppression systems.
g. Use of fire extinguishers.
h. Names of persons to contact for further emergency information.

1.3 Emergency Telephone Numbers

Include an emergency notification system in the emergency response plan. Prominently post emergency 24 hour telephone numbers near the telephone and on the service station's door or window so as to be viewed from outside the building. Typical emergency numbers to be posted on the door or window include, but are not limited to, fire, police and employer 24 hour emergency response, if available. Typical emergency telephone numbers to be available to employees should include the employer's and/or manager's home number, and the numbers of the fire department, police department, ambulance service and other applicable emergency responders.

Assure that all employees, including those for whom English is not a primary language, know where these numbers are posted and are familiar with the procedures and can effectively report emergencies and other incidents.

1.4 Medical and First Aid

Provide an appropriate service station employee first aid kit, which is readily accessible, regularly inspected, and replenished as necessary, so that employees can administer self help for their own personal minor injuries such as cuts, burns, and product exposures to the skin and eyes.

OSHA 29 CFR 1910.1030, ***Bloodborne Pathogens,*** requires that employers shall have a plan to reduce or eliminate employee exposure to bloodborne pathogens. Exposure, as it pertains to the OSHA Bloodborne Pathogens rule, is a reasonably anticipated skin, eye or mucous contact with blood , or infectious materials during performance of employees duties. This is the reason that employees should not be allowed to administer first aid to others. (Only designated persons who are trained and certified in first aid, and who have received annual training on the prevention of bloodborne pathogen disease transmission, may administer help to others.)

Injuries from chemical burns may occur in service station operations. Should battery acid, brake fluid, gasoline, or caustic solutions contact eyes or skin, flush the exposed area continuously with lukewarm, potable water for at least 15 minutes. This water may be from a drinking water fountain, potable water faucet or spigot, or approved eye wash bottle. Persons who are injured should seek immediate medical attention.

1.5 Emergency Shutdown Switches

Train employees in the purpose, location and operation of fuel dispenser emergency shut down controls. These switches must be installed at unobstructed locations (acceptable to the authority having jurisdiction), clearly identified and immediately accessible at all times.

NFPA 30A, ***Automotive and Marine Service Station Code,*** requires that at attended service stations and self-service stations, emergency controls shall not be more than 100 feet from the (furthest) dispenser. At unattended self service stations, emergency controls shall be more than 20 feet but less than 100 feet from the dispensers. Local authorities may have stricter requirements for locating emergency control devices.

1.6 Fire Extinguishers and Fixed Protection Systems

When fixed protection systems are installed, educate and/or train employees upon hire and annually thereafter, so they know when and how to activate and deactivate the systems. Assure that all fixed fire protection systems are regularly inspected, tested and maintained by a qualified person, as required by local regulation. Keep records of employee education and/or training, and protection system inspection and servicing. Maintain an MSDS on file for each of the extinguishing agents used.

Fire extinguishers are essential for proper response to certain emergency situations. All portable fire extinguishers should be fully charged and in good working condition. Educate and/or train employees in incipient fire fighting and in the proper use of fire extinguishers upon hire and annually thereafter. This education and/or training must be documented and records maintained on file. Employers may utilize extinguisher training provided by their fire extinguisher supplier or service contractor.

Either the employer, company, or fire department can determine the number and type of extinguishers that are needed at the service station. Where company standards are not established, and to ensure compliance with local regulations, the employer may consult with the appropriate authority having jurisdiction regarding extinguisher selection, location, use, storage, and display.

NFPA 30A, ***Automotive and Marine Service Station Code,*** requires service stations to be provided with at one or more 40 B:C rated extinguishers, for use on fuel fires. Class B:C extinguishers should be located so as to be within 50 feet of each pump, dispenser, underground tank fill pipe opening, tank vent or other outdoor hazard. It is recommended that service stations with inside operations such as repair and service bays, convenience stores, quick lubes, etc. have at last one fire extinguisher available with a minimum 20 A:B:C rating for use on Class A combustible fires located within 75 feet of each lubrication bay or service room.

Locate fire extinguishers at identified, designated places so that they are readily accessible and immediately available in the event of fire. Do not block fire extinguishers by obstacles or hide them from view. Whenever an extinguisher has been

used, or there is a question whether it has been used (such as a broken seal, traces of powder, etc.), take it out of service and immediately replace it with a fully charged extinguisher. Identify the used extinguisher as "out of service" and place it in a designated location until maintenance and recharging is performed.

It is good practice to visually inspect fire extinguishers daily to ensure they are in their designated places, fully charged and ready for use. Provide for visual monthly inspections of fire extinguishers to detect any physical damage, corrosion, or other impairments. Also provide for thorough annual maintenance checks by qualified service personnel, including internal inspection of non-stored pressure extinguishers.

Stored pressure extinguishers (with gauges on the top) do not require an annual internal examination. Stored pressure extinguishers which are subject to hydrostatic testing every 12 years, shall be emptied and have a complete maintenance check performed every 6 years. Assure that the inspection, maintenance and hydrostatic test schedules conform to both OSHA and manufacturers' requirements and local ordinances. Keep records of the monthly extinguisher inspections, annual maintenance and required hydrostatic testing.

1.7 Emergency Exits

Provide for safe egress from the service station in the event of a fire or similar emergency. A proper means of egress consists of three separate and distinct parts: the way to the exit (exit access); the exit (door); and the direction and where to go after exiting.

Provide all structures with exits sufficient to permit prompt escape of occupants in case of fire or other emergency. These exits shall not be blocked or locked from the inside. All doors which exit direct to the outside (except overhead garage doors) should swing outward, opening in the direction of exit travel.

Assure each exit is marked by a readily visible "EXIT" sign, in the appropriate colors and language as required by local regulation. Access routes to exits should be marked by readily visible signs wherever the exit or way to reach the exit is not immediately visible to the occupants.

Any door or passage which is neither an exit nor a way to an exit (example: door to a closet) should be identified as "Not an Exit" and, where appropriate, labeled to indicate its use ("washroom," "storage," etc.).

1.8 Physical Conditions

The safe operation of a service station depends on an effective, ongoing program to recognize potential hazards and provide for corrective measures to prevent incidents. Because of the nature of the operations, the first consideration must be to eliminate or minimize the risks associated with fuel spills and fires. Employers should develop and implement programs aimed toward preventing accidents and incidents which can be attributed to problems associated with service station physical conditions such as maintenance and housekeeping. Other factors contributing toward accidents include employees' lack of training or skills which may result in the improper use of equipment, tools, automotive parts, supplies and maintenance materials, etc.

Minimum requirements for a service station hazard identification and correction program include, but are not limited to, the following:

a. An inspection program involving employee participation.
b. A formal employee reporting procedure for incidents and hazards.
c. A procedure for employer and/or employee review of all accidents, incidents, and potential hazards.
d. A procedure to ensure corrective measures concerning accidents, incidents and hazards are accomplished in a proper and timely fashion.

1.9 Housekeeping and Storage of Flammable and Combustible Liquids

Maintain all service stations in as clean a condition as the nature of the work allows. Good housekeeping and general appearance is important to safe operation.

Typical safe work practices which help reduce accidents and injuries associated with poor housekeeping include, but are not limited to, the following:

a. Keep floors clean and dry to prevent slips and falls. Never use gasoline or kerosene as a cleaning agent. Only use detergents and nonflammable cleaning agents specifically formulated to remove grease and oil. Properly dispose of used cleaning agents and materials.
b. Promptly replace cracked or broken window and door glass.
c. Store merchandise so that it does not overhang shelves and so it will not fall or obstruct walkways and vehicle traffic.
d. Store oily rags, hazardous waste, recycle materials and food waste in approved, marked separate containers. Keep combustible trash away from sources of ignition. Do not mix incompatible wastes.

The safe and proper storage of flammable and combustible liquids in service stations is typically regulated by codes such as the Uniform Fire Code; NFPA 30, Flammable and Combustible Liquids Code; and NFPA 30A, Automotive and Service Station Code. Safe flammable and combustible liquids handling practices in these codes include, but are not limited to the following:

a. Properly handle and store flammable and combustible liquids and chemicals used in the service station, including paint cans, starter fluids, antifreeze, battery acids, solvents, oils, etc. Keep flammable liquids in tightly closed containers and stored in an approved manner, such as in a flammable liquids

locker cabinet in a well ventilated area, away from any source of heat or ignition.

b. NFPA 30A requires that no more than 120 gallons of Class I (flammable) liquids, in closed containers, may be stored in a service station. The code allows one open container of Class I liquid, not exceeding 60 gallons capacity, equipped with an approved (listed) pump.

c. Class I liquids may be transferred from one container to another in lubrication bays or other areas of service stations, provided that the electrical and heating equipment in the area comply with code requirements and that no sources of ignition, such as running engines, open flames, smoking, welding sparks, etc. are present. Gasoline is the most common Class I liquid in a service station.

d. Class II and IIIA (combustible) liquids, shall be stored inside service station buildings in (and dispensed from) approved containers or tanks not more than 120 gallons each, with a total capacity not exceeding 240 gallons. Class II liquids include diesel fuel, kerosine and some parts cleaning fluids. Outboard motor oil and solvents, with flash points above 140°F, are typical examples of Class IIIA liquids.

e. Class IIIB liquids (such as motor oil and transmission fluid), including automotive crankcase drainings, are permitted to be stored inside service stations in (and dispensed from) approved containers and tanks. Class IIIB liquid tanks are permitted above, at or below grade within service stations provided that adequate drainage or containment is provided.

1.10 Service Station Hazard Communications

Employers shall develop and maintain an up-to-date written hazard communication program for each service station in accordance with federal OSHA 29 CFR 1910.1200, Hazard *Communications* standard, and applicable state and local hazard communications and right-to-know regulations. As a minimum, the program should cover requirements for a service station hazardous chemicals list, chemical inventory and storage, material safety data sheets, warning signs and labels, chemical hazard recognition and employee training. Assure that all applicable "hazardous chemicals" in the service station to which employees may be exposed, are included in the program.

Communicate information concerning the hazards of these chemicals to employees by means of a comprehensive training program, to be given upon initial assignment or change in assignment, and whenever a new hazardous chemical is introduced into their work area. (Some states require annual refresher training.)

Employers must be aware of their obligation to comply with all applicable federal, state and local hazardous materials reporting, notification, record keeping, posting and training requirements. These include federal and state Environmental Protection Agency requirements; SARA Title III, Sections 302, 304, 311, and 312, *Emergency Planning* regulations; and state and community Right-to-Know laws and applicable spill, leak and hazardous materials release control and reporting requirements.

1.11 Waste Handling and Disposal

Properly store, label and discard waste materials according to applicable state, local, and/or federal regulations and employer directives. Waste materials include, but are not limited to: used motor oil, spilled gasoline and fuel oil, antifreeze, and certain cleaning solvents. Advise all employees of the impact these wastes might have on the environment, as well as the physical health, safety and fire risks associated with their handling and disposal.

Handle used motor oil properly, preferably by draining directly through a closed piping system that leads to an approved, properly labeled, used oil container. If an oil drain pan is used, it should be emptied promptly into the approved used oil container. Tanks and containers that contain only crankcase drainings are considered by fire codes as containing Class IIIB liquids. However, precautions should be taken to prevent any vapors which may be released from reaching sources of ignition. (This precaution is necessary because engines with worn cylinders or other defects may occasionally allow small amounts of gasoline to enter the crankcase.)

Any service station which generates used oil or accepts used oil from do-it-yourselfers is a ***used oil generator*** and subject to federal, state and local regulations which dictate the collection, handling and disposal of used motor oil. Some states require special permits to haul used motor oil. Service stations should recycle or dispose of used motor oil through an approved waste oil handling company.

Federal regulations require that undrained oil filters be disposed of as hazardous waste. This includes maintaining all required hazardous waste record keeping and documentation. However, EPA has allowed for an exemption from this requirement if the filters are thoroughly drained of oil and disposed of with a metal recycler. Both the oil and the filters must be recycled for the exemption to apply.

To avoid environmental contamination, do not sweep, wash or flush oils, grease, used antifreeze, spilled fuel, etc. into floor drains, toilets, other drains, or into the street. Clean floors with oil-dry type approved absorbent and store and dispose of the accumulated waste properly. Floor drain sumps should be checked frequently, and accumulations of grease and sediment removed to prevent these materials from flowing into the sewer.

Keep discarded battery solution containers, and "to be recycled" containers in tightly covered, labeled receptacles. Store oily, greasy, or dirty rags only in an approved, marked metal container, with a cover or snuffer lid to prevent spontaneous combustion. Recycle or properly dispose of rags that have no further use.

The handling of used fuel filters removed from vehicles or fuel dispenser pumps requires special consideration. A good practice is to carefully drain all remaining fuel from the filters into an approved container. Then store the filters in a well ventilated, appropriate location (i.e., a protected outside storage area), away from sources of ignition, and allow them to dry. If air drying is not permitted by local authorities, fuel filters must be stored, regulated and disposed of as hazardous waste. Assure that filter disposal is in accordance with the above requirements and local regulations.

1.12 Fuel Spills and Drainage

Assure all employees are aware of the regulations relative to reporting and cleaning up petroleum product spills. Clean up spills in accordance with employer policy and applicable regulations. To avoid fires, clean up fuel spills under or around vehicles, or first push vehicles away from the spill, before starting the vehicles' engines. Do not allow other vehicles to enter or drive through spills until they are is cleaned up. Clean up of large spills may require that responding personnel be specially trained and equipped in accordance with OSHA 29 CFR 1910.120, ***Hazardous Waste Operations and Emergency Response.***

Recovered spilled fuel may be recycled by returning it to the distribution terminal, refinery or recycle agency. If recovered fuel is not recycled, it must be removed by an approved hazardous waste collection agent or burned in an approved burner. Do not dispose of any petroleum products in drains, sinks, toilets, sumps, or sewer systems. Materials which have been used to clean up spills must be properly disposed of according to local regulations.

1.13 Ventilation of Vapors and Exhaust Gases

Gasoline vapors are heavier than air and may travel to a source of ignition when released during fuel filling, spills, overflows, or repairs. Provide proper and adequate ventilation, particularly in enclosed areas, whenever the potential exists for the release of gasoline vapors, in order to allow them to dissipate.

Vehicle exhaust gases contain carbon monoxide, a highly toxic, odorless substance. Provide for ventilation to assure an adequate supply of fresh air and to avoid overexposure to carbon monoxide. If engines are operated in an enclosed area such as a service bay or garage with doors closed, the vehicle exhaust gases must be piped outside through a flexible hose and fresh makeup air provided.

1.14 No Smoking and Other Required Signage

Service station areas used for fueling motor vehicles, dispensing fuel or receiving flammable products must be kept free of open flames and other ignition sources. State and local regulations require various types of "No Smoking" signs to be posted in the sections of the service station used for fueling and servicing vehicles and/or other kinds of internal combustion engines. Employers and employees should follow all applicable state and local no smoking regulations and enforce required no smoking restrictions.

Assure that the U.S. Department of Agriculture and specific state-required "WARNING - It is Unlawful and Dangerous to Dispense Gasoline Into Unapproved Containers" and "No Smoking - Shut Off Engine" signs are conspicuously posted in the dispensing areas.

The following signs are required by 40 CFR 80.22 (Note: some states, such as Arizona, require their own specific signs):

a. Signs in the immediate area of the gasoline dispenser, "Federal Law prohibits the introduction of any gasoline containing lead or phosphorus into any motor vehicle labeled UNLEADED GASOLINE ONLY."
b. "UNLEADED GASOLINE signs at unleaded gasoline dispensers and "CONTAINS LEAD ANTIKNOCK COMPOUNDS" at leaded gasoline dispensers.

Employers shall be aware of state and local notification and warning requirements and post signs accordingly. Examples of some of these include, but are not limited to, the following:

a. Sale of Tobacco Prohibited to Minors (Florida, Illinois).
b. Fire Department Emergency Notification (New York).
c. Product Quality and Purity (Michigan).
d. Proposition 65, Beer-Wine Warning, Beverage Container Recycling and Waste Oil (California).
e. Health Warning (New Hampshire).

1.15 Fuel Island Area and Dispensing System

Safety requirements for the fuel pump island area and dispensing system include, but are not limited to, the following:

a. Locate dispensing devices at automotive service stations so that all parts of vehicles being fueled will be on the premises of the service station.
b. Provide at least one clearly identified and easily accessible emergency shut-off control (disconnect switch or circuit breaker) at a location remote from dispensing devices to shut off the power to all service station dispensing devices and pumps in the event of an emergency. At unattended self-service stations, emergency controls shall be installed on each group of dispensers or equipment which operates dispensers. Where more than one emergency shut-off device is provided, they shall be located remotely separate from one another. Emergency disconnect switches should be maintained in good working order and tested annually.

c. Employers shall train and/or educate all employees so they know where emergency disconnect switches are located, and when and how to activate and deactivate them. Where required by local authorities and at all unattended self-service stations, post instructions in the dispensing areas advising users to immediately activate the emergency stop control and notify authorities in event of a spill or fire. Provide a telephone or other clearly identified means of emergency notification at unattended self-service stations.

d. Maintain hose retractors provided on pumps in proper working order so as to minimize any tripping hazard which may be created by unretracted hoses lying in the dispenser area. Assure that the length of fueling hoses, including suspended hoses, is such that no part of the hose touches the ground when the nozzle is in the dispenser bracket in order to prevent it from being run over by a vehicle.

e. Provide a listed emergency breakaway device, designed to retain liquid on each side of the break point, on each hose dispensing Class I liquid. When attached to a hose retrieving system, install the breakaway device between the point of attachment of the hose-retrieving mechanism to the hose and the hose nozzle valve. Maintain devices in accordance with manufacturer's instructions.

f. Install approved impact valves which incorporate a fusible link, designed to close automatically in case of severe impact or fire, in the dispensing supply line at the base of each dispenser (at an appropriate elevation to provide for proper action). To provide additional assurance, double poppet impact (shear) valves may be considered when replacement valves are needed. Impact valves are to be inspected and maintained at least annually by a qualified person, who trips each valve to assure product will not flow. In addition, visually check valves to assure that they are securely anchored whenever the dispenser cover is removed.

g. Maintain the fuel island areas in good condition, free of holes, cracks, other tripping and slipping hazards, and provide for lighting as required by service station operating hours or ambient conditions.

h. Mount all gasoline, kerosene, diesel, and other fuel dispensing devices on an appropriate concrete island or provide for protection against potential collision damage by barriers, curbs or other means.

i. Provide a control or system so the dispenser pump will operate only when the fuel hose nozzle is removed from the dispenser's bracket and when the pump's switch is manually or automatically activated. This same control or system should also stop the pump when the fuel hose nozzle is returned to the dispenser bracket. The bracket should be configured so as to not allow the nozzle to be returned to the dispenser with the automatic fuel delivery latch in the open position.

j. Provide only approved automatic shut-off type nozzles to dispense fuel, unless otherwise required by local or state regulation. Some state and local jurisdictions do not allow nozzles with automatic hold down latches at self serve islands.

k. Establish a program to conduct testing of the pressure piping system between the pump discharge and the connection for the dispensing facility. Isolate lines from tanks and dispensers and purge of fuel, before pressure testing. Hydrostatically test single wall lines at 5-year intervals following installation, or more frequently if required by local regulation. The line tightness test must be capable of detecting a 1/10 gallon per hour leak at 1½ times the operating pressure.

Refer to API Recommended Practice 1615, ***Installation of Underground Petroleum Product Storage Systems*** and the Petroleum Equipment Institute, ***Recommended Practice for Installation of Underground Liquid Storage Systems,*** for appropriate test protocol, such as testing new piping before being covered for at least 1 hour at 50 psig or testing existing piping for 30 minutes at the maximum operating pressure of the system.

l. Conduct daily inspections of dispensing equipment, including hoses and nozzles, for leaks, damage and other malfunctions and assure that repairs are made promptly. Deactivate, lock and label dispensers "out of service" until repairs are made.

1.16 Receiving and Storing Fuel

Protect fuel storage tanks from fires that may occur at the fill pipe, gauge pipe, tank vent, or where vapors may be present or spills may occur. It is important to control ignition sources at these locations, particularly when fuel is being delivered into the tanks. Fill-pipe fires, gauge-pipe fires, vent fires, and small spill fires can usually be extinguished by using hand-held fire extinguishers. Additional information on receiving and storing fuel is available in API Recommended Practice 1626, ***Storing and Handling Ethanol and Gasoline Ethanol Blends at Distribution Terminals and Service Stations*** and other publications.

Safety procedures appropriate for fuel delivery into service station storage tanks include, but are not limited to, the following:

a. In anticipation of a fuel delivery, the service station employees should assure that cars and other items are removed from the area where the delivery vehicle and unloading and vapor recovery hoses will be located.

b. Whenever possible, drivers should position delivery trucks so as to not interfere with the movement of other vehicles on the service station property. Traffic cones or other appropriate barrier devices should be placed by the driver (or service station employees) to prohibit vehicles from driving within approximately 20 feet of the unloading area. Keep delivery trucks at least 25 feet away from all aboveground Class I liquid tanks.

c. Gauge the receiving (underground or aboveground) storage tank to be certain that it can hold the quantity to be deliv-

ered. When required, check that there is no water in the storage tank. Assure that the product is delivered into the correct tank. Replace gauge caps, and assure that all tank openings not used for the delivery are covered.

d. Where vapor recovery is required by company policy, state or local regulation, assure that the tank truck vapor recovery system is connected to the receiving storage tank prior to delivering the fuel.

e. Where vapor recovery is not provided, check the vicinity around the vents for potential ignition sources. If possible from the point of delivery, observe the vents during delivery for proper operation. If an alarm sounds or if liquid is being ejected from vents, immediately stop delivery and check the tank, pipes, and vent system.

f. Federal regulations (Department of Transportation, Title 49, Parts 100-199) require that drivers stay in the vicinity of the tank truck flow valve and delivery point while the product is being delivered into the storage tank. NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids* requires that the vehicle extinguisher be serviceable and accessible during loading and unloading.

g. Assure overfill tank protection is provided in accordance with local, state and federal regulations. Stop delivery immediately upon activation of an overfill device.

h. Gauge the storage tank upon completion of delivery to verify that the proper storage tank has received the proper amount of product as indicated on the delivery ticket or record. If a spill containment device is provided on the storage tank, check to determine if draining is necessary.

i. Assure that the correct fill and gauge caps, and the storage tank pit covers have been replaced on the proper tanks.

1.17 Storage Tank Fill Pipes and Fill Caps

In order to minimize the possibility of a product being delivered into the wrong tank, assure that storage tank fill pipes, caps and fillbox rims or pads have the proper identification securely attached to indicate the product and grade in accordance with API Recommended Practice 1637, *Using the* API *Color Symbol System to Mark Equipment and Vehicles for Product Identijication at Service Stations and Distribution Terminals.* Assure that the same color coding as on the API color code chart is used.

Maintain the proper color coding at each storage tank. The color coding should appear on the fixed ring surrounding the tank fill pipe, and not just on the cap or fillbox lid, so that the color is visible even though the cap or lid is removed.

API RP 1637 recommends the following labeling methods:

a. Paint or place a decal on the top of the cover and on the rim of the fillbox.

b. Attach a tag to the fill pipe adapter or fillbox rim.

c. Fit a fiberglass insert inside the fillbox rim.

Product mixes are often caused by lack of markings or improper color coding. Post the API color code chart at the service station so that is accessible 24 hours a day, or whenever deliveries are to be made.

Assure that the gauge and fill caps are kept closed and locked except during filling and gauging to minimize release of fuel vapors. If the gauge openings are located inside a building, provide for a spring-loaded check valve or other approved device to protect each of the openings against fluid overflow and possible vapor release.

1.18 Inventory Control

Maintain and reconcile accurate inventory records on all gasoline and fuel oil storage tanks on a daily basis. Complete and keep on file all required federal, state and local mandated inventory control records. Manual stick gauging is commonly used to provide a daily check of the integrity of underground storage tanks and connecting pipes. Where automatic gauging is permitted by local regulations, its accuracy should be verified regularly by manual stick gauging. Supplemental commercial leak detection equipment is also available and may be used or required by local regulations. If installed, follow manufacturers instructions for operation, maintenance and testing.

Any storage tank or system suspected of leaking should be investigated immediately. If leakage is verified, the tank should be immediately emptied and expeditiously repaired, removed or replaced. All employees should be aware that leaking gasoline can travel long distances underground, contaminate water supplies, and cause fires and explosions. Expedient notification of leakage shall be made to the appropriate authorities.

1.19 Storage Tank Vents

Locate storage tank vents in accordance with NFPA 30 and/or in compliance with state and local regulations. Where vents to open air are allowed, locate vent pipe openings from both underground and aboveground storage tanks so that flammable vapors are directed away from potential sources of ignition and will not enter windows, air intakes, doors, or become trapped under eaves or overhangs.

1.20 Lighting

Provide for adequate illumination at all locations in the service station where good lighting could reduce the potential for accidents and injuries. Although there are no OSHA standards covering service station lighting, local regulations may prevail. In the absence of regulatory requirements, standards such as ANSI A11.1, *Industrial Lighting,* may be used to determine appropriate illumination levels, as follows:

Service station area/activity	Foot candles
Active traffic areas	20
Storage areas and stockrooms	10-20

Service station area/activity	Foot candles
Washrooms and waiting areas	30
Welding, work bench, cashier areas	50
Service, repair, lubrication & washing areas	100
Offices	100-150

Keep reflectors and bulbs clean and in good condition, and turn off electric circuits before changing bulbs. Provide only approved portable lights for use in the service station. Protect portable lights against breakage by the use of protective guards which minimize the chances that a light may ignite flammable vapors in case the bulb breaks.

Provide lighting and electrical fixtures of the proper electrical classification as required by NFPA 30A, Table 7, or other applicable code or regulation. For example, in lubrication or service pits and other below grade areas provided with mechanical ventilation, where Class I liquids may be released, Class I, Division 2, Group D requirements must be met. Without mechanical ventilation, Class I, Division 1 electrical classification is required. Never replace classified electrical fixtures and lamps with equipment of lesser classification.

Used electric light bulbs, fluorescent lights and cathode tubes (video screens and monitors), should not be thrown into incinerators. Store burned-out fluorescent lights and tubes in a safe place, inaccessible to the public, until they are properly disposed of by a trash collector in accordance with local regulations. Fluorescent lights, as well as cathode tubes, contain hazardous chemicals. Minor cuts caused by broken fluorescent lights, cathode tubes or bulbs should be washed immediately with soap and water and covered with an appropriate bandage or dressing. Wounds of a more serious nature, such as those containing glass particles, should be treated by a physician.

1.21 Snow, Ice, and Rain Water Removal

Promptly remove snow and ice from walkways, driveways, ramps, fuel islands, and fill covers, and place it in an area where it will cause the least interference with traffic and other activities in and around the service station. Clean up snow and water tracked into the building or bays to prevent slips and falls. Nonskid surface mats, rugs, or specially treated tiles may be used in high traffic areas of the building to further reduce slipping hazards. Use approved equipment (for example, if any flammable liquid is present, an explosion proof pump should be used) and methods to remove any rain water accumulated within the diked area around an aboveground storage tank.

1.22 Air Compressors

Follow manufacturer's instructions for the maintenance and operation of air compressors to ensure safe operation. Maintain records of compressor maintenance and servicing. Provide for regular drainage of water from air compressor receiver tanks to avoid corrosion and water in air lines. Assure guards are in place to provide for personal protection from exposed moving parts on air compressors (i.e., belts, pulleys and other).

Provide pressure reducing nozzles which do not exceed 30 psi, on all air hoses used for parts cleaning. Check all compressed air hoses at least monthly for wear and cracks, and repair or replace them, as necessary. Depressurize air lines and lockout the air compressor when servicing.

Protect air tanks from overpressure by providing an adequate safety-relief valve or valves, which are to be tested frequently and at regular intervals to ensure that they are in good operating condition. (Note: Some states and municipalities require testing pressure vessels at specific intervals). Do not paint over these valves. Keep rags and other combustible materials away from the compressor.

1.23 Lockout/Tagout

Injuries or accidents can occur from an unexpected release of energy when equipment which is undergoing repair or maintenance has not been properly locked out or tagged out of service. To comply with federal OSHA 29 CFR 1910.147, ***The Control of Hazardous Energy,*** and similar state requirements, establish a lockout/tagout program at each service station to prevent the release of potentially hazardous energy while performing maintenance, repair and service work on equipment, machinery and systems.

Establish a written program which includes provisions to identify and document lockout/tagout controls for all applicable service station electrical, mechanical and pneumatically operated equipment and systems. Provide locks and/or tags as necessary. Provide and document education and/or training for all employees, depending upon their job assignment, in the recognition and safe work practices involving lockout/tagout.

Typical service station equipment subject to lockout/tagout includes pneumatic tools, lifts and lubrication equipment; mechanical hoists and jacks; and electric circuits and powered tools and equipment such as dispenser pumps, compressors, drills, etc. Motor vehicle service and repair is exempt from the federal lockout/tagout requirements. Precautionary measures to prevent accidental start-up of engines during servicing or repair include disconnecting the battery or removing the key from the ignition.

1.24 Electrical Safety

Safety procedures and information applicable to electrical equipment and tools used in service stations, include, but are not limited to, the following:

a. Institute a service station electrical lockout/tagout program and educate (or train, if required by state OSHA) employees to be aware that electrical power to all electrical tools, components, or fixtures undergoing repair must be disconnected,

tagged or locked out at the circuit panel, or other control points before starting work (refer to Section 1.23).

b. Assure that the installation and maintenance of all electrical installations and equipment is in accordance with NFPA 70, National Electrical Code, and/or state and local regulations. Assure that replacement equipment is of similar classification.

c. Legibly mark or identify each electrical disconnect (circuit breaker, fuse, switch) to indicate its purpose, unless it is located so that the purpose is evident.

d. Assure that provisions have been made for lockout/tagout of circuit breakers and/or fuse boxes. Provide each electrical junction box with a cover which protects against accidental contact with energized conductors.

e. Provide wall outlets and extension cords with a three-wire ground system maintained in good condition. Where use of extension cords is permitted, only use those which are Underwriters' Laboratories (UL) or Factory Mutual (FM) listed, maintained in good condition, and free of splices. Do not use extension cords where fixed wiring is required by local code or regulation.

f. Assure that all electrical tools, water coolers, ice machines, refrigerators and similar electrical equipment are properly grounded. Assure that portable electric hand tools used by employees which are not equipped with three wire systems and three prong ground plugs are either double insulated or ground fault protected.

g. Inspect electrical cords to appliances and equipment periodically to assure that there are no cracks, breaks, or other deterioration in the insulation. Inspect plugs periodically to assure soundness and the continued presence of the ground prong on all three-prong electric plugs.

h. Provide and maintain sufficient access and working space around all electrical equipment to allow safe operation and maintenance.

i. Do not locate conductors or electrical equipment in wet or damp locations, or in areas where exposure to excessive temperatures or other agents having a deteriorating effect can occur, without determining if the classification is suitable to the location.

j. Assure all electrical circuits are protected by proper size circuit breakers or fuses. Keep a supply of replacement fuses on hand. Never use a coin or piece of metal behind a fuse to restore electrical service as it can start a fire. Since an overloaded circuit may be indicated by a blown fuse or the intermittent tripping of a circuit breaker, determine the cause and initiate corrective action.

k. Assure that heating equipment using electric, gas or oil fuel is properly installed, maintained and operated in accordance with applicable requirements.

l. Provide education and/or training for all employees in the basic fundamentals of electrical safety applicable to the service station and their assigned work.

1.25 Ladders

Minimum precautions for the safe use of ladders in service stations include, but are not limited to, the following:

a. Store ladders properly, and secure to prevent falling.

b. Inspect ladders before use. Remove defective ladders from service and repair or discard. Do not paint wooden ladders as paint can conceal defects, such as split or broken rungs or side rails.

c. Assure employees use ladders properly and safely. Overreaching from any ladder is dangerous and may cause the ladder to slide or fall. Ladders should be tall enough for the job being performed. The top levels of a stepladder are not to be used. The top of a straight (or extension) ladder must extend 3 feet above contact point when used to access another level.

d. Assure ladder footing is secure on a solid, level surface and tied off. Equip straight ladders with nonslip bases. Use a stepladder only when it is opened to its full width, with the spreader in the locked position. Do not stand on the top step of a stepladder.

e. When moving ladders, be careful that they remain clear of objects and people. Do not place a ladder in a doorway unless the door is blocked open or locked closed.

f. Never use metal ladders when working on or near electrical switches or wiring.

g. Don't work facing backwards on a ladder or stepladder.

1.26 Tools

Employers should assure that employees know how to safely use tools and equipment provided by the employer. Employees must be qualified, or be able to demonstrate that they know how to use and maintain tools and equipment which are provided by the employer and which they provide themselves.

Whether provided by the employer or the employee, all hand-held, air-driven portable tools must comply with federal OSHA 29 CFR 1910.243, ***Guarding of Portable Power Tools,*** or similar state OSHA requirements. All portable electric tools that are not double insulated or are not provided with a three-wire ground plug shall be guarded and protected by ground fault interrupters.

Never use electric tools while standing on a wet surface. Electric tools, and tools powered by internal combustion engines such as garden and lawn equipment, can be a source of ignition and should not be used where gasoline or other flammable vapors may be present, until the area has been checked and determined to be safe for work. Tools are not to be used in work for which they are not intended. This may damage the tools or the equipment being serviced or result in an injury. Damaged tools are not to be used. Manufacturer's recommendations are to be followed for the repair, maintenance and operation of any hand or power tools and equipment.

1.27 Handling and Storing Merchandise

Safe work practices, applicable when handling and storing merchandise, include, but are not limited to, the following:

a. Store merchandise neatly and orderly so that it will not fall. Store heavy items on lower shelves. Do not block fixed fire protection equipment. Keep items stored on top shelves at least 18 inches from ceiling sprinkler heads.
b. Except for the amounts which are allowed to be displayed in the sales area and used during the workday, flammable liquids must be stored in approved containers in approved cabinets or storage rooms. Containers, cabinets and storage rooms must meet the requirements set forth in federal OSHA 29 *CFR* 1910.106, ***Flammable and Combustible Liquids;*** and in other applicable state and local regulations such as the NFPA 30, ***Flammable and Combustible Liquids Code*** and the NFPA 30A, ***Automotive and Marine Service Station Code.***
c. Do not store combustible material, such as paper goods, work clothes, etc. near electrical equipment, in special furnace or heating equipment rooms, within 3 feet of space heaters or heating units or on heating ducts.
d. Arrange indoor/outdoor promotional displays so they are not a hazard to employees or customers, and don't block entrance or exit routes.

1.28 Safe Lifting Practices

Improper handling or lifting of heavy objects can cause injury or damage. Employees needing to lift heavy or bulky objects or to push vehicles, should get assistance or use appropriate, designated lifting equipment such as hoists and winches.

Safe practices to be followed by employees when lifting and handling include, but are not limited to, the following:

a. Be certain of secure footing and grip. Use gloves and/or handling aids when an object is slippery or has sharp edges. Stop and think about the job before lifting. Ask for help when necessary.
b. Maintain the normal, usual back posture and bend the knees; use the leg muscles to do the lifting.
c. Hold the load close to the body. Avoid twisting or turning the body while lifting. Avoid lifts below the knees and above the shoulders.
d. To set an object down, follow the same precautions, and reverse procedures, as for lifting.

1.29 Personal Protective Equipment

Employees should use and wear personal protective equipment as needed. Selection of personal protection equipment depends on the materials being handled, the work being performed, and the potential exposure. Employers shall assess the workplace to determine the hazards and potential hazards which require personal protective equipment. Employers should also consult Material Safety Data Sheets to determine what protection is recommended and/or required for exposure to hazardous chemicals. A written certification which identifies the workplace, date of assessment, and the person conducting the assessment is required by OSHA Subpart I, "Personal Protective Equipment," 29 CFR 1910.132, ***General Requirements.***

The responsibility to provide required personal protective equipment is guided by OSHA, contract obligations, terms of employment, company policy, and state/local regulations. For example, OSHA Subpart I, "Respiratory Protection," 29 CFR 1910.134, requires that employers provide appropriate respiratory protection when needed. OSHA Subpart I, "Eye and Face Protection," 29 *CFR* 1910.133, requires employees to make available and use eye protection when needed. In addition, employees are usually responsible to supply their own personal items like shoes, clothes, etc.

While OSHA does not mandate that employers provide all required personal protective equipment, employers must assure the adequacy and proper application of the personal protective equipment being used. Where employees provide their own equipment, employers must assure it is appropriate for the hazard, its maintenance and sanitation.

Examples of proper application of personal protective equipment and clothing, include but are not limited to, the following:

a. Employees should wear sturdy work shoes with oil/slip resistant soles for general use around the service station. Mechanics working in areas where there is a danger of foot injuries due to rolling or falling objects or equipment should wear approved safety shoes with oil/slip resistant soles which meet the ANSI Z41, 1991, ***Safety Toe Footwear*** standard.
b. Employees should wear appropriate eye protection as needed. Safety goggles should be worn when there is a potential for exposure to chemicals, dust, or steam; such as when working around batteries or radiators or when painting. Industrial safety glasses or face shields should be worn when there is potential for exposure to impact materials, such as working with a grinder or wire buffer, repairing or mounting a tire, or replacing a muffler. Approved welding glasses should be worn while welding to prevent flash bums and injuries from particles.
c. Impervious gloves, aprons, footwear, face shields, and chemical goggles should be used when handling battery acid or strong caustic solutions, or when cleaning up chemical or fuel spills.
d. Leather work gloves should be worn when handling sharp objects, such as broken glass, motor vehicle parts, tire rims, or while emptying trash cans.
e. Safety hats, bump caps or other head protection may be required when working beneath vehicles in pits, changing overhead signage or lights, or in areas where the potential exists for injury to the head.

Note: Personal protective precautions, such as wearing gloves and eye protection, should be exercised when emptying lavatory trash cans to avoid potential punctures from hypodermic needles or other hazardous materials which may have been discarded therein.

Employers shall provide or make training available to employees who are required to wear personal protective equipment, including:

a. What specific personal protective equipment is necessary.
b. When and how to use or wear personal protective equipment and its limitations.
c. The proper care, maintenance, useful life and disposal of personal protective equipment.

Retraining shall be provided if required by changes in the workplace or hazards, changes in the type of personal protection equipment or if employees demonstrate need for retraining. Training and retraining shall be certified in writing by the employer, including the employee name, date trained and subject of training.

1.30 Employee Clothing

Uniforms should be appropriate for the work required where there is an established employer uniform policy. Employees should be encouraged to dress neatly in clean clothing, and not wear long ties, scarves, and loose or tom clothing because such items can become caught in moving parts and cause injury. Employees working on vehicles should not wear rings, wristwatches, identification bracelets or long chains, because there is a chance that the jewelry could contact with a vehicle's moving parts or electrical system, causing a short circuit, shock, burn or other injury.

To prevent fires, dramatist or chemical burns to the skin, immediately remove clothing that is soaked with gasoline or oil, but only in an area or room with good ventilation and where no sources of ignition, such as electric heaters, engines, cigarettes, lighters, or hand dryers are present. After removing clothing, thoroughly wash the affected areas of the skin with soap and warm water to remove any traces of contamination. Hang the clothing in a well ventilated area (preferably outside) away from sources of ignition, to dry. After drying, employees should thoroughly launder gasoline and oil soaked clothing before wearing it again.

1.31 Fueling Vehicles

Requirements for safely dispensing fuel into vehicles include, but are not limited to, the following:

a. Children (age limit varies by state) should not be permitted to fuel vehicles where restricted by law.
b. Never fuel a vehicle while its engine is running. Shutting off the engine will reduce the possibility of accidental vehicle movement, spills and fuel vapor ignition. Never fuel a vehicle if the attendant, bystanders or occupants of the vehicle are smoking.
c. Insert the delivery hose nozzle firmly into the fill pipe of the vehicle. Maintain contact between the nozzle and the tank until the delivery has been completed. Do not stretch out the hose when there are small loops in it as this can kink the hose and cause it to crack and break.
d. Never block open a nozzle with fuel caps or other objects. Some jurisdictions prohibit the use of automatic, hold-open latches for self-service fueling. Where authorized, use only approved latches supplied by the nozzle manufacturer to hold open automatic nozzles.
e. Follow local and state regulations regarding fuel vapor recovery systems when fueling vehicles.
f. Clean up small spills which may occur while fueling vehicles promptly in accordance with employer policy. (Refer to Section 1.12 for information on clean up of larger spills, and disposal of fuel and clean up materials).
g. All employees should know where the dispenser pump emergency power shut off is located and how to activate it, at all times.
h. Immediately after fueling has been completed, properly replace the hose nozzle on the dispenser, turn off the pump, and replace the cap on the fuel tank, or container. Delay in removing the nozzle from the vehicle's tank can result in a spill or damage, should the customer drive away with the nozzle still in the fill pipe of the tank. Except in prepay situations, nozzles should be removed from the vehicle before collecting the customer's money.
i. Vehicles such as cement mixers or recreation vehicles, with auxiliary internal combustion engines, should not be fueled until both the vehicle engine and the auxiliary engine are shut **off.** Extra care is required when fueling recreational vehicles equipped with gas-fired stoves, refrigerators, and water heaters to make sure that fuel vapors are not ignited by pilot lights.
j. When fuel is to be dispensed by an employee, the employee should walk, not run, to the pump island. If employees are at the pump island when customers drive in, they should stand positioned in a safe area until the vehicle comes to a complete stop and the engine is shut off.
k. When fueling a vehicle, particularly one with a rear fill pipe, employees and customers should be alert to other moving vehicles. When walking around a vehicle, employees should be careful to avoid contact with objects that can result in injuries, such as trailer hitches, exhaust pipes, curb feelers, mirrors, loose trim, bent bumpers, tom fenders, etc. Employees should never fuel a truck while standing on the side rail or bed.
1. If there is an animal in the vehicle, employees should avoid reaching inside to accept a customer's payment.

1.32 Fueling Motorcycle Tanks

Fuel tanks on motorcycles, motor bikes or similar small vehicles shall not be filled while the engine is running or when anyone is seated on the vehicle. The tank should be

filled carefully at a slow rate to prevent spilling fuel, which could run onto the hot engine and catch on fire. If the hose nozzle does not fit into the fuel tank opening, a spout type container should be first filled and then used for refueling the tank. A funnel should not be used because it can easily overfill, resulting in a spill and/or fire.

1.33 Filling Portable Fuel Containers (Gas Cans)

Safety precautions to follow when dispensing fuel into portable containers include, but are not limited to, the following:

a. Fuel should only be dispensed into approved portable containers equipped with a screw top or a self-closing cap. Under no circumstances should fuel be dispensed into a glass, unapproved metal or plastic or open top container. Containers should be properly identified and labeled, and be correctly colored, as required by applicable federal, state, and/or local regulations.
b. Containers should be filled while the can is sitting on the ground and at a slow rate of fill to avoid splash and overfills. Contact must be maintained between the hose nozzle and container at all times while filling.
c. Portable containers of 12 gallons (45 liters) capacity or less shall not be filled while they are in or on a motor vehicle (see NFPA 30A).
d. Portable containers shall be properly stored in approved storage cabinets or rooms.
e. If a container does not have a built-in spout, a funnel should be used to minimize spillage when pouring fuel from the container. Avoid splash filling where possible. Maintain contact between the container, spout or funnel and tank during refueling. This may be accomplished by use of a bonding wire and clamps.
f. Children (age limit varies by state) should not be permitted to fill containers where restricted by law.

1.34 Cleaning Windshields

When cleaning windshields, employees should be careful to avoid injuries that may result from contact with windshield wipers, windshield trim, outside rear view mirrors, or cracked glass. Avoid grasping the vehicle door post for support because of possible injury to the fingers if the door or window is closed.

1.35 Checking Oil and Transmission Fluid

The transmission fluid and oil-level gauge dipsticks on some vehicles may be difficult to reach. Extra care must be taken when checking the transmission fluid level, as the engine must be running. A rag or paper towel should always be used to clean off the dipstick; fingers should never be used. Caution must be exercised to avoid bums from the exhaust manifold or to avoid cuts from sharp edges in the engine compartment or hood. Burns may also occur if the dipstick comes in contact with exposed electrical terminals or wiring.

1.36 Checking Radiator Coolant Levels

Most newer vehicles have pressurized cooling systems, which require less frequent radiator checks. On many vehicles, only a visual check of the radiator reservoir tank is necessary. The coolant level inside the radiator should be checked only at the customer's request, or during vehicle servicing.

Procedures for safely opening a radiator include, but are not limited to, the following:

a. Never open an overheated, pressurized radiator. Allow the radiator to cool before opening the pressure cap.
b. When opening, after cooling, cover the radiator cap with a heavy material such as a chamois, canvas tarp or heavy cloth. (Do not use paper towels.)
c. Use appropriate personal protective equipment. Stand back at arm's length, turning head and face away from the radiator. Do not inhale any escaping steam or vapors.
d. If the radiator cap does not have a pressure-relief lever, first tighten the cap and then loosen it slowly to the first notch. If it is equipped with a pressure-relief lever, pull the lever to reduce pressure prior to opening.
e. Clean up any antifreeze which spills during servicing. Both spilled and drained antifreeze should be collected and stored in approved containers for recycle or disposal in accordance with local, state and federal regulations.
f. If antifreeze contacts the eyes, flush with clean, lukewarm potable water for 15 minutes; if skin contact occurs, wash the areas thoroughly with soap and water. Remove any clothing soaked with antifreeze and allow it to thoroughly air-dry before laundering in order to minimize the amount of glycol entering waste water systems.

1.37 Inflating Tires

Precautions for safely checking and inflating tires include, but are not limited to, the following:

a. Visually inspect the tire. Determine the maximum tire pressure and do not exceed it.
b. If the tire is in poor condition, do not inflate, as a blowout could occur. New radial tires have wear indicators on the tread. The Tire Manufacturers Association and many states also have published inspection criteria for tires which is available to employers.
c. Use an air pressure gauge when inflating tires. The handheld gauges used in the service station and the automatic gauge on the air regulator should be regularly checked against one another to assure accuracy.
d. Stand or kneel to the side and keep face above the fender or to one side when inflating tires.
e. Where there is an automatic hose reel, do not let the hose fly back because the metal chuck or gauge may whip, causing

injury or damage. If the hose does not automatically retract, manually recoil and return the hose to the hanger.

f. When checking spare tire in trunks, be certain that the trunk lid will remain up and avoid back strain. Place vehicle on a lift or ramp when spare is located below the vehicle, keeping face averted when inflating.

1.38 General Security

Security measures, dependent upon service station operation, location and potential threat, include, but are not limited to, the following:

a. Each service station should develop security related programs and procedures. The local public safety organization, company security or consultants can be used to assess the specific needs of the service station. Educate (or train, where required by regulation or employer policy) employees in robbery and violence prevention and emergency response.

b. Consideration should be given to providing equipment designed for employee security to include, for example, security doors and locks, protective glass or plastic windows, alarm systems, fire suppression systems, etc. Service stations should obtain and utilize robbery deterrence materials such as signs, decals, video equipment, height identifiers, etc.

c. Maintain a minimum amount of cash, sufficient for normal operations, in the register. Equip service stations with a safe or similar device for securing extra cash, money orders, etc. Provide for a secure area, out of public view, for handling cash and preparing bank deposits.

d. Provide adequate lighting for balanced viewing both in and out of the service station. Balanced viewing means lighting which does not cause reflections or differences which retard viewing outside activities from inside the service station. Provide exterior lighting sufficient for a clear view of the property's perimeter. (See Section 1.20 for additional information.)

e. Maintain windows with a minimum amount of posters, signs, sun screens, etc., so as to provide a clear and unobstructed view in and out of the service station at all times.

f. Information concerning robberies, acts of violence, civil disturbances, etc. in the area should be reported to the employers' security function so as to determine the need for additional service station security measures.

Additional information on security considerations is contained in the National Institute of Safety and Health Publication #93-109, ***Preventing Homicide in the Workplace.*** This document is available to employers in the United States by calling (800)-35 NIOSH.

1.39 Confined Spaces in Service Stations

Confined spaces may exist in service stations. Examples are sumps, pump pits, waste containment and septic tanks, environmental collection wells, above and underground tanks, etc. Some confined spaces may meet the federal and state OSHA requirements for permit-required confined spaces (see OSHA 29 CFR 1910.146, Subpart J, "Permit-Required Confined Space").

The OSHA "Permit-Required Confined Space" defines both confined spaces and permit-required confined spaces. Each employer must determine whether or not his service station has permit-required confined spaces, and if so, complies with OSHA and other appropriate regulations. This may include identification and evaluation of the hazards associated with the permit-required confined space, informing employees by signs or training, and preventing unauthorized entry. In addition, employers shall establish a written confined space entry program for service stations with permit-required confined spaces. The program must include entry requirements and establish and implement safe entry procedures and practices. The industry normally uses contractors to perform maintenance work in permit-required confined spaces. It is important to communicate to contractors the importance of meeting all confined spaces entry regulations, including having their own written, confined space entry program.

SECTION 2—SERVICE STATIONS WITH REPAIR BAY OPERATIONS

2.1 General

This section provides information on the basic principles of safety and fire protection unique to quick lube facilities and service stations with repair bay operations.

2.2 Lift Operation

Inspect lifts regularly for air or oil leaks. Check the oil level and replace fluid as specified by the manufacturer. If a lift is equipped with automatic chocks, they should be lubricated regularly and kept in good operating condition. Regularly inspect the stops on adapters of the frame contact type lift and repair or report any mechanical defects immediately. The safety leg or bar, if provided, must be maintained in good operating condition at all times. Check the lift control valve for proper operation.

When operating the lift, the safest procedure is for the employee to position the vehicle on the lift. However, if a customer drives onto the lift, the employee should act as a guide, but stand out of the path of the vehicle on the driver's side. Employees should never stand in front of a vehicle being driven onto a lift, into a wash, or over a lube pit.

Particular attention must be given to the proper alignment of the vehicle on a two-rail or frame-contact type of free-wheel lift. An off-center position may cause a vehicle to fall off the lift. After the vehicle is properly positioned and all occupants are out of the vehicle, the procedure for safely lifting vehicles is as follows:

a. Assure that there is adequate overhead clearance for the vehicle to be lifted without causing damage.
b. Place the transmission, or shift, in the neutral position, turn off the ignition, close all vehicle doors, and check for obstructions (for example, antennas), if clearance is limited.
c. Place lift hoist adapters in the proper position under both the front and rear axles or frame-contact points, as appropriate.
d. Raise lift until the wheels are slightly clear of the floor (approximately 8 inches).
e. Inspect the lift to confirm that the adapters are set accurately and that loads are not being placed on parts of the vehicle that might be damaged. Push down gently on the front and rear of the vehicle to ensure that it is balanced on the lift.
f. Never block open the lift control valve.
g. Never raise only one end of the vehicle with the lift. The vehicle could fall and roll or the lift could stick in the up position. Never place a vehicle on a drive-on ramp type lift if the wheels do not safely and securely fit within the ramps. Use frame contact type lifts for vehicles whose axles are wider than the rails or whose tires are wider than the ramp width.
h. Always be aware of obstructions and low clearances when walking under an elevated vehicle.
i. Allow no one be under the vehicle while it is being raised or lowered.
j. After the vehicle is in working position, set the emergency stop device so that the lift will not fall in the event of a pressure drop.
k. If the lift is being used in a position where the emergency stop device cannot be engaged, then place jacks or other suitable stabilizing devices under the vehicle (or under the lift arms or ramps) to prevent the lift and vehicle from falling in the event of a pressure drop.
l. If it is necessary to enter the vehicle for any purpose, lower the lift to the floor, do not climb up on the lift.

A vehicle on a drive-on type lift shall be centered so that equal weight is distributed on each side of the lifting cylinder. The wheels shall be chocked to prevent movement. If the lift is a drive-on, back-off type, a permanent block sufficient to stop a slow rolling vehicle should be affixed to the front end of the lift runners. As the lift is raised, the automatic chocks should be observed for operability.

Some lifts have a device on the lift that takes the weight off the springs or wheels, other devices rock the vehicle. When using such devices, be certain that the vehicle will not be dislodged or overbalanced. On a free-wheel or drive-on type lift, the vehicle should never be raised so high that the axle is taken off the lift adapters or that the tires clear the chime of the lift runner.

The lift should be controlled by a self-closing valve that must be held open manually. The lift can drop if an attempt is made to operate it with continuous pressure, applied by blocking open the lift control valve. Some lifts are equipped with a folding leg or with bars that fit through holes in the piston. The leg or bar acts as an emergency stop, preventing the accidental dropping of the lift. Reliance should not be placed on the leg or the bar. If at any time a lift equipped with such a device settles so that the leg or bar bears the weight of the lift and vehicle, the lift should be taken out of service until the condition causing the defect is corrected. If the lift with the vehicle upon it has settled on the safety leg or bar, never knock out the leg or bar. Instead, raise the lift until the safety leg or bar is completely free and can be removed.

The hydraulic lift may be equipped with a low-oil control valve, which will prevent operation of the lift when there is insufficient oil in the cylinder. The lift can drop accidentally if the oil level in the supply tank is allowed to drop below a minimum level.

Employees working with and around lifts should trained and/or educated so they are aware of unsafe conditions and safe practices.

Upon completion of work, the employee should ensure that the lift is not lowered until all persons, tools, and materials have been cleared from beneath the lift. The area of the lift

should be designated with yellow safety lines on the floor that outline safe walkways when a vehicle is elevated. When not in use, the lift should be kept in the full lowered position. If the floor around the lift is being cleaned, the lift may be elevated approximately 2 feet, and access blocked until cleaning is completed.

2.3 Lubrication Service

Removal of the crankcase, transmission and differential drains, test plugs and oil filters, without causing damage to the vehicle or equipment, requires the use of proper tools. After the correct tool is placed on the drain plug or fitted to the filter, force should be applied slowly. If an adjustable wrench is used, the force should always be applied against the fixed jaw of the wrench. If the plug is unusually tight, it can be loosened by holding the wrench on the plug with one hand and striking the wrench handle lightly with a hammer. This exerts a force greater than can be achieved by pushing or pulling. It also reduces the possibility of skinned knuckles or other injuries which could occur if the wrench slips. Pipe wrenches, extenders and chisels should be used only by trained mechanics who know how to safely remove frozen or rusted plugs.

Because of the potential hazards involved, the starting mechanism of high pressure lubricating equipment should not be activated until the nozzle is set firmly against the grease fitting. Should it be necessary to test high-pressure lubrication equipment prior to use, place the open end of the nozzle into a oil waste container before operating the starting mechanism. Do not discharge high-pressure lubricant into a hand held waste container or rag.

Injuries from high-pressure, high-velocity grease gun equipment can be serious. If a high-pressure lubricating gun is discharged against some part of the body, the affected area should be examined immediately to see if petroleum products have penetrated the skin. These injuries cause little pain or bleeding, but involve almost immediate separation of the skin tissues and possible deeper damage. It is essential that the injured person receive immediate medical attention and that the attending physician know the cause and product involved in the injury.

2.4 Removing Wheels

Wheel bearing lubrication, brake repair, tire changing, and other services may require removing wheels from the axles of vehicles. When these operations are performed on a free-wheel or frame-contact lift, the vehicle should be raised only a few inches from the floor. This permits the employee to remove or replace the wheel from a squatting position, maintain proper back posture and thereby reduce the possibility of back strain.

When wheels are to be removed from a vehicle on a drive-lift, it should be blocked securely to prevent rolling. A hydraulic or mechanical jack can be used to raise the wheels off the lift runners, or a floor block can be used, and the lift lowered sufficiently to free the wheels.

After the wheels are removed, compressed air should not be used for cleaning or to blow residue from automotive brake systems. A safe method is to clean the wheel and parts with a vacuum or liquid solution. The parts can be lubricated or repaired after air drying for a few minutes. (Many brake linings, especially on older model vehicles, contain asbestos. Consult the brake lining suppliers for proper safety and health precautions, as well as appropriate disposal of old linings.) OSHA 29 CFR 1910.1001, ***Asbestos,*** provides information regarding employee exposure to asbestos.

2.5 Tire Service

The many types of passenger car and truck tires, and specialized tire-changing equipment, pose a variety of potential hazards. Employees should be trained and qualified to service tires.

2.6 Repairing and Mounting Tires

Inspecting, dismounting, repairing, remounting and inflating automobile, truck, motorcycle, trailer, and other vehicle tires requires skill and knowledge. Safe work practices should be established which satisfy applicable state and local requirements as well as OSHA 29 ***CFR*** 1910.177, ***Servicing Multi-Piece and Single Piece Rim Wheels.*** Manufacturers' instructions for the safe operation of tire changing machines should be followed to prevent equipment damage or severe injury. Special training sessions and literature are sometimes conducted by tire manufacturers and service equipment providers which can be used to train employees.

When repairing tires with patching compounds or liquids that are flammable or toxic, additional precautions, such as isolating ignition sources, using personal protective equipment and providing adequate ventilation, should be observed. Maintain tools used for tire repairs in good condition. Do not leave tires being repaired lying in areas where they create a tripping hazard. Dispose of old tires properly.

2.7 Tire Rack

Provide a ladder or portable stair of sufficient height to safely remove tires from overhead racks or high shelves. Position the ladder properly so that stretching or twisting will not be necessary while handling the tires. Store tires so that the size and type are readily visible. Do not store any items on top of the tires.

2.8 Truck Tires

Establish safe operating procedures for servicing truck and trailer lock ring rim wheels which satisfy applicable regulations. such as OSHA 29 ***CFR*** 1910.177. Documentation

should be maintained to show that employees assigned to this work are trained and qualified.

The higher inflation pressure and the use of lock rings on truck type tires, requires more skill and caution than needed for servicing passenger car tires. When inflating truck type tires, first check the lock rings to be sure they are seated properly. The principal cause of improperly seated lock rings is rust and dirt accumulation on the ring and wheel; these should be cleaned. Bent or damaged rings should not be used. Do not work on a lock ring with pressure in the tire.

When dismounting a truck tire, pressure should be released by removing the valve core before loosening the lock ring. The tire and lock ring should be reassembled in accordance with manufacturers' specifications. Do not place hands between dual wheels while the tires are being inflated. If truck tires are removed for inflating or repair, a special cage fitted with bars to retain the lock ring should be provided to hold the wheel during inflation. Hands and legs should be kept out of the cage during inflation.

2.9 Compressed Air

Establish safe work practices for the use of compressed air. A jet of air can cause injury if it strikes a wound or opening in the skin, or if it blows foreign matter into the eyes. Compressed air should never be used to blow dust or dirt from clothing. The air hoses should be used only for inflating tires and for certain lubrication and auxiliary services. Self-service tire inflation stations should be properly signed to alert customers of hazards of air pressure. Customers should be cautioned against pressurizing fuel tanks, air horns, water tanks, or other non-air pressure containers.

2.10 Battery Service

Storage batteries contain an electrolyte solution of sulfuric acid that is corrosive and can cause painful burns and other injuries if it gets into the eyes, an open cut, or on the skin. This potential hazard can be minimized by the use of personal protective equipment, including rubber gloves and eye protection. Immediately after servicing a battery, employees should thoroughly wash their hands. Until then, the hands should be kept away from the face and eyes. Battery solution will also damage clothing, metal, and painted surfaces.

Battery solution should be handled only in areas that are well lighted and where an supply of potable water or an eye wash station is available in case the solution spills or contacts an employee's eye. When filling batteries, exercise caution to ensure that flexible rubber tips of the hydrometers and the battery filling hoses do not flip back, splashing solution toward the face and body. Be extremely careful when placing or removing the tips of these devices into or from battery openings.

Safe practices for handling battery solution include, but are not limited to, the following:

a. Use a face shield or chemical goggles and gloves to keep solution from skin and eyes. Immediately flush electrolyte solution contacting the eyes or skin with clean potable water for at least 15 minutes.

b. Read and follow instructions on the container and on the Material Safety Data Sheet. Cartons containing electrolyte solution should be stored at temperature ranges between 60°F to 90°F, in a safe location away from customer traffic.

c. Never squeeze or puncture a container with a screwdriver or other instrument; the solution may splash on face, hands, or clothing. Immediately flush any electrolyte solution spilled on the battery or in the filling area with water, until clean.

d. Never fill a new battery with electrolyte solution when it is in a vehicle. Fill the battery while it is on the floor, and then replace the caps prior to installation.

e. Recap any electrolyte container that has not been emptied, and store it in a safe place at floor level. Never store electrolyte solution on shelves or other locations where the containers can overturn.

f. Thoroughly rinse used containers with water, before discarding or returning to the manufacturer for refilling. Otherwise, any solution remaining in the container could be potentially hazardous. Containers of the nonreturnable type should be cut open after rinsing, thereby rendering them unfit for further use.

g. Baking soda (sodium bicarbonate) is an effective neutralizer for battery electrolyte solution. It should be sprinkled liberally on any spills and slightly wetted with water, if necessary, to improve neutralization.

When servicing batteries, the corrosive particles that have accumulated around the terminals should be brushed away, washed with clean water and neutralized with baking soda or other similar material. Cleaning should be done in a direction away from the body to prevent particles from getting into the eyes or onto clothing.

2.11 Battery Storage and Handling

Storage and disposal of batteries and battery fluids shall be in accordance with local, state and federal regulations. It is important to guard against short circuits when removing, installing, or handling batteries. To prevent short circuits, disconnect the ground (negative) cable first, before removing batteries. When installing batteries, reconnect the ground (negative) cable last.

The weight and position of a battery in a vehicle can sometimes create excessive strain when removing and replacing the unit. To make lifting easier and to avoid touching the battery with the hands, a battery carrier should be used. When the carrier has been placed on the battery, double check its

grip to make sure it will not slip. Follow safe lifting practices to reduce the potential for strains, sprains, or other injuries.

2.12 Battery Charging

When "quick charging" a battery installed in a vehicle, first move the vehicle away from the fuel island. Disconnect the battery ground (negative) cable before connecting the charger unit. When using charger equipment without reverse polarity protectors, remove the ground cable to prevent alternator damage. If the battery is located within the passenger compartment or under the floorboard of a vehicle, remove the battery before charging.

Follow battery manufacturer's instructions for loosening and removing the caps. Always check the fluid levels in batteries prior to charging. During the charging process, periodically check to determine whether the battery is overheating. Turn off the charger before disconnecting cables from the battery, because failure to do so may cause a spark, igniting the hydrogen gas generated during the charge. Never "jump" or charge a frozen battery.

2.13 Battery Jumper Cables

Employees may occasionally be called upon to "jump start" vehicles with dead batteries. Extensive electrical systems damage can occur if jumper cables are hooked up incorrectly, and the potential for injury from an exploding battery increases.

Safe procedures to be used for negative-ground electric systems include, but are not limited to, the following:

a. Be sure that the stalled vehicle and the booster vehicle do not touch. If the two vehicles come together, a ground connection could be established causing sparks and increasing the danger of explosion when jumper cables are connected.

b. Turn off all battery-operated accessories in both vehicles. Set the parking brake, and make sure that both vehicles' transmissions are either in neutral or park.

c. Use appropriate personal protective equipment. Remove the vent caps from both batteries, check for adequate water in the batteries, and lay a heavy cloth over the filler holes. Follow battery manufacturer's instructions for loosening and removing the caps. This reduces the danger of explosion when a fully charged battery is connected to a fully discharged battery.

d. Connect one jumper cable clamp to the positive terminal of the discharged (bad) battery. (The positive terminal is connected to the starter or solenoid of the vehicle.) Then connect the other end of the same cable to the positive terminal of the booster (good) battery. Do not allow positive cable clamps to contact any other part of the vehicles than the battery terminals.

e. Connect one clamp of the second jumper cable to the negative terminal of the booster battery. Connect the other clamp to a ground connection of the stalled vehicle, such as the engine block, so as to not touch any moving parts. Make sure the connection is at least 12 inches away from the filler openings on the dead battery, carburetor, fuel injection system, fuel lines, etc. Do not attach the negative jumper cable directly to the negative terminal of the dead battery, as an explosion could occur.

f. Keeping away From both batteries, start the vehicle with the good battery. Then attempt to start the disabled vehicle. After the stalled vehicle is started, remove the jumper cables in the reverse order of the previous steps, making sure to disconnect the ground connection first.

2.14 Spark Plugs

Select and use the correct socket wrench for removing spark plugs. Place the wrench on the plug and tap it lightly to loosen the plug instead of pushing or pulling. This will reduce the potential of cuts, bruises, or other injuries which might result if the wrench slips, or if the plug comes free suddenly.

2.15 Fan Belts

Before installing or adjusting fan belts, disconnect the battery or lock the ignition and remove the key to prevent the engine from starting. (Note: disconnecting the battery is required on some vehicles, such as those meeting California emission standards, which have automatically starting fans even if the ignition is turned off.) To prevent burns, allow the vehicle to cool before servicing. Cuts and bruises can be reduced by placing a cloth between the hand and the radiator and/or by using gloves. Assure that the belt is placed on the correct pulleys, at the recommended tension. If a pry bar is used to adjust tension, be careful to avoid slips and potential injury or damage.

2.16 Priming Carburetors

The use of gasoline is not recommended for carburetor priming. With the engine stopped, spray starter fluid into the carburetor air intake following manufacturer's directions. Then replace the air cleaner cover and attempt to start the engine. This procedure may be repeated as often as necessary to start the engine. It is essential that carburetor priming is not attempted while the engine is running or being turned over with the starter. A flashback can ignite the fuel vapors.

If there is a need to physically hold the choke open while attempting to start the engine, use a clamp or other appropriate tool. Employees should stand away from the vehicle while an attempt is made to start the engine.

2.17 Driving Customers' Vehicles

Only employees with valid driver's licenses should be authorized to operate customers' vehicles. All vehicles should be operated in compliance with local and state traffic laws.

Check the vehicles' brakes immediately. Vehicles with faulty brakes should not be operated. When driving vehicles into repair bays or onto lifts, drive slowly so that emergency stops can be made quickly. The driver should be guided onto the lift by an employee who is standing away from the path of the vehicle.

2.18 Towing

Employees should be trained and qualified, with a proper federal and/or state motor vehicle operator's license, to operate a service truck, towing equipment, snow plow equipment, etc. Towing should be used instead of pushing whenever possible. Make sure the hitch is safe and signals for starting, stopping, and turning are understood. The route to be followed should be agreed upon before starting the tow.

Minimum safety precautions applicable to the operation of service trucks for towing or pushing vehicles and/or performing emergency road service, include but are not limited to, the following:

a. The service truck should be equipped with emergency equipment, warning signal devices and at least one fire extinguisher having a minimum 20 pound. BC rating.

b. Check the type of transmission and frame on the vehicle and follow the manufacturer's instructions for towing. The maximum lifting capacity of the unit should be prominently posted on the hoist mast. Information on the manufacturer's data plate should not be removed or painted over. The unit's controls should be remotely located from the winch drum, traveling cables, and sheaves.

c. The following items should be inspected regularly:

1. Control mechanisms and safety devices for maladjustments or excessive wear.
2. Hooks for cracks or excessive deformation.
3. Normal vehicle preventive maintenance items.

d. The following items should be inspected periodically to assure safe condition and corrective action taken if the following hazardous conditions are identified:

1. Deformed, cracked, or corroded structural members.
2. Cracked or worn locking devices, sheaves and drums.
3. Cracked or distorted pins, bearings, shafts, and gears.
4. Excessive cable wear, corrosion, broken strands, severe kinking and improperly applied, cracked, or corroded cable connections.

2.19 Compressed Gas for Welding, Cutting, and Brazing

Assure that employees who use oxygen-fuel gas equipment are trained and qualified. Never permit a customer or unauthorized person to use this equipment. Never use oxygen as a substitute for compressed air. Use appropriate personal protective equipment.

Post a sign in cylinder storage areas stating, "Danger: No Smoking, Matches, or Open Flame." Do not store oxygen cylinders near highly combustible material, especially oil and grease. Secure oxygen and fuel cylinders in an upright position by means of a chain or bar. Separate stored oxygen and fuel cylinders by a minimum distance of 20 feet or by a 5 foot high, noncombustible wall.

Mark all empty cylinders either "empty" or "MT" and close all valves. Keep them separated from full cylinders and promptly return them to the supplier with the valve-protection caps in place. No person, other than the gas supplier, should attempt to mix gases in a cylinder. Only approved gas suppliers should refill cylinders. Cylinder valves should not be tampered with nor should any attempt be made to repair them. If you experience trouble, the supplier should be notified promptly, indicating the type of the trouble and the cylinder's serial number. Follow the supplier's instructions as to its disposition.

Before each use, be sure that the oxygen-fuel gas hoses do not have any leaks, burns, worn places, or other defects. Have at least one 20 A:B:C fire extinguisher available. Take precautions to ensure that a jet of oxygen does not strike an oily surface, greasy clothes, or enter a fuel, oil, or other combustible or flammable material storage tank. Open cylinder valves slowly and do not stand in front of glass covered gauge faces.

Replace caps on all cylinders when not in service. Be sure that all cylinder valves are closed before moving them when work is finished or when the cylinder is empty. Keep cylinders, cylinder valves, couplings, regulators, hose, and, apparatus free from oily or greasy substances. Gas cylinders should not be dropped or otherwise roughly handled. Do not handle oxygen cylinders or apparatus with oily hands or gloves.

2.20 Electric Arc Welding

Assure that employees who operate electric resistance welding equipment are trained and qualified, and that records of training are maintained. Employees should wear leather gloves, work shoes and either leather, woolen or other protective clothing, maintained free from grease and oil, with sleeves and collars buttoned while welding. Protective helmets or head shields, made of material that insulates against heat and electricity, should be used when arc welding to protect the head, face, neck, and ears from direct radiant energy. Eye protection is needed to guard against electric flash or spark burns and flying debris. Both welders and persons assisting welders or standing close to the arc welding should also wear appropriate eye protection in accordance with ANSI 287.1.

Fire resistant curtains, or suitable shields with warning signs, should be set up around the station to protect other people in the area from welding arcs. At least one 20 A:B:C fire extinguisher should be available when welding. Identify any

material that might be hot by a sign or by marking the work with chalk or soap stone.

Assure that the electrical connections to the machine are properly made. Keep coiled welding cable spread out to prevent damage and overheating of the cable insulation. Assure that the work or ground lead is firmly attached to the work before starting to weld. Ground and electrode cables are to be joined together only by a connector specifically designed and insulated for this purpose. Do not use any cables which have splices within 10 feet of the welder.

Welders should not coil or hook cables around any part of their bodies. Electrode holders not being used should be disconnected or placed so that electrical contact cannot be made with personnel, conductive objects, fuel, or compressed gas tanks. Refer to OSHA 29 CFR 1910 Subpart Q, "Welding, Cutting and Brazing" for additional information.

2.21 Bench or Pedestal Grinders

Safety procedures for operating bench or pedestal grinders include, but are not limited to, the following:

a. Abrasive wheels should be used only on machines equipped with safety guards. Check to ensure that the safety guard covers the spindle, end nut, and flange projections. The exposed front and sides of the grinding wheel should not exceed more than one-fourth of the entire wheel. When measuring the guard opening, do not include the visors or other accessory equipment as a part of the guard, unless this accessory equipment is as strong as the guard.

b. Work or tool rests should be of strong construction and designed to be adjustable to compensate for wheel wear. Work rests should be closely adjusted to the wheel, with a maximum clearance of 1/8 inch, so as to prevent the work from becoming jammed between the wheel and the tool rest.

c. When an operator stands in front of the opening, provide a safety guard which is constructed so that the tongue guard, with a maximum clearance of 1/4 inch, can be adjusted to the constantly decreasing diameter of the wheel.

d. Mount all abrasive wheels between flanges which cover an area no less than one-third of the entire wheel (diameter). Regardless of the flange type used, be sure that abrasive wheels are always guarded. Blotters (compressible washers) should always be used between the flanges and abrasive wheel surfaces to uniformly distribute flange pressure. When using a bushing in the wheel hole, it must not exceed the width of the wheel and must not contact the flanges.

e. Assure that the driving flange is securely attached to the spindle and that the bearing surface runs true. The grinding wheel arbor should fit freely on the spindle and to remain free during all grinding conditions.

f. When selecting a grinding wheel, first check to assure that it is properly rated to match the RPM of the grinder.

g. Carefully inspect and sound test (ring test) all wheels immediately before mounting to ensure that the wheel hasn't been damaged in transit or storage. Ring test procedure: Tap the wheel lightly with a nonmetallic object, such as a screwdriver handle. If the wheel sounds cracked (dead), it should not be used.

h. After mounting a wheel, check that the safety guard is replaced and the work rest and tongue guard are properly adjusted before starting the wheel.

i. Do not use the side of the grinding wheel.

j. Personal protective equipment is necessary while operating a bench grinder, such as safety goggles, face shield, gloves, apron, and if needed, hearing protection.

2.22 Parts Washers

Parts washers which are used for cleaning tools and machine parts, should have protective covers. These covers are usually provided with a type of hold open device, such as a fusible link, which will allow the cover to automatically close in event of a fire. The device should not be painted over or, bypassed with another mechanism or otherwise make inoperable. Covers should be kept closed when the washer is not in use.

Never use gasoline to wash parts; it creates dangerous fire and health hazards. Use approved solvents with a flash point above 140°F, as cleaning agents. Exercise extreme care to ensure that traces of gasoline or other flammable liquids do not contaminate the cleaning solvent, thereby lowering its flash point and creating a fire hazard.

Replace contaminated cleaning solvent immediately. Contaminated solvents should be placed in an approved hazardous waste container for proper disposal or recycling. Employees using parts cleaning solvents should review the Material Safety Data Sheet for safe handling procedures, and use appropriate personal protective equipment. Care should be taken to avoid skin and eye contact with cleaning solvents.

2.23 Antifreeze Storage and Handling

Glycol antifreeze is typically available in one gallon containers. While there are few storage limitations for glycol type antifreeze, containment is needed to avoid contamination of drains and ground in event of a spill or leak. The safest method of dispensing antifreeze from an upright drum is to use a tightly connected hand pump equipped with a drip return. Faucets or valves on horizontal drums may drip and leak, or be knocked open or broken off, resulting in a spill. Never use air pressure to force antifreeze or any other substance from a drum.

Alcohol base antifreeze stored inside the service station should be in tightly closed drums or packaged containers, and kept in a separate room away from all heating equipment. (A total of no more than 60 gallons of alcohol based antifreeze, in closed containers, may be stored in the building at any time. One additional container that does not exceed 60 gal-

lons capacity, and is equipped with a tight fitting, approved pump is also permitted.)

All empty portable antifreeze containers should be completely drained before they are stored for disposal. Securely cap all empty drums and have them properly removed from the premises without delay. Because used glycol type antifreeze may be considered a hazardous waste, consult local authorities for its proper handling and disposal.

2.24 Spray Paint Finishing Operations

Employers conducting spray paint finishing operations in service stations should comply with OSHA 29 ***CFR*** 1910.94, ***Ventilation*** and OSHA 1910.107, ***Spray Finishing Using Flammable and Combustible Liquids*** *requirements,* and, appropriate state and local regulations.

APPENDIX—REFERENCES

American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018

ANSI A11.1, *Industrial Lighting*
ANSI Z41, *Safety Toe Footwear Standard*

American Petroleum Institute (API)
Publications and Distribution
1220 L Street, N.W.
Washington, D.C 20005

API RP 1615, *Installation of Underground Petroleum Product Storage Systems*
API RP 1626, *Storing and Handling Ethanol and Gasoline Ethanol Blends at Distribution Terminals and Service Stations*
API RP 1637, *Using the API Color Symbol System to Mark Equipment and Vehicles for Product Identification at Service Stations and Distribution Terminals*

National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 02269

NFPA 30, *Flammable and Combustible Liquids Code*
NFPA 30A, *Automotive and Marine Service Station Code*
NFPA 70, *National Electrical Code*
NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids*

National Institute of Occupational Safety and Health (NIOSH)
4676 Columbia Parkway
Cincinnati, OH 45226

NIOSH Publication #93-109, *Preventing Homicide in the Workplace*

Petroleum Equipment Institute
PO Box 2380
Tulsa, OK 74101

PEI/RP 100, *Recommended Practice for Installation of Underground Liquid Storage Systems*

United States Department of Labor
Occupational Safety and Health Administration
Washington, D.C. 20002

OSHA 1910.38, *Employee Emergency Plans and Fire Prevention Plans*
OSHA 1910.94, *Ventilation*
OSHA 1910.107, *Spray Finishing Using Flammable and Combustible Liquids*
OSHA 1910.132, *Personal Protective Equipment, General Requirements*
OSHA 1910.133, *Eye and Face Protection*
OSHA 1910.134, *Respiratory Protection*
OSHA 1910.136, *Foot Protection*
OSHA 1910.146, Subpart J, "Permit Required Confined Spaces"
OSHA 1910.147, *The Control of Hazardous Energy*
OSHA 1910.177, *Servicing Multi-Piece and Single Piece Rim Wheels.*
OSHA 1910.243, *Guarding of Portable Power Tools*
OSHA 1910.252, Subpart Q, "Welding, Cutting and Brazing"
OSHA 1910.1001, *Asbestos*
OSHA 1910.1200, *Hazard Communications*

United States Environmental Protection Agency
Washington, D.C. 20002

SARA Title III, Sections 302, 304, 311, and 312, *Emergency Planning*

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