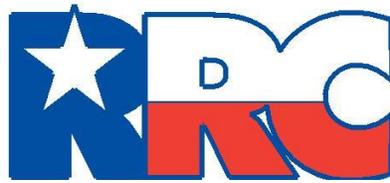


TEXAS LNG EXAMINATION STUDY GUIDE

Carrier
Management Level



RAILROAD COMMISSION OF TEXAS

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LNG EXAMINATION STUDY GUIDE

Management-LEVEL

Carrier Management Level

Who should use this guide?

You should use this guide if you plan to take the Railroad Commission’s management-level qualifying examination to perform LNG Carrier activities. Category 25 examination qualifies an individual to transport LNG by transport, including the loading and unloading of LNG.

What books do I need?



This examination tests your knowledge of the laws and standards that apply to Carrier Management Level operations in Texas. These laws and standards are found in:

- Regulations for Compressed Natural Gas And Liquefied Natural Gas* (Texas Railroad Commission)
- NFPA 52, Vehicular Natural Gas Fuel Systems Code* (2013 Edition)
- NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)* (2013 Edition)

Where do I get this book?

You may download the current edition of the Railroad Commission's *Regulations for Compressed Natural Gas And Liquefied Natural Gas* in PDF format free online at www.rrc.state.tx.us. If you need printed copies, they may be purchased for \$10.00, tax included, by calling the Railroad Commission's publications office at (512) 463-7309.

You may also order NFPA manuals online at www.nfpa.org; click on "Codes and Standards."

Sections and Topics

Before you take this examination, you should know the definitions found in this study guide and the contents of the sections of the codes and standards listed below. The actual examination questions may not cover all of the listed sections and topics.

Terms and Definitions

NOTE: The list below is **not** exhaustive.

You are responsible for knowing all the terms and definitions that apply to the LNG activities you will perform, as well as the rules and standards highlighted in this guide.

Railroad Commission Regulations for Compressed Natural Gas And Liquefied Natural Gas

Aggregate water capacity (AWC)--The sum of all individual container capacities as measured by weight or volume of water which are placed at a single installation location.

Regulations for LNG, §14.2007(2)

Automatic fuel dispenser--A fuel dispenser which requires transaction authorization.

Regulations for LNG, §14.2007(6)

Commercial installation--An LNG equipment installation located on premises other than a single-family dwelling used primarily as a residence.

Regulations for LNG, §14.2007(10)

Conversion--The changes made to a vehicle to allow it to use LNG as a motor fuel.

Regulations for LNG, §14.2007(15)

Ignition source--Any item, substance, or event having adequate temperature and energy release of the type and magnitude sufficient to ignite any flammable mixture of gases or vapors that could occur at a site.

Regulations for LNG, §14.2007(22)

LNG system--A system of safety devices, containers, piping, fittings, valves, regulators, and other LNG equipment intended for use or used with a motor vehicle fueled by LNG and any system or other facilities designed to be used or used in the sale, storage, transportation for delivery, or distribution of LNG.
Regulations for LNG, §14.2007(29)

LNG transport--Any vehicle or combination of vehicles and LNG containers designed or adapted for use or used principally as a means of moving or delivering LNG from one place to another, including but not limited to any truck, trailer, semi-trailer, cargo tank, or other vehicle used in the distribution of LNG.
Regulations for LNG, §14.2007(30)

Mass transit vehicle--Any vehicle which is owned or operated by a political subdivision of a state, city, or county, and which is used primarily in the conveyance of the general public.
Regulations for LNG, §14.2007(31)

Mobile fuel container--An LNG container mounted on a vehicle to store LNG as the fuel supply for uses other than the engine to propel the vehicle, including use in an auxiliary engine.
Regulations for LNG, §14.2007(33)

Pressure relief device--A device, including a pressure relief valve, which is designed both to open automatically to prevent a continued rise of internal fluid pressure in excess of a specified value (set pressure) and to close when the internal fluid pressure is reduced below the set pressure.
Regulations for LNG, §14.2007(44)

Pressure vessel--A container or other component designed in accordance with the ASME Code.
Regulations for LNG, §14.2007(45)

PSIG--Pounds per square inch gauge.
Regulations for LNG, §14.2007(47)

Public Transportation Vehicle--A vehicle for hire to transport persons, including but not limited to taxis, buses (excluding school buses, mass transit or special transit vehicles), and airport courtesy cars.
Regulations for LNG, §14.2007(48)

Special Transit Vehicle--A vehicle designed with limited passenger capacity which is primarily used by a mass transit authority for special transit purposes such as transport of mobility impaired individuals.
Regulations for LNG, §14.2007(55)

Trainee--An individual who has not yet taken and passed an employee-level rules examination.
Regulations for LNG, §14.2007(57)

Transfer area--That portion of an LNG refueling station where LNG is introduced into or dispensed from a stationary installation.
Regulations for LNG, §14.2007(58)

Transfer system--All piping, fittings, valves, pumps, meters, hoses, bulkheads, and equipment used in transferring LNG between containers.
Regulations for LNG, §14.2007(59)

Transport--Any container built in accordance with ASME or DOT specifications and used to transport LNG for delivery.

Regulations for LNG, §14.2007(60)

Transport system--Any and all piping, fittings, valves, and equipment on a transport, excluding the container.

Regulations for LNG, §14.2007(61)

Ultimate consumer--The person controlling LNG immediately prior to its ignition.

Regulations for LNG, §14.2007(62)

NFPA 52 (2013)

ASME Code. The American Society of Mechanical Engineers *Boiler and Pressure Vessel Code*.
NFPA 52, §3.3.3

Container A pressure vessel, cylinder, or cylinder(s) permanently manifolded together used to store CNG or LNG.

NFPA 52, §3.3.9

Cargo Transport Container. A mobile unit designed to transport LNG or CNG.
NFPA 52, §3.3.9.1

Composite Container. A container consisting of an inner metal or plastic gas-containing component, reinforced with a filament and resin outer layer.
NFPA 52, §3.3.9.2

Fuel Supply Container. A container mounted on a vehicle to store LNG or CNG as the fuel supply to the vehicle.
NFPA 52, §3.3.9.3

Fueling Facility Container. Primary storage for vehicular fueling.
NFPA 52, §3.3.9.4

Dispensing Station. A natural gas installation that dispenses CNG or LNG from storage containers or a distribution pipeline into vehicular fuel supply containers or into portable cylinders by means of a compressor, reformer, vaporizer, or pressure booster.

NFPA 52, §3.3.18

DOT. U.S. Department of Transportation.

NFPA 52, §3.3.19

Liquefied Natural Gas (LNG). A fluid in the cryogenic liquid state that is composed predominantly of methane.

NFPA 52, §3.3.30

Piping. A means of transporting natural gas. This term applies to refueling facilities.
NFPA 52, §3.3.42

Point of Transfer. The location where connections and disconnections are made.
NFPA 52, §3.3.43

Pressure.

Compression Discharge Pressure. The varying pressure at the point of discharge from the compressor.
NFPA 52, §3.3.44.1

Maximum Allowable Working Pressure (MAWP). The maximum pressure to which any component or portion of the pressure system can be subjected over the entire range of design temperatures. This value is $1.1 \times 1.25 \times$ the service pressure.
NFPA 52, §3.3.44.2

Operating Pressure. The varying pressure in a fuel supply container during normal container use.
NFPA 52, §3.3.44.3

Maximum Operating Pressure. The steady-state gauge pressure at which a part or system normally operates. This value is $1.25 \times$ the pressure.
NFPA 52, §3.3.44.3.1

Set Pressure. The start-to-discharge pressure for which a relief valve is set and marked.
NFPA 52, §3.3.44.5

Settled Pressure. The pressure in a container after the temperature of the gas reaches equilibrium.
NFPA 52, §3.3.44.6

Storage Pressure. The varying pressure in the storage containers.
NFPA 52, §3.3.44.7

Pressure Regulator. A device, either adjustable or nonadjustable, for controlling and maintaining, within acceptable limits, a uniform outlet pressure.
NFPA 52, §3.3.45

Vaporizer. A device other than a container that receives LNG in liquid form and adds sufficient heat to convert the liquid to a gaseous state, or a device used to add heat to LNG for the purpose of saturating LNG.
NFPA 52, §3.3.59

Water Capacity. The amount of water at 60°F (16°C) required to fill a container.
NFPA 52, §3.3.63

NFPA 52 (2013)

Components. Apart, or a system of parts, that functions as a unit in an LNG plant and could include, but is not limited to, piping, processing equipment, containers, control devices, impounding systems, electrical systems, security devices, fire control equipment, and communication equipment.

NFPA 59A, §3.3.4

Design Pressure. The pressure used in the design of equipment, a container, or a pressure vessel for the purpose of

determining the minimum allowable thickness or physical characteristics of its parts.

NFPA 59A, §3.3.7

LNG Plant. A facility whose components can be used to store, condition, liquefy, or vaporize natural gas.

NFPA 59A, §3.3.16

Overfilling. Filling to a level above the maximum design liquid level.

NFPA 59A, §3.3.21

Sources of Ignition. Appliances or equipment that, because of their intended modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable gas–air mixtures.

NFPA 59A, §3.3.24

Sample Question 1

Water Capacity is defined as the amount of water at ____°F (16°C) required to fill a container.

- A. 0
- B. 32
- C. 50
- D. 60
- E. 100

Answer on last page.

Key Topics

NOTE: The list below is not exhaustive.

You are responsible for knowing all the facts, rules, standards, and procedures that apply to the Natural Gas activities you will perform, as well as the rules and standards highlighted in this guide.

When you take the examination, read each question very carefully.

ADMINISTRATIVE RULES - GENERAL REQUIREMENTS

Company License

No person may engage in any LNG activities until that person has obtained a license from the Commission authorizing the LNG activities

Regulations for LNG, §14.2014(a)

Licensees, registered manufacturers, company representatives, and operations supervisors at each outlet shall have copies of all current licenses and/or manufacturer registration certificates and certification cards for employees at that location available for inspection during regular business hours

Regulations for LNG, §14.2014(c)

Licenses and manufacturer registrations issued under this chapter expire one year after issuance at midnight on the last day of the month prior to the month in which they are issued.

Regulations for LNG, §14.2014(d)

A properly completed LNG Form 2001 listing all names under which LNG-related activities requiring licensing are to be conducted and the applicant's properly qualified company representative, and the following forms or documents as applicable:

(A) LNG Form 2001A for outlets

(B) LNG Form 2007, 2007A, 2007T to register any LNG transports

(C) LNG Form 2019 transfer of ownership

Regulations for LNG, §14.2014(f)(1)

Application for a New Certificate

No person shall perform work, directly supervise LNG activities, or be employed in any capacity requiring contact with LNG unless that individual:

(A) is a certificate holder who is in compliance with renewal requirements in subsection (g) of this section and is employed by a licensee; or

(B) is a trainee who complies with subsection (f) of this section.

Regulations for LNG, §14.2019(a)(1)

An individual who passes the applicable rules examination with a score of at least 75% will become a certificate holder. AFS will send a certificate to the licensee listed on LNG Form 2016

(A) Successful completion of any required examination shall be credited to the individual.

(B) An individual who has been issued a certificate shall make the certificate readily available and shall present it to any Commission employee or agent who requests proof of certification.

Regulations for LNG, §14.2019(b)(1)

Certificate Renewal

Certificate holders shall pay the nonrefundable \$25 annual certificate renewal fee to AFS on or before May 31 of each year. Individuals who hold more than one certificate shall pay only one annual renewal fee.

(A) Failure to pay the nonrefundable annual renewal fee by the deadline shall result in a lapsed certificate.

(i) To renew a lapsed certificate, the individual shall pay the nonrefundable \$25 annual renewal fee plus a nonrefundable \$20 late-filing fee. Failure to do so shall result in the expiration of the certificate.

(ii) If an individual's certificate lapses or expires, that individual shall immediately cease performance of any LNG activities authorized by the certificate.

(iii) If an individual's certificate has been expired for more than two years from May 31 of the year in which the certificate lapsed, that individual shall comply with the requirements of subsection (b) of this section.

Regulations for LNG, §14.2019(g)(3)

Rules Examination

An individual who files LNG Form 2016 and pays the applicable nonrefundable examination fee may take the rules examination.

Regulations for LNG, §14.2019(b)(3)

Failure of any examination shall immediately disqualify the individual from performing any LNG related activities covered by the examination which is failed, except for activities covered by a separate examination which the individual has passed.

Regulations for LNG, §14.2019(e)

Trainees

A licensee or ultimate consumer may employ an individual as a trainee for a period not to exceed 45 calendar days without that individual having successfully completed the rules examination.

(A) The trainee shall be directly and individually supervised at all times by an individual who has successfully completed the Commission's rules examination for the areas of work being performed by the trainee.

(B) A trainee who has been in training for a total period of 45 days, in any combination and with any number of employers, shall cease to perform any LNG activities for which the trainee is not currently certified, until the trainee successfully completes the rules examination.

Regulations for LNG, §14.2019(f)

Designation and Responsibilities of Company Representatives and Operations Supervisors

An applicant for license shall not engage in LNG activities until it has employed a company representative who meets the requirements of §14.2025 of this title.

Regulations for LNG, §14.2014(b)

Each licensee shall have at least one company representative for the license and at least one operations supervisor for each outlet.

Regulations for LNG, §14.2025

A licensee maintaining one or more outlets shall file LNG Form 2001 with AFS listing the physical location of the first outlet and designating the company representative for the license and file LNG Form 2001A designating the physical location and operations supervisor for each additional outlet.

Regulations for LNG, §14.2025(1)

A licensee may have more than one company representative.

Regulations for LNG, §14.2025(2)

An individual may be an operations supervisor at more than one outlet provided that:

(A) each outlet has a designated LNG certified employee responsible for the LNG activities at that outlet; (B) the certified employee's and/or operations supervisor's telephone number is posted at the outlet on a sign with lettering at least 3/4 inches high, visible and legible during normal business hours; and (C) the certified employee and/or operations supervisor monitors the telephone number and responds to calls during normal business hours.

Regulations for LNG, §14.2025(3)

The company representative may also serve as operations supervisor for one or more of the licensee's outlets provided that the person meets both the company representative and operations supervisor requirements in this section.

Regulations for LNG, §14.2025(4)

A licensee shall immediately notify AFS in writing upon conclusion of employment, for whatever reason, of its company representative or any operations supervisor and shall at the same time designate a replacement.

(A) A licensee shall cease all LNG activities if it no longer employs a qualified company representative who complies with the Commission's requirements. A licensee shall not resume LNG activities until such time as it has a properly qualified company representative.

(B) A licensee shall cease LNG activities at an outlet if it no longer employs a qualified operations supervisor at that outlet who complies with the Commission's requirements. A licensee shall not resume LNG activities at that outlet until such time as it has a properly qualified operations supervisor.

Regulations for LNG, §14.2025(5)

Qualified Personnel

The installation of LNG and CNG systems shall be supervised by qualified personnel with reference to their construction and use.

NFPA 52, §4.2

At least one qualified person shall be in continuous attendance with an unobstructed view of the transfer point while unloading is in progress.

NFPA 52, §10.3.5

The maintenance program shall be carried out by a qualified representative of the equipment owner.

NFPA 52, §10.13.1.1

All persons employed in handling and dispensing LNG shall be trained in handling and operating duties and procedures.

NFPA 52, §12.4.1

Training shall be conducted upon employment and every 2 years thereafter.

NFPA 52, §12.4.3

Training shall include the following:

- (1) Information on the nature, properties, and hazards of LNG in both the liquid and gaseous phases
- (2) Specific instructions on the facility equipment to be used
- (3) Information on materials that are compatible for use with LNG
- (4) Use and care of protective equipment and clothing
- (5) Standard first aid and self-aid instruction
- (6) Response to emergency situations such as fires, leaks, and spills
- (7) Good housekeeping practices
- (8) Emergency response plan as required in 12.2.3
- (9) Evacuation and fire drills

NFPA 52, §12.4.4

Sample Question 2

The installation of LNG and CNG systems shall be supervised by _____ personnel with reference to their construction and use.

- A. Qualified
- B. Certified
- C. Licensed
- D. Registered

Answer on last Page

Report of LP-Gas Incident/Accident

At the earliest practical moment or within two hours following discovery, a licensee owning, operating, or servicing equipment or an installation shall notify AFS by telephone of any incident or accident involving LNG which:

- (1) involves a single release of LNG during or following LNG transfer or during container transportation. Any loss of LNG which is less than 1.0% of the gross amount delivered, stored, or withdrawn need not be reported. Any loss occurring as a result of a pullaway shall be reported;
- (2) caused an estimated damage to the property of the operator, others, or both totaling \$50,000 or more, including gas loss;
- (3) caused a death or any personal injury requiring hospitalization;
- (4) required taking an operating facility out of service;
- (5) resulted in an unintentional ignition of LNG requiring an emergency response;
- (6) involved the LNG installation on any vehicle propelled by or transporting LNG;
- (7) could reasonably be judged as significant because of rerouting of traffic, evacuation of buildings, or media interest, even though it does not meet paragraphs (1) - (6) of this subsection; or
- (8) is required to be reported to any other state or federal agency (such as the Texas Department of Public Safety or U.S. Department of Transportation).

Regulations for LNG, §14.2049

Portable or wheeled fire extinguishers shall be recommended for gas fires by their manufacturer.

NFPA 59, §12.6.1

Portable or wheeled fire extinguishers shall be available at strategic locations, as determined in accordance with 12.2.1, within an LNG facility and on tank vehicles.

NFPA 59, §12.6.1.1

Portable and wheeled fire extinguishers shall conform to the requirements of NFPA 10, *Standard for Portable Fire Extinguishers*.

NFPA 59, §12.6.1.2

Handheld portable dry chemical extinguishers shall contain minimum nominal agent capacities of 20 lb. or greater and shall have a minimum 1 lb./sec agent discharge rate.

NFPA 59, §12.6.1.3

Control systems that are used as part of the fire protection system at the LNG plant shall be inspected and tested in accordance with the applicable fire codes.

NFPA 59, §14.8.10.4

General Rules For All Stationary LNG Installations

Transfer of LNG

When transfers are made into fueling facility containers, the LNG shall be transferred at a pressure that does not overpressurize the receiving tank.

NFPA 52, §10.3.2

At least one qualified person shall be in continuous attendance with an unobstructed view of the transfer point while unloading is in progress.

NFPA 52, §10.3.5

At least one qualified person shall be in constant attendance while a transfer is in progress.

NFPA 59A, §14.6.4

Sources of ignition shall not be permitted in the unloading area while transfer is in progress.

NFPA 52, §10.3.6

ASME containers shall be identified by the attachment of a corrosion resistant nameplate as required by ASME Boiler and Pressure Vessel Code, Section VIII.

NFPA 59A, §7.3.4.2

Containers designed to operate at a pressure in excess of 15 psi shall be equipped with a device(s) that prevents the container from becoming liquid-full or the inlet of the relief device(s) from becoming covered with liquid when the pressure in the container reaches the set pressure of the relieving device(s) under all conditions. [59A:13.4]

NFPA 52, §13.3.19

Where bulk transfers are made into stationary storage containers, the LNG being transferred shall be compatible in composition or in temperature and density with the LNG already in the container.

NFPA 59A, §14.6.1

Prior to transfer, gauge readings shall be obtained, or inventory established to ensure that the receiving container cannot be overfilled, and levels shall be checked during transfer operations.

NFPA 59A, §14.6.6.4

While tank car or tank vehicle loading or unloading operations are in progress, rail and vehicle traffic shall be prohibited within 25 ft of LNG facilities or within 50 ft of refrigerants whose vapors are heavier than air.

NFPA 59A, §14.6.6.8

Transport Vehicle Loading and Unloading Facilities and Procedures

A rack structure, if provided, shall be constructed of a noncombustible material.

NFPA 59A, §11.6.3

A tank vehicle loading and unloading area shall be of sufficient size to accommodate the vehicles without excessive movement or turning of the vehicles. Transfer piping, pumps, and compressors shall be installed with the following protective measures:

NFPA 59A, §11.6.4

- (A) protection from damage from vehicle movements in compliance with the guardrail and fencing requirements of §14.2101 of this title (relating to System Protection Requirements);
- (B) isolation valves at both ends of containers with less than 2,000 gallon capacity, and a remote operating valve, automatic closure, or check valve to prevent backflow on containers of 2,000 gallons or more capacity;
- (C) a check valve on piping for liquid transfer to minimize accidental release; and
- (D) a line relief valve between every pair of isolation valves.

Operating status indicators shall be provided in the transfer area.

Regulations for LNG, §14.2119

Isolation valves and bleed connections shall be provided at the loading or unloading manifold for both liquid and vapor return lines so that hoses and arms can be blocked off, drained of liquid, and depressurized before disconnecting.

NFPA 59A, §11.6.6

Where multiple products are loaded or unloaded at the same location, loading arms, hoses, and manifolds shall be identified or marked to indicate the product or products to be handled by each system.

NFPA 59A, §11.7.3

The operating procedures manual shall be accessible to all plant personnel and shall be kept readily available in the operating control center.

NFPA 59A, §14.3.2

Prior to transfer, gauge readings shall be obtained, or inventory established to ensure that the receiving container cannot be overfilled, and levels shall be checked during transfer operations.

NFPA 59A, §14.6.6.4

The transfer system shall be checked prior to use to ensure that valves are in the correct position.

NFPA 59A, §14.6.6.5

Transfer operations shall be commenced slowly and if any unusual variance in pressure or temperature occurs, transfer shall be stopped until the cause has been determined and corrected.

NFPA 59A, §14.6.6.6

Pressure and temperature conditions shall be monitored during the transfer operation.

NFPA 59A, §14.6.6.7

Truck vehicle engines shall be shut off if they are not required for transfer operations.
NFPA 59A, §14.6.6.8.3

Brakes shall be set, and wheels chocked prior to connection for unloading or loading.
NFPA 59A, §14.6.6.8.4

The engine shall not be started until the truck vehicle has been disconnected and any released vapors have dissipated.
NFPA 59A, §14.6.6.8.5

(A) Before LNG is loaded into a tank car or tank vehicle that is not in exclusive LNG service, a test shall be made to determine the oxygen content in the container.

(B) If the oxygen content exceeds 2 percent by volume, the container shall not be loaded until it has been purged to below 2 percent oxygen by volume.

(C) If a tank car or tank vehicle in exclusive LNG service does not contain a positive pressure, it shall be tested for oxygen content.

NFPA 59A, §14.6.6.9

Before loading or unloading, a tank vehicle shall be positioned so it can exit the area without backing up, when the transfer operation is complete.

NFPA 59A, §14.6.6.10

Sample Question 3

Pressure and temperature conditions shall be monitored _____.

- A. prior to connection
- B. during business hours
- C. during the transfer operations
- D. before loading and unloading

Answer on last page

Transfer Systems, Including Piping, Pumps, and Compressors, Used for LNG and Refrigerants

Pumps used for transfer of LNG shall be provided with means for a precooling to reduce the effect of thermal shock and overpressure.

NFPA 52, §9.9.3

Valves shall be installed such that each pump or compressor can be isolated for maintenance.

NFPA 52, §10.8.1

Isolation valves shall be installed at the extremity of each transfer system.

NFPA 59A, §11.3.1

In addition to a locally mounted device for shutdown of the pump or compressor drive, a readily accessible, remotely located device shall be provided a minimum of 25 ft away from the equipment to shut down the pump or compressor in an emergency.

NFPA 59A, §11.4.1

Remotely located pumps and compressors used for loading or unloading tank cars, tank vehicles, or marine vessels shall be provided with controls to stop their operation that are located at the loading or unloading area and at the pump or compressor site.

NFPA 59A, §11.4.2

The pipeline system shall be designed so that it cannot exceed its temperature or pressure limits.

NFPA 59A, §11.7.2

Pipelines used only for liquid unloading shall have a check valve at the manifold adjacent to the manifold isolation valve.

NFPA 59A, §11.6.9

Hoses and Arms

Hoses or arms used for transfer shall be designed for the temperature and pressure conditions of the loading or unloading system.

NFPA 59A, §11.8.1

Hoses shall be approved for the service and shall be designed for a bursting pressure of at least five times the working pressure.

NFPA 59A, §11.8.2

Hoses shall be tested at least annually to the maximum pump pressure or relief valve setting and shall be inspected visually before each use for damage or defects.

NFPA 59A, §11.8.6

Communications and Lighting

Communications shall be provided at loading and unloading locations to allow the operator to be in contact with other personnel associated with the loading or unloading operation.

NFPA 59A, §11.9.1

Facilities transferring LNG during hours of darkness shall have lighting at the transfer area.

NFPA 59A, §11.9.2

Fire Protection

Fire protection shall be provided for all LNG facilities.

NFPA 59A, §12.2

The extent of such protection shall be determined by an evaluation based on fire protection engineering principles, analysis of local conditions, hazards within the facility, and exposure to or from other property.

NFPA 59A, §12.2.1

The evaluation shall determine the following:

- (1) The type, quantity, and location of equipment necessary for the detection and control of fires, leaks, and spills of LNG, flammable refrigerants, or flammable gases
- (2) The type, quantity, and location of equipment necessary for the detection and control of potential nonprocess and electrical fires
- (3) The methods necessary for protection of the equipment and structures from the effects of fire exposure
- (4) Requirements for fire protection water systems
- (5)*Requirements for fire-extinguishing and other fire control equipment
- (6) The equipment and processes to be incorporated within the ESD system, including analysis of subsystems, if any, and the need for depressurizing specific vessels or equipment during a fire emergency
- (7) The type and location of sensors necessary to initiate automatic operation of the ESD system or its subsystems
- (8) The availability and duties of individual plant personnel and the availability of external response personnel during an emergency
- (9) The protective equipment, special training, and qualification needed by individual plant personnel as specified by NFPA 600, Standard on Industrial Fire Brigades, for their respective emergency duties
- (10) Requirements for other fire protection equipment and systems

NFPA 59A, §12.2.2

The emergency procedure manual required in NFPA 59A §13.18.3.1 shall be available in the operating area and shall be updated as required by changes in equipment or procedures.

Regulations for LNG, §14.2131(a)

Each facility shall have a written manual of emergency procedures that shall include the types of emergencies that are anticipated from an operating malfunction, structural collapse of part of the facility, personnel error, forces of nature, and activities carried on adjacent to the facility, including the following:

(1) Procedures for responding to controllable emergencies, including notification of personnel and the use of equipment that is appropriate for handling of the emergency and the shutdown or isolation of various portions of the equipment and other applicable steps to ensure that the escape of gas or liquid is promptly cut off or reduced as much as possible

(2) Procedures for recognizing an uncontrollable emergency and for taking action to ensure that harm to the personnel at the facility and to the public is minimized

(3) Procedures for the prompt notification of the emergency to the appropriate local officials, including the possible need to evacuate persons from the vicinity of the facility

(4) Procedures for coordinating with local officials in the preparation of an emergency evacuation plan that sets forth the steps necessary to protect the public in the event of an emergency

NFPA 59A, §13.18.3.1

Portable or wheeled fire extinguishers shall be recommended for gas fires by their manufacturer.

NFPA 59A, §12.6.1

Handheld portable dry chemical extinguishers shall contain minimum nominal agent capacities of 20 lb. or greater and shall have a minimum 1 lb./sec agent discharge rate.

NFPA 59A, §12.6.1.3

For facility hazard areas where minimal class “A” fire hazards are present, the selection of potassium bicarbonate– based dry chemical extinguishers is recommended.

NFPA 59A, §12.6.1.4

Automotive vehicles assigned to the plant shall be provided with a minimum of one portable dry chemical extinguisher having a capacity of not less than 18 lb.

NFPA 59A, §12.6.4

Facility operators shall prepare and implement a maintenance program for all plant fire protection equipment.

NFPA 59A, §12.7

In addition to NFPA 59A §12.7, safety and fire protection equipment shall be visually inspected at least once a month and tested at least once a year. Documentation shall be maintained on inspections and tests for at least two years or consistent with other safety record retention schedules, whichever is greater.

Regulations for LNG, §14.2131(b)

Maintenance Manual

Each operating company shall have a documented plan that sets out inspection and maintenance program requirements for each component used in its LNG plant that is identified as requiring inspection and maintenance.

NFPA 59A, §14.7.1

The maintenance manual shall refer to maintenance procedures, including procedures for the safety of personnel and property while repairs are carried out, regardless of whether the equipment is in operation.

NFPA 59A, §14.7.4

The maintenance manual shall include the following for LNG plant components:

- (1) The manner of carrying out and the frequency of inspections and tests
- (2) A description of any other action, in addition to those referred to in 14.7.5, that is necessary to maintain the LNG plant in accordance with this standard
- (3) All procedures to be followed during repairs on a component that is operating while it is being repaired, to ensure the safety of persons and property at the LNG plant

NFPA 59A, §14.7.5

Sample Question 4

Hoses shall be inspected visually _____ for damage or defects.

- A. daily
- B. before each use
- C. after each use
- D. weekly

Answer on last page

LNG Transports

Registration and Transfer of LNG Transports

A person who operates a transport equipped with LNG cargo tanks or any container delivery unit, regardless of who owns the transport or unit, shall register the transport with AFS in the name or names under which the operator conducts business in Texas prior to the unit being used in LNG service.

- (1) To register a cargo tank unit previously unregistered in Texas, the operator of the unit shall:
- (A) pay to AFS the \$270 registration fee for each LNG transport;
 - (B) file a properly completed LNG Form 2007;
 - (C) file a copy of the manufacturer's data report;
 - (D) file a copy of the DOT compliance sheet; and
 - (E) file a copy of the test required by §14.2707 of this title (relating to Testing Requirements) unless that unit was manufactured within the previous five years.

Regulations for LNG, §14.2704(a)

When all registration or transfer requirements have been met, AFS shall issue LNG Form 2004 which shall be properly affixed in accordance with the placement instructions on the form. LNG Form 2004 shall authorize the licensee or ultimate consumer to whom it has been issued and no other person to operate such unit in the transportation of LNG and to fill the transport containers.

- (1) A person shall not operate an LNG transport in Texas unless the LNG Form 2004 has been properly affixed or unless its operation has been specifically approved by AFS.
- (2) A person shall not introduce LNG into a transport container unless that transport bears an LNG Form 2004 or unless specifically approved by AFS.
- (3) LNG Form 2004 shall not be transferable by the person to whom it has been issued, but shall be registered by any subsequent licensee or ultimate consumer prior to the unit being placed into LNG service.

Regulations for LNG, §14.2704(c)

DOT Requirements

(a) This subchapter applies to LNG transports as defined in this chapter used in the transportation and distribution of LNG.

(b) LNG transports shall comply with the requirements of DOT specification MC-338 and the applicable parts of Title 49, Code of Federal Regulations, Parts 171 – 180

Regulations for LNG, §14.2701

Testing Requirements

Transports required to be registered with AFS shall be tested at least once every five years by a Category 15, 20, or 50 licensee.

(1) Documentation of the required testing shall be filed by the Category 15, 20, or 50 licensee.

(2) The results of any test required under this section shall clearly indicate whether the transport container unit is safe for LNG service. The Category 15, 20, or 50 licensee shall send LNG Form 2008 to AFS within 30 calendar days of the due date of any tests required under this section.

(3) If evidence of any unsafe condition is discovered as a result of any tests performed under this section, the transport container unit shall be immediately removed from LNG service and shall not be returned to LNG service until AFS notifies the licensee in writing that the transport container unit may be returned to LNG service.

Regulations for LNG, §14.2707(a)

Containers shall be tested in accordance with 49 CFR §180.407.

Regulations for LNG, §14.2707(b)

Containers shall be inspected for corroded areas, dents, or other conditions (including leakage under test pressure) which could render the container unsafe for LNG service.

Regulations for LNG, §14.2707(c)

Marking

LNG transports shall be marked on each side and the rear with the name of the licensee or the ultimate consumer operating the unit.

Such lettering shall be legible and at least two inches in height and in sharp color contrast to the background. AFS will determine whether the name marked on the transport is sufficient to properly identify the operator.

Regulations for LNG, §14.2710

Pressure Gauge

Transport containers shall be equipped with a pressure gauge for LNG service which shall be maintained in good operating condition at all times. An isolation valve shall be installed between the container and the pressure gauge.

Regulations for LNG, §14.2713

Electrical Equipment and Lighting

LNG transports and container delivery units shall not be equipped with an artificial light other than electrical. Lighting circuits shall have suitable overcurrent protection (fuses or automatic circuit breakers). Wiring shall have sufficient current capacity and mechanical strength, and shall be secured, insulated, and protected against physical damage.

Regulations for LNG, §14.2719

Liquid Level Gauging Devices

Truck and trailer containers shall be equipped with a liquid level gauging device of approved design, such as a fixed tube device.

Fixed tube devices shall be arranged so that the maximum liquid level to which the container may be filled is set at the maximum permitted for the container based on an initial liquid temperature not to exceed 40 degrees Fahrenheit. An isolation valve shall be installed between the container and the liquid level gauging device.

Regulations for LNG, §14.2722

Extinguishers Required

Transport power units shall be equipped with at least one fire extinguisher having a UL rating of 10 B:C or more and shall be labeled or marked with that rating.

Regulations for LNG, §14.2728(a)

Fire extinguishers shall be fully charged, in good mechanical condition, and accessible for use. Fire extinguishers shall be mounted with a mounting bracket which will allow visual determination of being fully charged.

Regulations for LNG, §14.2728(b)

Manifests

Manifests or bills of lading shall be covered by permanent shipping papers authorized by the DOT.

Regulations for LNG, §14.2731

Transfer of LNG on Public Highways, Streets, or Alleys

Transferring LNG on public highways, streets, or alleys is prohibited except in an emergency or where the containers are on machinery being used for the construction or maintenance of such public highways, streets, or alleys.

Regulations for LNG, §14.2734

Parking of LNG Transports and Container Delivery Units and Use of Chock Blocks

LNG transport or container delivery units shall not be parked on any public street, highway, or alley, except in an emergency, or when in connection with normal duties, meals, or rest stops. Such units shall not be parked in a congested area and shall be parked a minimum distance of 50 feet from any building, except buildings devoted exclusively to LNG activities.

Regulations for LNG, §14.2737(a)

LNG transports shall carry at least two chock blocks designed to effectively prevent the movement of the transport. These blocks shall be used any time the transport is parked and during the transfer of fuel regardless of the level of the surrounding terrain.

Regulations for LNG, §14.2737(b)

Uniform Protection Standards

LNG transport units and container delivery units, including appurtenances, shall be maintained in a safe operating condition at all times.

Regulations for LNG, §14.2740(a)

Any transport unit or container delivery unit discovered to be in an unsafe condition while being operated on a public roadway may be continued in operation only to the nearest place where repairs can safely be made. Such operation shall be conducted only if it is less hazardous to the public than to permit the transport unit or container delivery unit to remain on the public roadway.

Regulations for LNG, §14.2740(b)

Delivery of Inspection Reports to Licensee

The transport driver of any transport unit receiving an inspection report from AFS shall deliver that report to the licensee in whose name the transport unit is registered.

Regulations for LNG, §14.2746

Sample Question 5

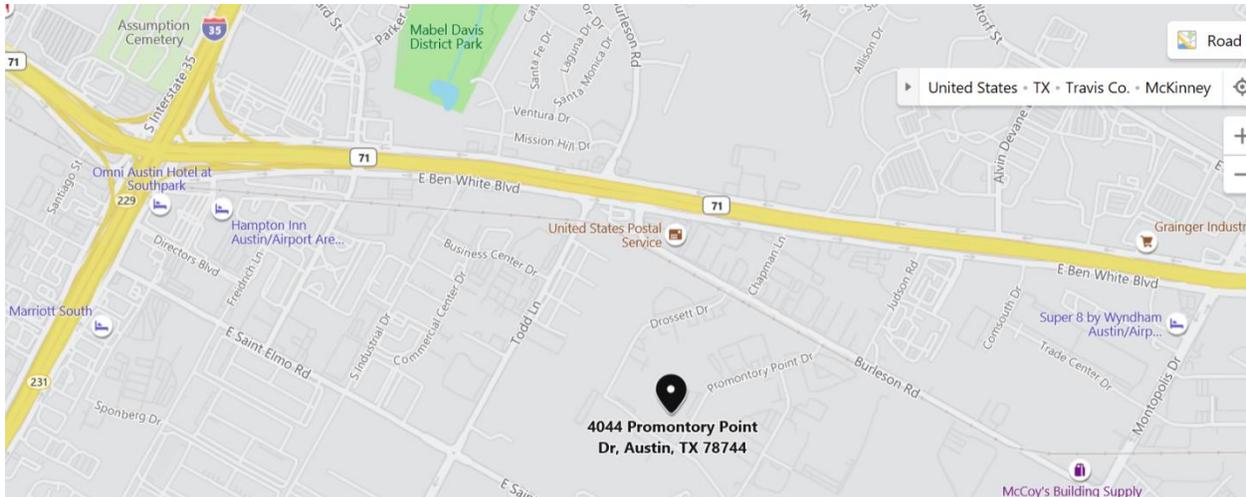
Manifests or bills of lading shall be covered by permanent shipping papers authorized by the _____.

- A. Texas Railroad Commission
- B. The American Society of Mechanical Engineers
- C. Department of Public Safety
- D. Department of Motor vehicles
- E. DOT

Answer on last page

ALTERNATIVE FUELS TRAINING CENTER

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Sample Question Answers

1. D
2. A
3. C
4. B
5. E