

(ii) A cathodic protection system designed to protect components in their entirety in accordance with the requirements of § 192.463 of this chapter and placed in operation before October 23, 1981, or, within 1 year after the component is constructed or installed, whichever is earlier.

(b) Where cathodic protection is applied, components that are electrically interconnected must be protected as a unit.

**§ 193.2631 Internal corrosion control.** Each component that is subject to internal corrosive attack must be protected from internal corrosion by—

(a) Material that has been designed and selected to resist the corrosive fluid involved; or

(b) Suitable coating, inhibitor, or other means.

**§ 193.2633 Interference currents.** (a) Each component that is subject to electrical current interference must be protected by a continuing program to minimize the detrimental effects of currents.

(b) Each cathodic protection system must be designed and installed so as to minimize any adverse effects it might cause to adjacent metal components.

(c) Each impressed current power source must be installed and maintained to prevent adverse interference with communications and control systems.

**§ 193.2635 Monitoring corrosion control.** Corrosion protection provided as required by this subpart must be periodically monitored to give early recognition of ineffective corrosion protection, including the following, as applicable:

(a) Each buried or submerged component under cathodic protection must be tested at least once each calendar year, but with intervals not exceeding 15 months, to determine whether the cathodic protection meets the requirements of § 192.463 of this Chapter.

(b) Each cathodic protection rectifier or other impressed current power source must be inspected at least 6 times each calendar year, but with intervals not exceeding 2½ months, to ensure that it is operating properly.

(c) Each reverse current switch, each diode, and each interference bond whose failure would jeopardize component protection must be electrically checked for proper performance at least 6 times each calendar year, but with intervals not exceeding 2½ months. Each other interference bond must be checked at least once each calendar year, but with intervals not exceeding 15 months.

(d) Each component that is protected from atmospheric corrosion must be inspected at intervals not exceeding 3 years.

(e) If a component is protected from internal corrosion, monitoring devices designed to detect internal corrosion, such as coupons or probes, must be located where corrosion is most likely to occur. However, monitoring is not required for corrosion resistant materials if the operator can demonstrate that the component will not be adversely affected by

internal corrosion during its service life. Internal corrosion control monitoring devices must be checked at least two times each calendar year but with intervals not exceeding 7½ months.

§ 193.2637 **Remedial measures.** Prompt corrective or remedial action must be taken whenever an operator learns by inspection or otherwise that atmospheric, external, or internal corrosion is not controlled as required by this subpart.

§ 193.2639 **Maintenance records.** (a) Each operator shall keep a record at each LNG plant of the data and type of each maintenance activity performed on each component to meet the requirements of this subpart, including periodic tests and inspections, for a period of not less than five years.

(b) Each operator shall maintain records or maps to show the location of cathodically protected components, neighboring structures bonded to the cathodic protection system, and corrosion protection equipment.

(c) Each of the following records must be retained for as long as the LNG facility remains in service:

- (1) Each record or map required by paragraph (b) of this section.
- (2) Records of each test, survey, or inspection required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures.

### Subpart I—Fire Protection

§ 193.2801 **Scope.** This subpart prescribes requirements for fire prevention and fire control at LNG plants other than waterfront LNG plants.

§ 193.2803 **General.** Each operator shall use sound fire protection engineering principles to minimize the occurrence and consequences of fire.

§ 193.2805 **Fire prevention plan.** (a) Each operator shall determine—

- (1) Those potential sources of ignition located inside and adjacent to the LNG plant which could cause fires that affect the safety of the plant; and
- (2) These areas, as described in Section 500—4 of MFPA-70, where the potential exists for the presence of flammable fluids in an LNG plant. Determinations made under this paragraph must be kept current.

(b) With respect to areas determined under paragraph (a) (2) of this section, each operator shall include in the operating and maintenance procedures under § 193.2503 and § 193.2605, as appropriate, steps necessary to minimize—

- (1) The leakage or release of flammable fluids; and
- (2) The possibility of flammable fluids being ignited by sources identified under paragraph (a) (1) of this section.

§ 193.2907 **Smoking.** (a) (1) Smoking is prohibited at an LNG plant in areas identified under § 193.2805 (a) (2).

(2) Smoking is permitted only in such locations that the operator designates as a smoking area.

(b) Signs marked with the words "smoking permitted" must be displayed in prominent places in each smoking area designated under paragraph (a) of this section.

(c) Signs marked with the words "NO SMOKING" must be displayed in prominent places in areas where smoking is prohibited.

§ 193.2809 **Open fires.** (a) No open fires are permitted at an LNG plant, except at flare stacks and at times and places designated by the operator.

(b) Whenever an open fire is designated, there must be at the site of the fire—

(1) Trained fire fighting personnel; and

(2) Fire control equipment which has the capability of extinguishing the fire.

(c) The fire fighting personnel and equipment must remain at the fire site until the fire is extinguished and there is no possibility of reignition.

§ 193.2811 **Hotwork.** Welding, flame cutting, and similar operations are prohibited, except at times and places that the operator designates in writing as safe and when constantly supervised in accordance with NFPA-51B.

§ 193.2813 **Storage of flammable fluids.** Flammable fluids may not be stored in areas where ignition sources are present, unless stored in accordance with the requirements of Chapter 4 of NFPA 30.

§ 193.2815 **Motorized equipment.** Use of motor vehicles and other motorized equipment which constitute potential ignition sources is prohibited in an impounding space, in areas within 15 m (49.2 ft) of a storage tank, and in areas within 15 m (49.2 ft) of processing equipment containing a flammable fluid except—

(a) At times the operator designates in writing as safe; and

(b) When the motorized equipment is constantly attended.

§ 193.2817 **Fire equipment.** (a) Each operator shall determine; (1) the types and sizes of fires that may reasonably be expected to occur within and adjacent to each LNG plant that could affect the safety of components; and (2) The foreseeable consequences of these fires, including the failure of components or buildings due to heat exposure.

(b) Each operator shall provide and maintain fire control equipment and supplies in accordance with the applicable requirements of NFPA 59A to protect or cool components that could fail due to heat exposure from fires determined under paragraph (a) of this section and either worsen an emergency or endanger persons or property located outside the plant. Protection or cooling must be provided for as long as the heat exposure exists. The fire control equipment and supplies must include the following;

(1) Portable fire extinguishers suitable for types of fires identified under paragraph (a) of this section; and

(2) If the total inventory of LNG is 265 m<sup>3</sup> (70,000 gal.) or more, a water supply and associated delivery system.

(c) Each operator shall determine the type, size, quantity and location of the fire control equipment and supplies required under paragraph (b) of this section.

(d) Each operator shall provide each facility person who may be endangered by exposure to fire or the products of combustion in performing fire control duties protective clothing and equipment, including, if necessary, a self-contained breathing apparatus.

(e) Portable fire control equipment protective clothing and equipment for personnel use controls for fixed fire control equipment, and fire control supplies must be conspicuously located, marked for easy recognition, and readily available for use.

(f) Fire control equipment must have operating instructions. Instructions must be attached to portable equipment and placed at the location of controls for fixed equipment.

**§ 193.2819 Gas detection.** (a) All areas determined under § 193.2805 (a) (2) in which a hazard to persons or property could exist must be continuously monitored for the presence of flammable gases and vapors with fixed flammable gas detection systems provided and maintained according to the applicable requirements of NFPA 59A.

(b) Each fixed flammable gas detection system must be provided with audible and visible alarms located at an attended control room or control station, and an audible alarm in the area of gas detection.

(c) Flammable gas detection alarms must be set to activate at not more than 25 percent of the lower flammable limit of the gas or vapor being monitored.

(d) Gas detection systems must be installed as that they can be readily tested as required by NFPA 59A.

(e) A minimum of two portable flammable gas detectors capable of measuring the lower flammable limit must be available at the LNG plant for use at all times.

(f) All enclosed buildings located on an LNG plant must be continuously monitored for the presence of flammable gases and vapors with a fixed flammable gas detection system that provides a viable or audible alarm outside the enclosed building. The systems must be provided and maintained according to the applicable requirements of NFPA 59A.

**§ 193.2821 Fire detection.** (a) Fire detectors that continuously monitor for the presence of either flame, heat, or products of combustion must be provided in all areas determined under § 193.2805 (a) (2) in which a hazard to persons or property could exist and in all other areas that are used for the storage of flammable or combustible material.

(b) Each fire detection systems must be provided with audible and visible alarms located at an attended control room or central station, and an audible alarm in the area of fire detection. The systems must be

provided and maintained according to the applicable requirements of NFPA 59A.

### Subpart J—Security

§ 193.2901 **Scope.** This subpart prescribes requirements for security at LNG plants other than waterfront LNG plants.

§ 193.2903 **Security procedures.** Each operator shall prepare and follow one or more manuals of written procedures to provide security for each LNG plant. The procedures must be available at the plant in accordance with § 193.2017 and include at least;

(a) A description and schedule of security inspections and patrols performed in accordance with § 193.2913;

(b) A list of security personnel positions or responsibilities utilized at the LNG plant;

(c) A brief description of the duties associated with each security personnel position or responsibility;

(d) Instructions for actions to be taken, including notification of other appropriate plant personnel and law enforcement officials, where there is any indication of an actual or attempted breach of security;

(e) Methods for determining which persons are allowed access to the LNG plant.

(f) Positive identifications of all persons entering the plant and on the plant, including methods at least as effective as picture badges; and

(g) Liaison with local law enforcement officials to keep them informed about current security procedures under this section.

§ 193.2905 **Protective enclosures.** (a) The following facilities must be surrounded by a protective enclosure:

- (1) Storage tanks;
- (2) Impounding systems;
- (3) Vapor barriers;
- (4) Cargo transfer systems;
- (5) Process, liquefaction, and vaporization equipment;
- (6) Control rooms and stations;
- (7) Control systems;
- (8) Fire control equipment;
- (9) Security communications systems; and
- (10) Alternative power sources.

The protective enclosure may be one or more separate enclosures surrounding a single facility or multiple facilities.

(b) Ground elevations outside a protective enclosure must be graded in a manner that does not impair the effectiveness of the enclosure.

(c) Protective enclosures may not be located near features outside of the facility, such as trees, poles, or buildings, which could be used to breach the security.

(d) At least two accesses must be provided in each protective enclosure and be located to minimize the escape distance in the event of emergency.

(e) Each access must be locked unless it is continuously guarded. During normal operations, an access may be unlocked only by persons designated in writing by the operator. During an emergency, a means must be readily available to all facility personnel within the protective enclosure to open each access.

**§ 193.2907 Protective enclosure construction.** (a) Each protective enclosure must have sufficient strength and configuration to obstruct unauthorized access to the facilities enclosed.

(b) Protective enclosures must be fences or walls constructed as follows:

(1) Fences must be chainlink security fences constructed of No. 11 American wire gauge or heavier metal wire.

(2) Walls must be vertical and constructed of stone, brick, cinder block, concrete, steel or comparable materials.

(3) Protective enclosures must be topped by three or more strands of barbed wire or similar materials on brackets angled outward between 30" and 45" from the vertical, with a height of at least 2.4m (8 ft.) including approximately one foot of barbed topping.

(4) Openings in or under protective enclosures must be secured by grates, doors or covers of construction and fastening of sufficient strength such that the integrity of the protective enclosure is not reduced by any opening.

(c) Paragraphs (b) (1) thru (b) (3) of the section do not apply to protective enclosures constructed before October 23, 1980.

(1) Are made of noncombustible materials:

(2) Are at least 2.1m (7 ft.) in height including approximately one foot of barbed or similar topping; and

(3) Have served to protect the LNG plant without having been breached during their history of service.

**§ 193.2909 Security communications.** A means must be provided for: (a) Prompt communications between personnel having supervisory security duties and law enforcement officials; and

(b) Direct communications between all on-duty personnel having security duties and all control rooms and control stations.

**§ 193.2911 Security lighting.** Where security warning systems are not provided for security monitoring under § 193.2913, the area around the facilities listed under § 193.2905 (a) and each protective enclosure must be illuminated with a minimum in service lighting intensity of not less than 2.2 lux (0.2 ft.) between sunset and sunrise.

§ 193.2913 **Security monitoring.** Each protective enclosure and the area around each facility listed in § 193.2905 (a) must be monitored for the presence of unauthorized persons. Monitoring must be by visual observation in accordance with the schedule in the security procedures under § 193.2903 (a) or by security warning systems that continuously transmit data to an attended location. At an LNG plant with less than 40,000 m<sup>3</sup> (250,000 bbl) of storage capacity, only the protective enclosure must be monitored.

§ 193.2915 **Alternative power sources.** An alternative source of power that meets the requirements of § 193.2445 must be provided for security lighting and security monitoring and warning systems required under §§ 193.2911 and 193.2913.

§ 193.2917 **Warning signs.** (a) Warning signs must be conspicuously placed along each protective enclosure at intervals so that at least one sign is recognizable at night from a distance of 39m (100 ft.) from any way that could reasonably be used to approach the enclosure.

(b) Signs must be marked with at least the following on a background of sharply contrasting color:

The words "NO TRESPASSING," or words of comparable meaning.

## **Subpart H—Personnel Qualification and Training**

§ 193.2701 **Scope.** This subpart prescribes requirements for personnel qualifications and training.

§ 193.2703 **Design and fabrication.** For the design and fabrication of components, each operator shall use—

(a) With respect to design, persons who have demonstrated competence by training or experience in the design of comparable components.

(b) With respect to fabrication, persons who have demonstrated competence by training or experience in the fabrication of comparable components.

§ 193.2705 **Construction, Installation, Inspection, and testing.** (a) Supervisors and other personnel utilized for construction, installation, inspection, or testing must have demonstrated their capability to perform satisfactorily the assigned function by appropriate training in the methods and equipment to be used or related experience and accomplishments.

(b) Each operator must periodically determine whether inspectors performing duties under § 193.2307 are satisfactorily performing their assigned function.

§ 193.2707 **Operations and maintenance.** (a) Each operator shall utilize for operation or maintenance of components only those personnel who have demonstrated their capability to perform their assigned functions by—

(1) Successful completion of the training required by §§ 193.2713 and 193.2717; and

(2) Experience related to the assigned operation or maintenance function; and

(3) Acceptable performance on a proficiency test relevant to the assigned function.

(b) A person who does not meet the requirements of paragraph (a) of this section may operate or maintain a component when accompanied and directed by an individual who meets the requirements.

(c) Corrosion control procedures under § 193.2605(b), including those for the design, installation, operation, and maintenance of cathodic protection systems, must be carried out by, or under the direction of a person qualified by experience and training in corrosion control technology.

§ 193.2709 **Security.** Personnel having security duties must be qualified to perform their assigned duties by successful completion of the training required under § 193.2715.

§ 193.2711 **Personnel health.** Each operator shall follow a written plan to verify that personnel assigned operating, maintenance, security, or fire protection duties at the LNG plant do not have any physical condition that would impair performance of their assigned duties. The plan must be designed to detect both readily observable disorders, such as physical handicaps or injury, and conditions requiring professional examination for discovery.

§ 193.2713 **Training; operations and maintenance.** (a) Each operator shall provide and implement a written plan of initial training to instruct—

(1) All permanent maintenance, operating, and supervisory personnel—

(i) About the characteristics and hazards of LNG and other flammable fluids used or handled at the facility, including, with regard to LNG, low temperatures, flammability of mixtures with air, odorless vapor, boiloff characteristics, and reaction to water and water spray;

(ii) About the potential hazards involved in operating and maintenance activities; and

(iii) To carry out aspects of the operating and maintenance procedures under §§ 193.2503 and 193.2605 that relate to their assigned functions; and

(2) All personnel—

(i) To carry out the emergency procedures under § 193.2509 that relate to their assigned functions; and

(ii) To give first-aid; and

(3) All operating and appropriate supervisory personnel—

(i) To understand detailed instruction on the facility operations, including controls, functions, and operating procedures; and

(ii) To understand the LNG transfer procedures provided under § 193.2513.



1. API 620-Recommended Rules for Design and Construction of Large, Welded, Low Pressure Storage Tanks (6th edition, Dec. 1978)

2. API 1104 Standard for Welding Pipelines and Related Facilities (15th edition, 1980)

3. API 6D Specifications for Pipeline Valves (17 edition, 1977).

E. American Society of Mechanical Engineers (ASME)

1. ANSI B31.32 Chemical and Plant Petroleum Refinery Piping (1976 edition).

2. ASME Boiler and Pressure Vessel Code, Section 1 Power Boilers (1977 edition).

3. ASME Boiler and Pressure Vessel Code, Section 8 Division 1 (1977 edition).

4. ASME Boiler and Pressure Vessel Code, Section 8 Division 2, Alternative Rules (1977 edition).

5. ASME Boiler and Pressure Vessel Code, Section 9 Welding and Brazing Qualifications (1977 edition).

6. ASME Boiler and Pressure Vessel Code, Section 4 Heating Boilers.

7. ANSI B31.5 Refrigeration Piping (1974 edition).

8. ANSI B31.8 Gas Transmission and Distribution Piping Systems (1975 edition).

F. International Conference of Building Officials

1. UBC, Uniform Building Code (1979 edition).

G. National Fire Protection Association (NFPA)

1. NFPA No. 37 Stationary Combustion Engine and Gas Turbines (1979 edition).

2. NFPA No. 59A. Storage and Handling of LNG (1972 edition for 193.2005(c), otherwise 1979 edition).

3. NFPA No. 70 National Electric Code (1978 edition).

4. NFPA No. 30. Flammable Liquids (1981 edition).

5. NFPA No. 51 B. Cutting and Welding Processes (1977 edition).

History: Cr. Register, May, 1972, No. 197, eff. 6-1-72; cr. 192.12, 192.379, appendix A-II F 4; am. 192.201 (a), 192.625 (g) (1), 192.717 (b), 192.727, Register, February, 1973, No. 206, eff. 3-1-73; am. PSC 192.457 (d), PSC 192.613 (c) (1), Register, June, 1974, No. 222, eff. 7-1-74; am. 192.3, 192.55 (a) (2) and (b) (2), 192.65, 192.197 (a), 192.625 (g) (1), appendix A-I, B, and II A, 1., 2., 3., and 5., appendix B, I, cr. appendix B, III, Register, December, 1974, No. 228, eff. 1-1-75; am. 192.59 (a) (1), (b)(1) and cr. (c), am. 192.65(a), 192.225 (a), 192.227(a)(2), 192.229(c), 192.241(c), 192.625(a) and (b), 192.625(g)(1), 192.705 (a) and (b), r. 192.705(c), cr. 192.706, am. 192.707, appendix A II and appendix B I, Register, March, 1976, No. 243, eff. 4-1-76; revised, Register, April, 1977, No. 256, eff. 5-1-77; am. 192.13 (2), 192.313 (a)(4), 192.455 (f), 192.619 (a)(2)(ii), 192.707 (d)(1) and (e)(2)(i), cr. 192.14, 192.452 and 192.455 (f), Register, May, 1978, No. 269, eff. 6-1-78; cr. 192.283, 192.285, 192.287 and part 193., am. (1), 192.121, PSC 192.375, PSC 192.727, Appendix A, IIA and IIB, Appendix B, I, 192.281, 192.465(a), 192.711(b) and 192.713, r. 192.12, Register, December, 1981, No. 312, eff. 1-1-82; reprinted to correct error in 192.287, Register, March, 1983, No. 327; r. and recr. (2), 192.113, 192.117, 192.225(a), 192.227(a), 192.229(c), Appendix A and B1, r. 192.17, cr. 192.375(c), am. 192.7(b) and (c), 192.145(a), 192.163(e), 192.225(b)(1) and (2),

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192.227(b)(1) and (2), 192.237(a), 192.239(a) and (b), 192.241(c), 192.557(d)(1) and (3),  
Register, July, 1983, No. 331, eff. 8-1-83.

5. ASME Boiler and Pressure Vessel Code, Section 9 Welding and Brazing Qualifications (1977 edition).

6. ASME Boiler and Pressure Vessel Code, Section 4 Heating Boilers.

7. ANSI B31.5 Refrigeration Piping (1974 edition).

8. ANSI B31.8 Gas Transmission and Distribution Piping Systems (1975 edition).

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4. NFPA No. 30. Flammable Liquids (1981 edition).

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