

DEPARTMENT OF TRANSPORTATION**Research and Special Programs Administration****49 CFR Parts 192 and 193**

[Amdts. 192-36 and 193-2; Docket OPSO-46]

Liquefied Natural Gas Facilities; Federal Safety Standards

AGENCY: Materials Transportation Bureau (MTB), DOT.

ACTION: Final rule.

SUMMARY: This final rule establishes new safety standards governing the operations, maintenance (including corrosion control), fire protection, personnel qualifications and training, and security of liquefied natural gas (LNG) facilities used in the transportation of gas by pipeline in or affecting interstate or foreign commerce. Present regulations are considered inadequate because they do not provide an acceptable level of safety.

EFFECTIVE DATES: In Part 192 the provisions of § 192.12 applicable to design, installation, construction, initial inspection, and initial testing are revoked effective March 15, 1980, and the remaining provisions are revoked effective when corresponding provisions take effect under Part 193 as set forth below. In Part 193, the amendments to §§ 193.2005 and 193.2007 and the addition of §§ 193.2304 and 193.2431(c) become effective November 24, 1980. To allow an appropriate time to conduct required studies and analyses, prepare plans and procedures, and train and test personnel, the new rules for operations, maintenance, personnel qualifications and training, fire protection, and security (including § 193.2017) become effective July 23, 1980, except that the following sections, which may require a longer period for the purchase and installation of new equipment or material do not become effective until January 1, 1982: §§ 193.2511, 193.2519, 193.2817, 193.2819, 193.2821, 193.2905, 193.2907, 193.2909, 193.2911 and 193.2915.

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SUPPLEMENTARY INFORMATION:**Background**

On January 30, 1980, MTB issued a notice of proposed rulemaking (Notice 5; Docket OPSO-46) (NPRM) for the addition of new Federal safety standards to 49 CFR Part 193 governing the operation, maintenance, fire protection and security of LNG facilities

(45 FR 9220, February 11, 1980). The NPRM was preceded by an advance notice of proposed rulemaking (42 FR 20776, April 21, 1977), and based, in part, on the 1975 edition of the National Fire Protection Association standards, NFPA 59A "Storage and Handling Liquefied Natural Gas". The NPRM was issued under authority of the Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1671 et seq.), as amended by the Pipeline Safety Act of 1979 (Pub. L. 96-129, November 30, 1979) (hereafter, "the Act") which specifically requires that new standards be established.

Interested persons were given until May 9, 1980, to comment on the proposed rules; and 69 different persons submitted comments, primarily LNG facility operators and their trade associations but also State and Federal agencies, non-industry and industry related organizations, and individuals.

In accordance with section 4 of the Act, the Technical Pipeline Safety Standards Committee (TPSSC) met in Washington, D.C., on June 17-20, 1980, to review the technical feasibility, reasonableness, and practicability of the regulations proposed in the NPRM. The Committee's report is available in the docket and may be obtained by writing to the Docket Branch, Materials Transportation Bureau, 400 Seventh Street, S.W., Washington, D.C. 20590. Where MTB has not adopted the views of the TPSSC, an explanation is provided below regarding the section concerned.

Since the NPRM was issued, both the National Transportation Safety Board (NTSB) and the House Subcommittee on Energy and Power have made recommendations as a result of their investigations of the explosion and fire, killing one person and injuring another with an estimated \$3 million cost, at the Cove Point, Maryland LNG receiving terminal. MTB considered the NTSB report, dated April 16, 1980 (NTSB Par-80-2) and the House Subcommittee Report, dated May, 1980 (Committee Print 96-IFC 46) as relevant information in the development of the final rules.

Waterfront Facilities

Concurrent with this proceeding the United States Coast Guard (USCG) is developing regulations for the storage and handling of hazardous materials, including LNG, at waterfront facilities. In conjunction with this effort, MTB has coordinated these final rules with the USCG to avoid any problems of possible inconsistent regulatory approach.

This coordination was carried out under the Memorandum of Understanding (MOU) between MTB and the USCG on the regulation of

waterfront LNG facilities (see Notice 4; 44 FR 8146). Under this MOU and these final rules, fire protection and security at waterfront LNG facilities are subject to USCG rather than MTB jurisdiction. This policy is reflected in the sections setting forth the scopes of Subparts I and J.

The comments to Notice 5 generally did not disagree with the wording of the proposed definition of "waterfront LNG facility" (45 FR 9222). It, therefore, is adopted as final in § 193.2007, but changed to use the term "LNG plant".

Definition of "Component"

A number of commenters argued that the term "component" is not defined clearly enough under § 193.2007 to convey the intended meaning of the term, and misunderstandings or economic impracticabilities could result in applying the new standards. These commenters argued that as currently defined "component" could include virtually every piece of equipment at an LNG plant, regardless of significance, and even parts of that equipment, such as a seal.

Under § 193.2007, the definition of "LNG facility" matches the definition of this term in the Pipeline Safety Act of 1979, and speaks of "pipeline facilities" that are used for LNG purposes. In a similar fashion, the definition of "component" is intended to carve out from the full range of facilities called "LNG facilities" those facilities that provide safety. Thus, where the term is used in a substantive requirement of Part 193, that requirement applies only to facilities of an LNG plant that are safety-related, or whose failure to function as designed could result in a danger to the public or plant personnel. In light of the comments, that this intended meaning be expressed more clearly, the term "component" is redefined to mean "any part, or system of parts functioning as a unit, including, but not limited to, piping, processing equipment, containers, control devices, inpounding systems, lighting, security devices, fire control equipment, and communication equipment, whose integrity of reliability is necessary to maintain safety in controlling, processing, or containing a hazardous fluid."

Under this new definition, an individual part, such as a gasket, of a piece of equipment would not be a component, because the equipment is considered as a whole. A lamp post would not be a component; but an entire lighting unit would be if its integrity or reliability is necessary for safety in providing for control, processing, or containment of a hazardous fluid. A

protective enclosure erected under Subpart J for security purposes would be a component, since its integrity is essential to plant safety. A fire hydrant would be a component, since it used to provide for safe handling of flammable fluids.

As a result of this change, it is unnecessary to qualify the term "component," where it is used in the new standards, by such phrases as "whole malfunction would cause a hazardous condition". Qualifying phrases like this one were recommended by many commenters and TPSSC where they considered it appropriate to limit the scope of a proposed standard related to components.

Size of Facilities

The NPRM asked that interested persons tell MTB where different standards might be appropriate because of LNG facility size or extent of operation and its associated risk (45 FR 9222). In consideration of the arguments received on this topic, a few of the final rules (e.g., § 193.2817(b)(2)) do not apply to plants below certain amounts of storage capacity.

Standards Affecting Design

At least two industry commenters asserted that retroactive application to an existing LNG facility of standards affecting design or construction is restricted by section 6(c) of the Act, and that many of the proposed standards contravene that mandate.

MTB concedes that both proposed and final standards, primarily in the areas of fire protection and security, could, depending on the condition of an existing plant, require design modifications or new construction for compliance. We do not agree, however, that application of these standards to existing plants is forbidden by the Act as asserted by the commenters. While section 6 of the Act restricts the application of design and construction standards to new facilities or certain replacements at existing facilities, this restriction applies to new standards for the design or construction of facilities like containers, piping, and control systems that are used directly in the processing and handling of LNG. The restriction does not apply to facilities that are needed to assure adequate fire protection capabilities, security, or safe operations at an existing plant. This distinction is made evident by section 6(d)(3) of the Act, which specifically requires that the Secretary, in prescribing general safety standards for the operation and maintenance of "any LNG facility" (which includes existing facilities), consider the condition and

type of equipment used, fire prevention and containment equipment, security measures to prevent sabotage, and other factors relating to safe handling of LNG. Since new or modified equipment may be needed to carry out the full intent of this section of the Act that safe operation and adequate fire protection and security be assured at existing plants, section 6(c) cannot be broadly construed, as the commenters have, so as to limit the authority granted over these matters by section 6(b) and section 6(d) of the Act.

Notwithstanding the issue of whether certain operation and maintenance standards that affect design and construction are legally authorized, MTB has recognized the need in many instances for an appropriate lead time for compliance with these standards. In this regard, the effective dates are extended until January 1, 1982, as provided above under the Effective Dates heading.

Safety Analysis

In its comment to the NPRM, NTSB argues that the final rules should contain "an explicit requirement for the use of safety analysis techniques * * * to reduce to a minimum the risk of remaining system hazards". NTSB also made similar recommendations in its report on the Cove Point, Maryland incident.

NTSB concedes in its comment that many of the proposed standards would, in effect, require the use of safety analysis techniques in order to meet the objectives of the standards. For example, in developing operating and emergency procedures. An operator must foresee potential hazards and be able to eliminate or control them. Likewise, under Subpart I, an operator must predict the types and sizes of fires and the places they may occur and plan steps to avoid or control fires. Nevertheless, NTSB states these requirements may not be effective unless operators are also required to use "applicable safety analysis techniques," the results of which would be available to MTB in assessing the acceptability of procedures and plans that are formulated. NTSB seems to say, therefore, that some additional benefits could be obtained if the final rules were to identify the required efforts as "safety analyses" and if the level of sophistication of the analysis were spelled out.

MTB presented this issue before the TPSSC at its meeting in June. While no formal recommendations were made, the discussion brought out the points that safety analyses are advantageous and done as a normal part of design as

well as planning for emergency preparedness. It could also be concluded from the discussion that regardless of the type of analysis performed, anything less sophisticated than that done for airplane or space vehicle design probably would not identify all potential safety problems at a plant.

In view of this discussion, the safety history of LNG facilities, and the lack of consensus and opportunity for public participation on the methods that should be used in an analysis, MTB has decided not to specify in the final rules the types or levels of analyses that must be performed by operators in preparing the required plans and procedures. This does not mean the issue is closed, however. As MTB gains more information about the reliability of analysis techniques used to comply with Part 193 through its field review of studies, plans, and procedures that operators are required to prepare, it will be better able to judge the merits of different approaches, with a view toward standardization if warranted.

49 CFR 192.12

Before new standards for the siting, design, and construction of LNG facilities were published in Part 193 last February 11, the only MTB standards for LNG facilities were prescribed by 49 CFR 192.12. Section 192.12 references NFPA 59A (1972 edition) and other requirements of Part 192 for the siting, design, construction, operation and maintenance of LNG facilities. The newly issued standards in Part 193 superseded the related standards of section 192.12 for the siting, design, and construction of LNG facilities that were not under construction before February 11, 1980, except facilities for which an application was filed before March 1, 1978, as described in section 193.2005(a)(2). The excepted facilities are defined by the Act as "existing LNG facilities". In accordance with the Act, siting, design and construction standards issued after March 1, 1978, may not be applied to existing LNG facilities (subject to the exceptions provided by section 193.2005(b)). Therefore, the siting, design, and construction of existing LNG facilities not under construction before February 11, 1980. Are governed by the applicable standards of section 192.12 not including applicable standards issued in Part 192 after March 1, 1978.

The application of Part 192 standards to existing LNG facilities is now provided in Part 193 by section 193.2005(c). This provision is modified by this document to conform with statutory intent and to permit the alternative of compliance with Part 193.

Without this alternative, facilities not under construction before February 11, 1980, might be forced in some instances to comply with outmoded 1972 NFPA 59A standards. Existing LNG facilities that are subject to the 1972 edition of NFPA 59 referenced in section 192.12 are those that were not under construction before July 1, 1976, the date the 1972 edition became effective under Part 192.

When standards for the operation and maintenance of LNG facilities take effect under Part 193 as provided above in this final rulemaking document, they will supersede standards for those subjects under 49 CFR 192.12. As a result, section 192.12 will thereafter be beneficial only as an historical reference to applicable standards and as current standards for siting, design, and construction of certain existing LNG facilities as discussed above. Since the application of Part 192 standards to existing LNG facilities is provided by section 193.2005(c) and since standards without current effect are normally not codified for historical purposes, 49 CFR 192.12 is revoked by this document, effective coincidentally with the effective dates of the final rules.

The following table shows the relation between section numbers in the January 30, 1980, NPRM and the section numbers in this final rule. Some of the section titles have been changed.

<i>Final rule</i>	<i>NPRM</i>
193.2017
193.2304	193.1405
193.2431(c)	193.1310(g)
193.2501	193.1101
193.2503	193.1105
193.2505	193.1106
193.2507	193.1107
193.2509	193.1109
193.2511	193.1111
193.2513	193.1117
193.2515	193.1121
193.2517	193.1139
193.2519	193.1140
193.2521	193.1141
193.2601	193.1201
193.2603	193.1203
193.2605	193.1205
193.2607	193.1206
193.2609	193.1206a
193.2611	193.1207
193.2613	193.1208
193.2615	193.1209
193.2617	193.1211
193.2619	193.1215
193.2621	193.1217
193.2623	193.1219
193.2625	193.1402
193.2627	193.1407
193.2629	193.1409
193.2631	193.1411
193.2633	193.1415
193.2635	193.1419
193.2637	193.1421
193.2639	193.1423, 193.1221
193.2707	193.1103, 193.1403
193.2709	193.1124a
193.2711	193.1113
193.2713	193.1115
193.2715	193.1124
193.2717	193.1311
193.2719	193.1313

<i>Final rule</i>	<i>NPRM</i>
193.2801	193.1301
193.2803	193.1303
193.2805	193.1305
193.2807	193.1306
193.2809	193.1306a
193.2811	193.1306b
193.2813	193.1306c
193.2815	193.1306d
193.2817	193.1308
193.2819	193.1310
193.2821	193.1310a
193.2901
193.2903	193.1123
193.2905	193.1125
193.2907	193.1127
193.2909	193.1130
193.2911	193.1131
193.2913	193.1133
193.2915	193.1134
193.2917	193.1135

Sectional Analysis

The following portion of this preamble discusses the significant comments to the NPRM and their disposition in development of the final rules.

Plans and Procedures—Amendment of Subpart A (§ 193.2017)

In various sections of the NPRM, MTB proposed that procedures and revisions thereof be filed with the Director or the State Agency having jurisdiction. Under the NPRM, the Director or State Agency would also have been permitted to amend procedures that did not assure safety. As these proposed requirements were repetitive in many sections, MTB feels it is better to have one section covering this matter in Subpart A of Part 193, applicable as appropriate throughout the entire Part. Thus, a new § 193.2017 is added for that purpose. Filing is not required by the final rule for consistency with section 105 of the Act. Also, to provide for procedural safeguards, the Director or State agency must give notice and provide an opportunity for hearing before requiring any changes to plans or procedures.

Subpart F—Operations

Operating Procedures

Many commenters objected to the term "manual" in § 193.2503 and wherever a manual of written procedures was proposed in the NPRM. The commenters assumed that one bound volume would be required, and that a "cook-book" approach would have to be used, whereby personnel would have to have a manual with them open to the correct page to carry out their operational activities. This was not MTB's intent. However, to dispel the one-volume concept, in § 193.2503 and elsewhere MTB has modified the wording to read "one or more manuals". MTB would accept any number of pertinent documents such as pamphlets, instruction books, files of relevant materials and any other materials

relating to operating procedures which individually or collectively are arranged in manual form. Personnel, in their training, would become familiar with and follow the precepts of those items in any manual of procedures related to their assigned functions, but they would not have to carry such material with them.

As proposed under § 193.2503, operators were to follow a manual of written procedures to "assure safety * * *." MTB accepts the suggestion that "provide" is a more appropriate word than "assure," for the latter implies a guarantee which the operator could not be expected to meet. A similar change has been made elsewhere in Part 193 where the intent is the same.

In response to additional comments to § 193.2503:

- § 193.2503(c) now requires procedures for recognition of abnormal operating conditions in general, rather than the specific ones listed in the NPRM.

- § 193.2503(e) has been rewritten to better express the intent, which is to control factors involved so that the resultant gas is within limits established for the vaporizer and the downstream piping.

- NPRM § 193.1105 (b), and (c) and have been deleted as they now appear in § 193.2017 in revised form.

Cooldown

Section 193.2505 has been revised to reflect MTB's agreement that cooldown is normally achieved in systems of components, rather than in individual components. MTB also agrees that the proposed requirement to inspect flange gaskets and seals after cooldown is physically impossible. Therefore, § 193.2505(b) now requires operators to check for leakage in the areas of flanges and seals, as well as valves.

Monitoring Operations

Comments on § 193.2507 pointed out that certain sensing, warning, and control devices are used only periodically for certain functions, and that continuous monitoring of such devices should not be required. MTB agrees, and has deleted the term "continuously" in § 193.2507. In accordance with § 193.2503(a), the details of monitoring would have to be included in the operating procedures.

Comments to § 193.2507 also questioned the intent of requiring components to be monitored from a control center. It was felt that the term "control center" implied the necessity to monitor all individual components equipped with sensing, warning, and control devices from a central location,

even when such devices for a component are located at the component site. This was not exactly MTB's intent, which was to provide for monitoring from an attended location. However, the term "control center" is being retained in the final rule, with the understanding that control stations at component sites are to be considered "control centers" for the purpose of complying with the § 193.2507 monitoring requirement.

It was proposed that components and buildings not monitored from a control center be monitored by a daily inspection or test. Commenters reasoned that daily testing or inspection would be onerous and may be "overkill" or "underkill," depending on the characteristics of an individual component or building. MTB agrees, and has modified § 193.2507 to permit operators to establish the testing or inspection intervals, which must be specified in the operating procedures. The proposal for direct observation of startups, shutdowns, and transfer operations has been deleted in recognition that many components operate automatically to maintain preset conditions and the safety of startups, shutdowns and transfers as provided for by procedures under Subpart F.

Emergency Procedures

Several comments to § 193.2509 objected to including structural collapse and personnel error as factors in determining the types and places of emergencies that may reasonably be expected to occur at an LNG facility. These terms are retained in paragraph (a) of the final rule because the standard of "may reasonably be expected to occur" qualifies the paragraph adequately so as not to create any hardship to the operator. Also, in paragraph (a) as well as elsewhere in this Part, the term LNG plant replaces the term LNG facility, where the broader context is intended.

In response to the majority of the comments on § 193.2509(b)(2), MTB has deleted the reference to "early notification of local law enforcement officials" and inserted in its place "prompt notification of appropriate local officials." This change is warranted given the involvement of more than just law enforcement personnel in responding to emergencies at an LNG plant. The word "prompt" replaces "early" to convey better the intent that notice be given quickly after an emergency becomes uncontrollable.

As proposed, § 193.2509(b)(3) would have required operators to prepare an emergency evacuation plan, setting forth the steps required to protect the public in the event of a catastrophic failure of

an LNG tank. Commenters expressed concern over the operator's ability to prepare such a plan without having the authority to unilaterally mandate that evacuation measures be taken. The final rule responds to that concern by requiring preparation of the plan in coordination with appropriate local authorities. Such coordination will assure that planned evacuation measures will be called for and taken.

NPRM §§ 193.1109 (c), (d) and (e) have been deleted from § 193.2509, as they now appear in § 193.2017 in revised form.

Personnel Safety

As suggested by TPSSC and other commenters, in § 193.2511 paragraph (a) is revised to require that the operator only provide any "special" clothing and equipment needed for emergency response, as the NPRM could have been interpreted to cover clothing and equipment needed to prevent injury during normal duties, a result MTB did not intend. Also, MTB agrees that the proposed term "shelter" used in § 193.1111(b) of the NPRM with respect to providing thermal radiation protection was too restrictive. It has been replaced in § 193.2511 by "means of protection" or "a means of escape," which would permit other options.

This is the first of nine O & M sections identified by the Draft Evaluation on the NPRM as having a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to NFPA 59A (1975 edition), the former baseline, were respectively \$3.417 and \$4.081 million. These costs were due primarily to separate shelters required for the protection of plant personnel from potential thermal radiation.

The final rule permits water screens and other alternatives to brick or block structures contemplated in the NPRM. This flexibility is estimated to reduce corresponding estimated costs under the final rule to \$1.24 and \$1.50 million.

The new baseline, NFPA 59A (1979 edition), is modified, providing greater specificity in certain areas, but shelters or alternative measures are not required. Estimated costs are therefore unaffected. Accordingly, the preceding costs also apply to the final rule when compared to the new baseline.

NPRM § 193.1113, Personnel Performance, and § 193.1115, Personnel Training, now appear in Subpart H as §§ 193.2711 and 193.2713, respectively.

Transfer Procedures

Section 193.2513(b)(2) requires each operator to verify that a tank vehicle does not contain any substance that

would be incompatible with the incoming fluid. Commenters questioned how verification could be accomplished regarding fluid compatibility in a vehicle not owned by the operator. In response, MTB expects that operators would check with the tank vehicle driver, examine the bill of lading or vehicle log, or ask the vehicle owner to tell what commodity had been previously carried. For clarification of the meaning of "stratification" in the NPRM, (b)(4) has been modified to state "to prevent rollover due to stratification."

There were some objections to the proposed § 193.1117(c)(2) which would have required positioning of a tank truck so that it need not exit the transfer area by backing after transfer has been completed. The objections focused on the need to rebuild facilities not designed for use without backing out. This proposal was based on a similar requirement that appears in paragraph 8-7.2.5 in NFPA 59A-1979; however, the change to § 193.2513(c)(2) discussed below should alleviate any safety problems posed by backing, and § 193.1117(c)(2) has thus been deleted.

Section 193.2513(c)(2) (§ 193.1117(c)(3) in the NPRM) has been revised to permit backing in the transfer area, provided a person is positioned at the rear of the truck giving instructions to the driver. Comments on this section convinced MTB that this arrangement provides for safe truck backing.

NPRM §§ 193.1117 (a), (e), and (f) have been deleted, as they now appear in § 193.2017 in revised form.

Accident Investigation

MTB agrees with commenters and TPSSC that "investigate" is more fitting than "determine" in § 193.2515(a), for in many cases, the cause of an accident may not be determinable. In paragraph (a), MTB has also adopted the commenter's and TPSSC's suggestion that the scope of accidents to be investigated be limited to ones involving explosion, fire or LNG spill or leak. The wide range of accidents proposed to be investigated, when combined with the threshold \$10,000 value, would have resulted in many investigations outside the realm of those necessary to provide for safe operations.

Section 193.2515(b) has been revised to delete the proposed reporting requirement. MTB intends such reporting to be the subject of future rulemaking. Instead, a record of the investigation must be kept under § 193.2521.

Section 193.2515(c) now recognizes there may be occasions where a component involved in an incident may have to be moved when necessary to

restore service or for safety purposes before approval from the Director or State Agency may be obtained. However, the component may not be removed from the plant site until the investigation is complete or the investigating agency otherwise provides.

This is the second of nine O & M sections estimated by the Draft Evaluation to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to NFPA 59A (1975 edition), the former baseline, which has no comparable requirement, were respectively \$4.495 and \$5.384 million. These costs were due primarily to retainer fees and service charges for engineering consultants to make the required investigation, and for personnel time dedicated to reporting.

Under the final rule, substantive changes reducing the extent of investigations and eliminating most reporting requirements, reduce corresponding estimated costs to \$1.25 and \$1.52 million. These costs also apply to a comparison with the new baseline, NFPA 59A (1979 edition), which like the former baseline, has no comparable requirement.

Purging

MTB recognizes that purging may not always be necessary when components are taken out of service or before being returned to service as originally proposed. Thus under § 193.2517, purging is required only "when necessary for safety." MTB expects that the operating procedures developed under § 193.2503(d) will give guidance as to when purging is necessary. Likewise, as elsewhere in this Part, purging must be in accordance with a procedure which meets the provisions of AGA "Purging Principles and Practice," and the procedure must be specifically developed to fit the system being purged. Commenters pointed out that the AGA document does not by itself contain the steps necessary for purging.

Communication

Section 193.2519(b) has been revised to require emergency communication systems for LNG plants having in excess of 70,000 gallons storage capacity. Verbal communications would be adequate to deal with emergencies in smaller plants.

Many commenters objected to the requirement proposed in § 193.1140(c) for an auxiliary source of power for each communication system, specifically with regard to sound powered or battery powered equipment. MTB has exempted sound powered equipment, but feels a plant should have spare (new or

recharged) batteries on hand as replacements, and this would be considered as meeting the requirements of this paragraph.

Operating Records

Section 193.2521 now only requires a record of the results of each inspection, test, and investigation required by the subpart. The proposal to keep a record of each abnormal operation was deleted as overly broad, and MTB intends to cover the subject of collecting information on abnormal operations in future rulemaking.

Notice of Intent To Operate

NPRM § 193.1143 has been deleted from the final rule. MTB agrees with commenters and TPSSC that adequate notice of intent to operate a new LNG facility is available when an operator files applications to construct or operate with appropriate Federal and State agencies. Also, the proposal would have been too burdensome with regard to components replaced due to normal wear and tear. As stated earlier, MTB will consider in future rulemaking the need to gather information about components replaced because of malfunctions or failure.

Subpart G—Maintenance

Subpart G of the final rules covers general requirements for maintaining components at LNG plants (appearing in the NPRM as Subpart M) and requirements for corrosion control, which were proposed as Subpart O of the NPRM. This combination is a result of the coordination between MTB and USCG in developing a common numbering system.

General

In § 193.2603, paragraph (c) has been revised to require that when a component is taken out of service, it must be identified in the maintenance records kept under § 193.2639. The final rule refers to records rather than a "log book" as proposed, because as further discussed under § 193.2639, MTB recognizes that records may be kept in other ways than a log book. There were comments that only major maintenance should be recorded, because, otherwise, the requirement would hinder routine maintenance. Such comments show a misunderstanding of the intent of § 193.2603(c). This requirement serves to notify that a component is not "in service," or ready for use. It is not intended to provide a record of maintenance work performed on a component, which must be provided under § 193.2639. Thus, the word "maintenance" is not used in the final

rule. With the information provided by recording components taken out of service, it should be clear which ones are in service, and thus subject to the maintenance standards of Subpart G.

Section 193.2603(e) now only requires tagging if operation of a component taken out of service could cause a hazardous condition rather than tagging if such a component could be "inadvertently operated." This change was made to avoid having to tag components whose inadvertent operation would not cause a hazard.

Maintenance Procedures

In § 193.2605, paragraph (b) is changed to incorporate corrosion control procedures, proposed in § 193.1403(a), as further discussed hereafter. Paragraphs (c), (d), and (e) in the NPRM have been included in § 193.2017.

Foreign Material

Section 193.2607(a) has been modified so that the presence of foreign material, contaminants, or ice need only be controlled to maintain the operational safety of each component. MTB agrees with TPSSC and other comments that the presence of foreign materials may be an inherent problem in the operation of some components, but that operational safety can be provided by monitoring and removal of such materials. Under § 193.2605(b), the maintenance procedures would have to describe steps needed to provide operational safety. Section 193.2607(b) has been reworded in terms of LNG plant rather than LNG facility to better express the intent.

Fire Protection

The general and referenced maintenance standards proposed under § 193.1207 (a) and (b) of the NPRM are deleted in the final rule and replaced by references in Subpart I to the maintenance requirements of NFPA 59A. The 59A document provides a comprehensive set of requirements for the various types of equipment and detection systems in use for fire protection. MTB agrees with the industry comments presented at the TPSSC meeting that "all" fire control equipment has to be taken out of service for maintenance periodically. In this regard, § 193.2611(a) does not prohibit such action, but would prevent an operator from taking a large amount of fire control equipment out of service at one time and from leaving equipment out of service for an inordinate period.

Section 193.2611(b) is changed to require that routes "within the LNG plant" for use by fire control vehicles or portable equipment must be maintained

to "reasonably" provide for use in all weather conditions. Under a strict interpretation of the proposal, operators would have been required absolutely to maintain access over all routes, including public roads, under even the most extreme conditions. The final rule is consistent with § 198.2068(c) in regard to access in flood conditions.

Auxiliary Power Sources

TPSSC and many commenters objected to the proposed monthly tests for capacity under § 193.1208, because shutdown of facilities may be necessary to carry out the test. The purpose of the proposed test is to assure adequate capacity if any additional load from new equipment is added. Because adequacy of capacity would normally be considered in design and tests as frequently as proposed, could present operating difficulties, the final § 193.2613 only requires capacity tests annually.

Some commenters argued that requiring the test under § 193.2613 to account for power needed to "start up and simultaneously operate equipment" could cause a tremendous starting load, beyond the capacity of the auxiliary power source. These comments indicate some confusion, as it was not MTB's intent to require a test based on simultaneous starting. Under the final rule, start up could be properly sequenced, but once equipment to be served by an auxiliary power source in an emergency is online, it must be simultaneously operated during the test.

Purging

The TPSSC and commenters pointed out that certain maintenance activities could be carried out safely on isolated components without purging. MTB agrees that an absolute requirement to purge would not be appropriate for all cases, and § 193.2615 has been revised to not require purging when the operator's maintenance procedures provide that it is not necessary for safety. The term "or double block and bleed valving" has been added as an example of a protective measure that must be taken if an ignition source is present.

Repairs

The typographical error in § 198.2617, was corrected by changing "Subpart K" to "Subpart D" in paragraph (a)(1).

Control Systems

In § 193.2619, paragraph (a) has been reworded to clarify that a control system need only be able to operate "within design limits" instead of "as designed," which was the proposed standard. Commenters argued that the

proposed wording was too rigid to serve as a minimum standard of acceptable maintenance.

Despite TPSSC objections that § 193.2619(b) is superfluous, it is retained in the final rule because of the need to assure operational capability of controls that may have been adversely affected during a service outage.

Some commenters objected to the proposed requirement under § 198.1215(e) that the reseating pressure of relief valves be tested, arguing that such a test is impractical and not useful. MTB agrees that an exact reseating pressure is not as important a safety concern as knowing that the valve will reseal and will not leak in the closed position. Thus, in view of the difficulties, the test to determine reseating pressure is deleted in the final rule under paragraph (e).

This is the third of nine sections estimated by the Draft Evaluation to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to NFPA 59A (1975 edition), the former baseline, which has no comparable requirement, were respectively \$3.360 and \$4.370 million.

In the final rule, modifications clarifying that a control must be tested only for its design application range rather than its maximum design capability will not alter these costs, since this intent was recognized in preparing the Draft Evaluation.

The new baseline, NFPA 59A (1979 edition), also lacks a counterpart to this requirement. Accordingly, the given estimated incremental costs for the final rule are unchanged from \$3.63 and \$4.37 million respectively for the minimum and maximum number of facilities.

Inspecting Storage Tanks

Section 193.2623 has been revised extensively in response to comments that many of the proposed requirements, such as means of conducting inspections, were too specific and in some cases would only be applicable to certain designs of LNG storage tanks. The section is now more performance oriented, and together with § 193.2605, makes the operator responsible for conducting appropriate inspections or tests to assure the listed conditions do not impair the structural integrity of the tank. The proposed inspection to check the condition of stratification has been deleted, for the problem is covered better by proper operation than by inspection (e.g., § 193.2513(b)(4)). The condition identified in the NPRM as "cold spots" has been changed to "inner tank leakage," for although internal leakage would be indicated on the outer

shell of most above ground metal tanks, this would not necessarily be so for all types of tanks and impoundment designs.

This is the fourth of nine sections estimated by the Draft Evaluation to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to NFPA 59A (1975 edition), the former baseline, which has no comparable requirement, were respectively \$7.260 and \$8.739 million. The new baseline NFPA 59A (1979 edition) also lacks a counterpart of this requirement.

Under the final rule, inspection requirements for stratification, the most costly single inspection function, has been eliminated. Also, specific intervals for the inspections are no longer prescribed and the rule is set forth in performance language. These changes are estimated to reduce the incremental costs to \$1.91 and \$2.29 million respectively for the minimum and maximum number of facilities.

Corrosion (Subpart O in the NPRM)

The NPRM sections covering corrosion have been rearranged in the final rules to provide a better sequence. The proposed § 193.1403(b) is moved to Subpart H (§ 193.2707(c)), for it relates to qualifications of corrosion control personnel. The proposed § 193.1405, Corrosion control overview, has been relocated in Subpart D, since it deals more with construction than maintenance. Although there were several suggested changes to § 193.1405, in regard to the types of metallic components that need corrosion control, MTB believes the revised definition of "component" takes care of the problems raised. The proposed § 193.1403(a), Procedures, is deleted in the final rules, because procedures for corrosion control would now have to be followed under the requirements of § 193.2605, Maintenance procedures.

Corrosion Protection, (Previously "General")

Section 193.2625 has been revised in response to comments and TPSSC views that a method for corrosion control be permitted as an alternative to the protective methods proposed in the NPRM. Commenters argued that the use of corrosion control systems as proposed would be impractical or prohibitively expensive for many existing plants. MTB agrees that an alternative of regularly scheduled inspection and replacement under established procedures would provide an acceptable corrosion control alternative. This alternative is set forth in § 193.2625(b)(2).

External Corrosion Control

Commenters suggested that § 193.2629(a)(2)(ii) permit up to three years for an operator to cathodically protect existing components. They argued a similar time period was allowed under Part 192 for operators to bring their pipeline systems into compliance with the cathodic protection requirements. MTB believes 1 year is adequate to prepare for compliance in view of the number and location of components requiring cathodic protection in an LNG plant, as compared with entire transmission or distribution piping systems subject to Part 192.

Monitoring Corrosion Control

The ad hoc industry group participating at the TPSSC meeting recommended that § 193.2635(e) not require monitoring for internal corrosion inside components that are protected from internal corrosion by a material that is proven to be corrosion resistant over the component's life (as permitted under § 193.2631(a)). The group argued that periodic monitoring would require undesirable opening of systems, exposing them to the atmosphere or contaminants; and there would be substantial construction costs for existing plants to provide access points for installation and periodic removal of monitoring devices. After considering this argument, MTB believes that it would be redundant and counterproductive to monitor the performance of corrosion resistant materials that have historically or otherwise been proven to handle corrosive fluids without adverse consequences due to corrosion. Therefore, § 193.2635(e) is changed in the final rule by excepting proven corrosion resistant materials from the requirement to monitor the performance of internal corrosion control techniques. For the exception to apply, an operator need only be able to demonstrate that the material will control corrosion by the fluid involved to the extent that the component's integrity or reliability will not be adversely affected over its service life.

There was considerable discussion at the TPSSC meeting over the need to monitor internal corrosion control inside a component operating at cryogenic temperatures. MTB agrees with the TPSSC view that corrosion does not occur at cryogenic temperatures or where the metal is continually in contact with liquid LNG or LNG vapors. At extremely low temperatures, the chemical reaction necessary to cause corrosion does not occur. In view of this fact, the monitoring requirements of

§ 193.2635(e) do not apply to components operating at cryogenic temperatures, because corrosion control would not be required by § 193.2625; and therefore, the proposed frequency for monitoring cryogenic systems is deleted in the final rule. Parts of such a component that are not continually at cryogenic temperatures may, however, have to be protected against corrosion and thus monitored under § 193.2635, depending on the findings made under § 193.2625 regarding the effects to corrosion on those parts and the overall effect on the component.

MTB recognizes that cryogenic components in service but infrequently operated at cryogenic temperatures or out of service for lengthy periods may be subject to corrosion. Such components would have to be protected only if the findings under § 193.2625 indicate that adverse consequences from corrosion may occur.

This is the fifth of nine sections estimated by the Draft Evaluation to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to Section 68 in NFPA 59A (1975 edition) the related baseline standard, were respectively \$19,208 and \$20,924 million, the most costly of the nine sections. The new baseline Section 6-9 in NFPA 59A (1979 edition) has the same basic requirements as its predecessor.

These costs largely derive from installation and monitoring of test coupons and probes in LNG storage tanks and other cryogenic equipment, erroneously interpreted by the Draft Evaluation to be required by the NPRM. Clarifications in the final rule eliminate the potential for misinterpretation in this respect, and thereby the corresponding excessive cost for monitoring of most common LNG tanks and certain other cryogenic equipment. Accordingly, the estimated incremental costs are reduced to \$1.30 and \$1.42 million respectively.

Maintenance Records

In § 193.2639, the word "records" is used instead of "log," for MTB, recognizes that there are several other techniques that can be used rather than keeping a log. Such records could be kept at a central maintenance office, covering a number of facilities in the LNG plant. This section now includes the corrosion recordkeeping proposed under § 193.1423.

As elsewhere in this part, the proposed reporting requirements of § 193.1423(a) have been deleted in the final rules. As previously indicated, future rulemaking will consider the need for such reports.

This is the sixth of nine sections estimated by the Draft Evaluation to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to Section 68 in NFPA 59A (1975 edition) the related baseline standard, were respectively \$3.216 and \$3.839 million. The new baseline, Section 6-9 in NFPA 59A has the same basic requirements as its predecessor.

Requirements under the NACE standard referenced in the NFPA 59A baseline, which sets forth record keeping provisions that are more extensive than those provided in either the NPRM or the final rules, were not considered in developing costs for the Draft Evaluation. Recognizing that detailed corrosion records are required in the baseline (both editions) and that reporting required under the NPRM has been deleted, there are no incremental costs attributable to the final rule.

Subpart H—Personnel Qualifications and Training

As fully explained in the preamble of the NPRM, Subpart H is a result of the coordination between MTB and USCG in developing a common numbering system for the two agencies' regulations which would make both sets of regulations easier for the public to understand.

Three sections are already included in this subpart under the existing Part 193 rules. The following sections, which appeared in Subparts L-0 of the NPRM, have been incorporated in this subpart as they deal with personnel qualifications or training.

Qualifications for Operation and Maintenance Personnel

Section 193.2707 was criticized by TPSSC and others because it appeared in the operations subpart of the NPRM but also applied to maintenance personnel. It was suggested a similar section be included in the maintenance subpart covering qualifications. This objection may have been valid under the original format, but MTB feels that with the rearrangement and with the qualification standards for operating and maintenance personnel being identical in most respects, the section as it now stands should not be a problem.

Many persons commented that the compatibility to an LNG facility of a facility where experience is gained is not always relevant to an individual's performance capability. MTB agrees that facility compatibility is not an important criterion, and § 193.2707(u)(2) now only requires work-related experience; references to "compatible" facilities, or examples of such facilities

are deleted. MTB will recognize on the job experience obtained under § 193.2707(b) as satisfying this requirement.

The proposed qualification test is referred to as a "proficiency test" under § 193.2707(a)(3). Many commenters stated the word "proficiency" would be more indicative of the abilities being tested. Some commenters felt performance on a test should serve as an alternative to experience, and not an additional criterion for judging an individual's capability. MTB did not adopt this view because of the importance of verifying that personnel know and understand their duties. Both the NPSB and the House Subcommittee on Energy Power recommended written testing in their reports on the LNG accident at Cove Point, Maryland.

As recommended by TPSSC and many commenters, § 193.2707(b) has been revised to permit a person who is not yet qualified under the requirements of paragraph (a) to operate or maintain a component when accompanied and directed by an "individual" who is qualified. The term "individual" replaces "supervisor" used in the NPRM, because individuals other than a supervisor may qualify to perform the duties required by § 193.2707(b).

Security Qualifications

Section 193.2709 (formerly § 193.1124a) has been modified to clarify that an operator may use personnel other than special security forces for security functions. The final rule also responds to commenters and the TPSSC by deleting the proposed requirement that each operator "ensure" that personnel are qualified. MTB agrees that operators should not be required to "ensure," or "guarantee," that personnel are actually qualified, in the sense of providing indemnity for loss. However, an operator is nonetheless liable to penalty under the Act if security functions are assigned to personnel who are unqualified.

MTB has not adopted any of the various proposals to use general language for security qualifications, to be accompanied by deletion of paragraph (a) in the NPRM. The TPSSC and others contended that paragraph (a) is redundant, in that the same requirement appears in § 193.2715(a) and (b) (formerly § 193.1124) concerning security training. MTB disagrees, since the referenced section requires only that personnel be trained, not that the training be successfully completed.

Many more commenters objected to paragraph (b) in the NPRM. Arguments by the TPSSC and others were essentially based on difficulties that

would be encountered in determining whether a person is "physically and mentally capable" of performing security duties. Since aspects of this proposal are met by successful completion of training and by compliance with § 193.2711, discussed below, paragraph (b) is deleted in the final rule.

Personnel Health

Many of the commenters to § 193.2711 apparently assumed that compliance with the proposed training requirements would also meet the requirements of § 193.2711. In proposing that a written program be conducted to ensure that personnel are mentally and physically capable while performing their duties, MTB did not intend to duplicate the training requirements proposed elsewhere. The personnel performance program proposed under § 193.1113 of the NPRM was directed to the potential problem of personnel, although properly trained, reporting for work in a condition (e.g., drunk, injured, or with a debilitating mental or physical ailment) that would impair their proper performance of duties, especially emergency response. This section has thus been rewritten and retitled to better reflect this intent.

While most commenters did not contest the need for such a program, objections were raised that it need not be written, since a written program does not relate well either to examining physical problems or to other valid ways of evaluating personnel (e.g., use of a simulator). Most commenters also argued that in the absence of any mental criteria under § 193.2711 (such as for psychological screening), the test of an individual's mental capability to work is covered by the training and qualification standards.

In response to these comments, the revised rule requires a written plan rather than a program. The plan may refer to use of any techniques or equipment an operator deems necessary to properly evaluate an individual's physical condition in relation to the demands of the job. The final rule does not refer to "mental capabilities," to avoid any implication that intelligence testing is required (since this is a factor in meeting the qualification and training requirements), and because criteria for measuring the suitability of an employee's mental condition would be extremely difficult for an operator to develop and apply. Also, MTB feels that any mental disorders that could impair an employee's performance would be physically manifested. In assessing physical capabilities, periodic physical examinations will be needed to assure

compliance with the new standard as well as day-to-day observations. Physical examinations were recommended by the House Subcommittee on Energy and Power in its report on the Cove Point incident.

Training for Operation and Maintenance

Commenters pointed out that a training program for operation and maintenance personnel under § 193.2713 could be carried out by means that are not "written," such as lectures, audio-visual, simulator, hands-on, or combinations of these means. Although MTB agrees, it is important that an overall description of the program be available. Use of the term "documented," recommended by some commenters, would not necessarily yield this result. The final rule requires the operator to provide and implement a "written plan" of initial and continuing training. The plan may refer to the use of any program training techniques an operator chooses. The term "plan" is also consistent with § 193.2017.

Section 193.2713(a)(3) now applies to "appropriate" supervisory personnel to avoid the implication that all supervisors must be trained, not just those engaged in operations. Paragraph (a)(4) in the NPRM has been deleted as redundant.

Security Training

MTB agrees with comments to § 193.2715 that a person specifically responsible for security functions need not be familiar with all plant operations and all emergency procedures. Paragraph (a)(3) has, therefore, been clarified by describing operations and emergency procedures as those "necessary to effectively perform their assigned duties."

Fire Protection Training

There were ten comments received on § 193.2717. All the commenters stated that paragraph (a) should be reworded to define which supervisory personnel must be trained. Their reason was that only maintenance and operations supervisory personnel need to be trained, since they would be the only supervisors involved in handling a fire emergency. MTB agrees with the commenters and has reworded § 193.2717 to clearly define which supervisors must be trained.

MTB has also made it clear under paragraphs (a) and (b) that plant fire drills must be a part of any fire training program. MTB believes the proposed training program could not be satisfactorily accomplished without fire drills, but to be certain, this point is in

the final rule. The House Subcommittee on Energy and Power recommended "full-fledged drills" in its report on the Cove Point incident.

Training Records

There were four comments received on § 193.2719. All four commenters stated that the fire protection training records should not have to be maintained after the employee has been discharged. MTB disagrees. MTB believes that it is necessary to have records available for one year after personnel are no longer employed, because to fully evaluate a training program, it is necessary to have past records of employees, their duties, and training furnished. For this reason, the commenters' recommendation was not included in the final rule. As finally adopted, § 193.2719 applies to all training required by Subpart H.

Subpart I—Fire Protection

General

In § 193.2803 one commenter stated that the phrase "minimize the occurrence and consequences of fires" should be changed by using the word "limit" instead of "minimize." The rationale was that the word "minimize" implies that zero is possible. MTB does not agree. In its ordinary dictionary sense, "minimize" means to reduce to the smallest possible amount. On the other hand, "limit" implies a boundary, and would require a further definition of the bounds to be set. The final rule retains "minimize" in the general standard.

Fire Prevention Plan

There were twenty-two comments received on § 193.2805, which requires that a fire prevention plan be established for each LNG plant, and procedures followed to carry it out. All commenters to this section were concerned with the proposed requirement that operators determine potential sources of ignition "outside" the LNG plant. Some suggested deletion of the requirement, given the gas dispersion requirements of § 193.2059 that a flammable vapor concentration not go beyond the dispersion zone of the plant. Others, including the TPSSC, suggested that the term "outside" be qualified to limit the amount of study necessary and the potential controversy as to the meaning of "outside." While the siting requirements of § 193.2059 are intended to preclude a flammable vapor concentration from dispersion beyond the dispersion zone, those requirements do not apply to existing facilities, and in any event, will not preclude ignition

sources located beyond the property line of a plant from causing fires on plant property. Rather than delete reference to areas outside the plant, MTB has adopted the TPSSC recommendation to change the word "outside" to "adjacent to" in the final rule. MTB believes that this term sufficiently limits, and is more descriptive of, the area to be investigated for potential sources of ignition.

Several commenters to § 193.2805 suggested that it is not necessary to "determine" ignition sources and places of flammable fluids, as proposed, since these can be discovered by conducting an examination without the "scientific method" required to comply with the definition of "determine" in § 193.2007. These commenters suggested that a requirement for the operator to "identify" sources of ignition and areas at an LNG plant where flammable fluids may be present would be more appropriate. MTB does not agree with this view, because the application of fire protection engineering principles required by § 193.2803 should readily identify sources of ignition, and the reference to NFPA 70 provides adequate guidance for identifying flammable fluid areas. Application of these principles and NFPA 70 should satisfy the requirement to conduct an investigation based on scientific method under the definition of "determine." The use of "identify" would also result in a weak standard, since unlike "determine," the word "identify" is not required to have a demonstrable basis. Therefore, "determine" rather than "identify" is used in the final rule.

Ten commenters stated that the reference to "§ 500-4 of NFPA-70" in § 193.2805 should be changed to "§ 7-6 NFPA 59A," since the 59A reference would give a better guide to places of flammable fluids. MTB disagrees with the commenters' reason. Section 7-6 of NFPA 59A states the type of electrical equipment which may be used, and it references NFPA 70 as a whole, not the particular section 500-4. It is only § 500-4 of NFPA-70 that describes areas that could be hazardous. For this reason, the commenters' recommendation was not adopted in the final rule.

Several commenters stated that § 193.1305(b) in the NPRM, which proposed a manual of procedures to minimize leakage and ignition, should be deleted in its entirety. Their reasons were that it is redundant with other requirements for operations (§ 193.2503) and emergency (§ 193.2509) procedures. MTB does not believe that adopting § 193.1305(b) as proposed would result in a redundancy because the proposed

requirements for operating and emergency procedures were not aimed at preventing fires by reducing leakage and controlling the opportunity for ignition. MTB concedes, however, that these objectives can best be attained through proper plant operations and maintenance. Therefore, the final rule is revised to require that the proposed fire prevention procedures be included in the plant operating and maintenance procedures, as appropriate.

Smoking

Comments to § 193.2807 stated that the installation of "smoking permitted" signs would be an overkill; that "no smoking" signs should be sufficient, since "no smoking" signs are the normal and traditional signs used.

MTB believes that if smoking is prohibited in certain areas of an LNG plant and those areas are marked with signs, then it is also appropriate to mark those areas of an LNG plant where smoking is permitted. The marking of both areas will reduce confusion by positively identifying each area. For this reason, the comment was not adopted in the final rule.

Open Fires

There were 22 comments received concerning the requirements of § 193.2809, governing open fires. Twenty of the commenters stated that open fires should be permitted in designated areas. Their reasons were: that the proposed rule would effectively prohibit venting gas through flare stacks and training fire fighting personnel on the plant site, and that open fires necessary for maintenance work, such as water heaters, would be prohibited. Two commenters stated that § 193.2809 should be deleted, because § 193.2811, Hotwork, contains provisions which are adequate to cover all open fires.

MTB disagrees with commenters that § 193.2809 should be deleted, and that the provisions of § 193.2811 are adequate for all open fires that may occur on an LNG plant. The requirements of § 193.2811 are intended to cover those situations where such maintenance and operating activities as welding, cutting, and grinding are being performed. This is clearly indicated by the reference to NFPA 51-B, Cutting and Welding Processes. Other types of open fires that can be present on an LNG plant are covered by § 193.2809. Therefore, the comment was not adopted in the final rule. MTB does not intend that the open fire restrictions be applied to flare stacks. This point is clarified in the final rule.

MTB does agree with the other twenty commenters to the extent that an

absolute prohibition against open fires is too restrictive. The final rule permits open fires on an LNG plant at places and times designated by the operator, provided that whenever an open fire is permitted, there must be trained fire fighting personnel with adequate equipment at the site, and the fire fighting personnel and the equipment must remain at the site until there is no possibility of danger from the fire.

Hotwork

There were no adverse comments received on § 193.2811. MTB has adopted it as proposed for the final rule.

Storage of Flammable Fluids

There were seventeen comments received on § 193.2813. All opposed the proposed prohibition against storage of flammable fluids in areas with ignition sources, because of the need to store small quantities of flammable fluids, like lubricating oils or cleaning fluids, for maintenance work in areas where ignition sources are present. Several commenters recommended that storage of flammable fluids be permitted if stored according to the requirements of § 3-3 of NFPA 59A. This comment was not adopted, however, because § 3-3 references industry standards, such as NFPA 30, Flammable and Combustible Liquids Code, that are broader in scope than the mere fire prevention purpose intended by the NPRM.

MTB agrees with the comments that an allowance should be made for storage of fluid needed for maintenance purposes. With the intent of the comments in mind, MTB believes that Chapter 4 of NFPA 30 would be an appropriate safety standard for such storage. The final rule permits the storage of flammable fluids where ignition sources are present, if they are stored in accordance with the requirements of Chapter 4 of NFPA 30.

Motorized Equipment

Of the five comments received regarding § 193.2815, two agreed with the proposal as written, two stated that supervisors at the scene should be permitted to make minute-to-minute decisions for the use of motorized equipment, and one commenter stated that motorized equipment should be permitted near tanks and equipment only when constantly attended and when specifically designed to be without open ignition sources.

MTB believes that the proposal as written does not prohibit an operator's supervisors from making the necessary decisions for use of motorized equipment, as long as the times for use are designated in writing as safe. Also,

the proposed rule provides for the safe use of motorized equipment which is a potential ignition source by requiring constant attendance and prior consideration of the time of use. To permit only the use of ignition proof vehicles would be more stringent than reasonably necessary for safety. For the above reasons, the commenters' recommendations were not adopted, and the final rule is issued as proposed.

Fire Control Equipment

There were fourteen comments received on § 193.2817. Comments to paragraph (a) stated with regard to the proposal to determine the types and sizes of fires inside and outside an LNG plant, that the word "determine" should be changed to "identify," and that the word "outside" should be deleted. Their reasons were the same as those given for their objection to the use of those words in § 193.2805. Likewise, MTB's reasons for not changing the word "determine" to "identify" and for changing the word "outside" to "adjacent to" in the final rule are the same as in the discussion of § 193.2805. It was also suggested for paragraph (a) that the words "potential fires" should be deleted and the term "reasonably be expected to occur" be used. The commenters reasoned that "potential" is too broad for a reasonable requirement of this type. MTB agrees, and the comment is adopted in the final rule. This change makes § 193.2817(a) consistent with the wording of § 193.2509(a), concerning emergencies other than fires.

TPSSC recommended that § 193.2817(b)(1) be reworded to delete the term "portable fire extinguisher" and use instead the words "fire control equipment" to eliminate the implication that portable extinguishers are the only type of equipment necessary to comply with paragraph (b). MTB does not agree with the TPSSC's recommendation. The intent of paragraph (b) is to ensure that each operator has sufficient fire control equipment on hand to protect components against the damaging effects of exposure to fires determined under paragraph (a). MTB believes that, at a minimum, the equipment should include portable extinguishers and, in some cases, water delivery systems, as provided respectively by subparagraphs (b)(1) and (b)(2). Additional equipment, such as foam systems, would be required only if necessary to provide the requisite protection.

Also, in paragraph (b)(1), the proposed reference to NFPA 10 as standards for portable fire extinguishers is deleted in the final rule. Instead, a general reference to NFPA 59A is included.

Chapter 9 of 59A provides a more comprehensive set of standards for fire protection equipment that might be used, covering such units as foam systems as well as portable extinguishers and water delivery systems. A similar reference has also been included in §§ 193.2819 and 193.2821 for the provision and maintenance of gas and fire detectors.

This is the seventh of nine sections that the Draft Evaluation estimates to have a high cost impact. Minimum and maximum estimated incremental costs for the NPRM, when compared to § 92 in NFPA 59A 1975 edition), the related baseline, were respectively \$6.835 and \$7.976 million. Since the final rule and NPRM are essentially the same, these costs would be unchanged.

However, because of substantive changes with detailed requirements in the new baseline, § 9-1 in NFPA 59A (1979 edition), that, compared to the final rule, provide equal or greater stringency there are no incremental costs associated with the final rule.

Gas Detection

Nine commenters stated that § 193.2819(a), as proposed, was not reasonable because it would require continuous monitoring for gas in areas where escaping gas would not be a hazard, such as areas within 5 feet of vents or relief valves. Consequently, they said, an unreasonable number of monitoring devices would be required.

MTB agrees with the commenters that it may not be necessary to monitor all areas determined under § 193.2805(a) that have a potential for the presence of gas. For example, properly designed vents and open air storage areas safely separated from ignition sources would not normally become hazardous with the escape of gas. Therefore, MTB has, for the final rule, reworded § 193.2819(a) to require operators to monitor only those areas in which a hazard could exist.

The bulk of the comments received on § 193.2819(b), concerning alarms, stated the audible alarms should not be required in the area of gas detection, except building, because personnel in the area could be notified verbally from the control station by use of the emergency communication system and because audible alarms could cause confusion, panic, and false alarm. Several commenters stated that audible alarms for areas other than buildings could be located anywhere as long as they are clearly audible in the area of gas detection.

Because of the built-in delay and possibility of confusion in transmitting verbal instructions in an emergency and

the need for immediate action of personnel in an area where there may be a hazardous gas leak, MTB does not agree with the commenters that verbal notice through the emergency communication system is sufficient warning to personnel. MTB believes that well trained personnel will not panic or be confused because of an audible alarm. If, indeed, false alarms were occurring at a high rate, it could be an indication of other problems which the operator should determine and correct. MTB believes that the alarms should be located to pinpoint the area of a gas leak as close as possible. If an alarm located outside the area of detection were used to alert personnel, it could lead to delay and confusion and inhibit the taking of prompt action, because the area of leak would not be indicated by the alarm. For these reasons, the commenters' recommendations were not included in the final rule.

Three commenters stated that the flammable gas detectors required by paragraph (e) should be capable of reading the lower flammable limit, and not "percent by volume." MTB agrees that the lower flammable limit is the critical reading the detectors must show, and paragraph (e) is changed accordingly.

Seventeen commenters objected to the requirement of § 193.2819(f) that all enclosed buildings located on an LNG plant be continuously monitored for flammable gas by fixed gas detectors. They argued that placing gas detectors in every building would be an unreasonable burden because such buildings as warehouses, portable toilets, and administration buildings do not process gas and would not be likely to have gas inside.

MTB does not agree with the commenters. MTB believes that any enclosed building on an LNG plant has, in the event of a gas or LNG leak, a potential for the collection and containment of a flammable gas to the extent that the cost of gas detection is warranted. Therefore, the MTB did not adopt the changes as proposed by the commenters for the final rule.

The TPSSC recommended that MTB establish criteria based upon distance from areas known to have flammable gases and liquids and upon the methods of gas entry into buildings to determine which enclosed buildings should be required to have fixed gas detectors. Because of the many variables involved in determining the flow of gas/vapor, such as temperature, wind, and terrain, and the almost impossible task of determining all methods by which gas may enter a building, it is not practicable to establish meaningful

criteria as recommended. Thus, TPSSC's recommendation was not adopted for the final rule.

All comments received on § 193.1310(g) of the NPRM stated that the proposed requirement to heat vented gas to 100° F was not necessary for safety. Their reasons were that: natural gas achieves positive buoyancy at -160° F and to require that the temperature be raised to 100° F would be excessive and not reduce any hazard presented by the vented gas. The intent of paragraph (g) was to require the gas to be of such positive buoyancy that it will rise in the vent stack, thereby venting in a safe manner. MTB agrees with the commenters that it is not necessary to prescribe a specific temperature for the gas. Therefore, MTB has reworded the proposed paragraph (g) in the final to require that the gas be heated to a temperature that will provide positive buoyancy and save venting. Because the proposed § 193.1310(g) relates more to the design of venting systems than to maintenance, operation, or fire protection, it is relocated in the final rule in § 193.2431(c).

Commenters to § 193.1310(h) of the NPRM opposed the proposal that emergency venting be observed by a person with portable gas detector. They argued that in most cases emergency venting would occur without prior notice and would be over before the monitoring could be done. MTB agrees and has deleted paragraph (h) in the final rule.

Fire Detection

Many commenters to § 193.2821(a) stated that the operator should be required to detect fires only within the plant in areas determined under § 193.2817, not § 193.2805(a)(2) as proposed. The rationale given was that § 193.2817 relates more to where fire may be expected to occur. MTB finds this point confusing, however, since § 193.2817 does not require operators to determine areas where fires may occur, while under § 193.2805(a)(2), fires may be expected in areas inside a plant where there is a potential for flammable gas or vapor. Thus, the required placement of fire detectors is adopted as proposed, except that for consistency with § 193.2819(a) detectors need only be placed where a hazard to persons or property could exist. Commenters also urged that the words "substantial quantities" should be included in paragraph (a) to modify the amount of material stored. If not, storage areas of small quantities of materials such as pencils, office supplies, and cleaning fluid would be included, with an unwarranted expense for monitoring. The TPSSC also made a similar

recommendation. MTB is not in agreement with these views that only storage areas of large quantities of flammable fluids and combustible material should be monitored. Since the requirements of § 193.2821 permit the use of wide range of equipment, an operator could use less extensive devices in areas where small quantities are stored. Also, the purpose of fire protection is to detect a fire as soon as possible so quick action can be taken to prevent its spreading. Large fires may result from small sources of ignition.

Many commenters to paragraph (b) objected to the placement of alarms in outdoors areas (outside buildings), because detectors might be set off by reflected sunlight, welder's arcs, and lighting strikes, leading to confusion and causing workers to ignore the alarms. Others argued that local alarms are unnecessary and should not be required.

MTB does not agree with the commenters that fire alarms should not be required outside of buildings. The operator should be able to shield the detectors so as to prevent the great majority of false alarms, and the few false alarms that might occur should not be confusing to well-trained workers nor cause them to ignore the alarms. MTB discussed the use of audible alarms and the use of the emergency communications system in the discussion of comments on § 193.2819. MTB believes the reasons discussed there are also valid for § 193.2821, and, therefore, paragraph (b) is adopted as proposed.

Subpart J—Security

Sections on security, located under Subpart L in the NPRM, are set forth under a new Subpart J, to more appropriately delineate security functions in accordance with the MOU between the MTB and U.S. Coast Guard and to give greater recognition of their importance.

Throughout this subpart, terms such as "facility," "component," or "item" have been changed to "plant," "facility," or "component," as appropriate, in accordance with earlier discussions in this preamble and with definitions in § 193.2007.

Security Procedures

Section 193.2903 prescribes the basic features of security procedures that must be prepared and followed. Overall, public comment on this section was greater than for other sections on security.

Use of the term "manual" to describe required written procedures met with objections from several commenters who otherwise generally acknowledged

the need for written procedures. In response, MTB has adopted the wording "one or more manuals" for the reasons discussed in regard to § 193.2503 above.

There were several proposals that security procedures be kept confidential to minimize the possibility of compromising security. Similarly, there were proposals to exempt the procedures from public disclosure or to limit access to specific agencies. These comments have not been adopted, since the idea of subjecting operators to penalty for compromising disclosures was not proposed in the NPRM. Of course, operators may voluntarily limit disclosure to parties having authority under existing law.

Section 193.2903(a). A proposal to delete the storage capacity limitation set forth in the referenced section (§ 193.2913) has not been adopted. Although MTB agrees with the commenter that small plants may cover large areas, monitoring only the protective enclosure at these plants is considered appropriate in view of the limited hazard resulting from the combination of a small plant with a large area open for detection of unauthorized personnel.

Section 193.2903(b). MTB has amended this paragraph to permit operators to list security personnel responsibilities as an alternative to personnel positions. This clarifies MTB's original intent, and is in accordance with proposals from the TPSSC and 15 other commenters.

Section 193.2903(c). This and other relevant paragraphs have been similarly modified for clarification, consistent with the change in paragraph (b) of this section and views expressed by the TPSSC and ten other commenters. MTB agrees with the commenters that alternate assignment of operating personnel to security duties should be permitted, particularly at smaller plants. Such an arrangement is desirable since knowledge of operations could benefit certain security functions.

Section 193.2903(d). A change from the term "facility personnel" to "designated facility personnel" was suggested by the TPSSC and two other commenters. Another two commenters proposed the term "key personnel." The suggested modifications were intended to clarify that specific personnel be designated, and to limit notification of security breaches to persons with authority to direct and take action. MTB agrees that only specific personnel should be notified. However, notification should not be strictly limited to persons in authority. In the event of a nearby riot or other insurgency, staff reinforcement might be necessary. The instructions

should prescribe notification in accordance with the nature of the event. Therefore, MTB has used the term "appropriate plant personnel" in the final rule. At the same time, the word "appropriate" used in the NPRM to modify "law enforcement officials" has been deleted, since officials engaged in law enforcement are the appropriate officials.

Also, in accordance with views expressed by the TPSSC and six other commenters, the word "emergency" has been deleted from paragraph (d) in the final rule, since security is the subject of Subpart J and notification of emergencies is covered under Subpart F (§ 193.2509). However, MTB disagrees with the TPSSC and ten other commenters that notification should be required only if an actual breach of security occurs, since, while a "potential" breach may be undetectable, evidence of an "attempted" breach should be reported as a preventive action, even if plant safety was not endangered, in view of possible future attempts. Suggestions by several other commenters that notification should be required only for events requiring assistance is unacceptable for the same reason. Therefore, MTB has modified paragraph (d) in the final rule to require notification if there is any indication of an actual or attempted security breach.

Section 193.2903(f). Many commenters and the TPSSC objected to providing security badges for plant personnel. The TPSSC felt the proposed regulation implied that picture badges are the best method of identification. Performance language, permitting operator judgment, was advocated by the TPSSC and nine other commenters. Other commenters contended that other means are as effective, or that more sophisticated techniques should not be discouraged. Three argued that picture badges are unnecessary at small plants.

MTB agrees that for small plants, if a person is well known to security personnel, identification by direct recognition is sufficient and probably would, in any event, be the real method of identification. However, when a new employee is hired, an effective means of identification is necessary pending sufficient familiarization with the employee for identification by recognition. Notwithstanding the General Accounting Office report (EMD-78-28) which recommended picture badges, MTB believes that code identification, electronic identifiers, and other improved techniques could assure more positive identification than badges, which lose their effectiveness with age. Of greater importance to plant security,

alternate means of positive identification than picture badges would be necessary for positive identification of single or infrequent entries by persons such as equipment technicians or drivers of cargo or material delivery trucks. Therefore, using performance language, the final rule cites picture badges as a minimum criterion to measure the effectiveness of identification methods, but does not mandate their use. Also, by deleting the term "facility personnel," as suggested by commenters, the requirement for identification applies more broadly to include one-time or occasional entries, who, compared to entry by facility personnel, have greater security implications.

Section 193.2903(g). MTB has made an editorial correction, changing "continual liaison" to "liaison," in accordance with a proposal by the TPSSC and a number of commenters. The commenters felt that uninterrupted contact was implied, but periodic contact is adequate, or that liaison should focus on mutual assistance. The word "continual" has been deleted, since "liaison" by itself denotes a close connection that would have to be carried out at a frequency sufficient to meet the objectives of § 193.2903.

This is the eighth of nine sections that is estimated to have a high cost impact by the Draft Evaluation. Minimum and maximum estimated incremental costs for the NPRM, when compared to the former baseline NFPA 59A (1975 edition) which has no counterpart, were respectively, \$3.216 and \$3.839 million.

Reduction in costs under the final rule, due to lowering restrictions on personnel maintaining security, permitting alternate identification techniques, and eliminating some procedural requirements for notification and liaison, result in reduced estimated incremental cost, compared to the former baseline, of \$1.49 and \$1.80 million respectively for the minimum and maximum number of facilities. Changes in the new baseline, § 9.8-1 in NFPA 59A (1979 edition) which now includes specific security provisions, would further reduce comparative estimated incremental costs for the final rule to \$102 and \$124 thousand.

Protective Enclosures

The kinds of LNG facilities that require protective enclosures are designated in § 193.2905. Conditions for access, location and surrounding topographical features are also prescribed.

The principal concern of the TPSSC and many other commenters was the proposal that each of the facilities listed

in paragraph (a) be surrounded by an enclosure. Most felt that "each" implied that a separate enclosure was required for each facility. Since this was not intended, the word "each" is deleted, and new language to show that one or more facilities may use the same enclosure is adopted in the final rule to clarify the issue. All facilities need not be within the same enclosure, because control rooms, vaporizers, or other equipment may be better located at some remote distance from other facilities.

All but one commenter indicated agreement with the designated facilities requiring enclosure under paragraph (a). This commenter stated that a protective enclosure should not be required for fire control equipment (para (a)(8)) and alternative power source (para (a)(10)). The commenter argued that location of fire control equipment outside the enclosure should be permitted to serve for vapor dispersion protection and for protection of equipment from thermal radiation. Also, protection of electric service lines was claimed to range between the impractical and the impossible.

Fire control equipment is necessary for plant safety, and could have major importance if the security of other facilities is breached. Separate enclosures may be used if the equipment is outside a security enclosure for the major part of the plant. Each alternative power source required by § 193.2915 must be designed so that failure of the primary source does not affect the capability of the alternative. In most cases, this will require an operator to have full control over the alternative, and where electrical power lines cannot be fenced, wiring may be underground. For these reasons, MTB has not incorporated the suggested modifications in the final rule.

MTB also rejects the proposal by the TPSSC and a few commenters in regard to paragraph (b) that grading to assure enclosure integrity should not be required because grading is not always necessary. Under the standard, where existing grade satisfies the requirement, the area is properly graded, and the standard does not imply a need for further grading.

Four commenters objected to paragraph (c) on the basis that unalterable obstructions and conditions at existing facilities would make it nearly impossible for an enclosure to be located so as to avoid outside features that could be used to breach the enclosure. They suggested the proposed rule be modified to allow equivalent alternate security measures to a protective enclosure in these cases. This

comment was not adopted, because MTB believes the proposal provides for such conditions as it is written. Where equivalent alternative measures are provided, there would not be a feature "which could be used to breach the enclosure." However, to clarify this intent, the word "enclosure" is changed in the final rule to "security."

Many commenters and the TPSSC proposed to change the proposed requirement under paragraph (e) regarding an unlocked gate to permit "monitoring" as an alternative to "guarding" of the gate. Most commenters essentially felt that monitoring by closed circuit television, intrusion alarms, or other means is equivalent or superior to guarding, which they properly interpreted as implying a manned procedure. In more extensive argument, the TPSSC and others claimed that employee safety could be jeopardized by locked gates or that the operator may consider unlocked accesses to be desirable. A number said monitoring would provide better reaction time for either a casual or less than casual entry attempt.

The recommendation to change "guarded" to "monitored" in paragraph (e) is not adopted, because MTB does not consider monitoring to be equivalent to guarding, which provides both assured monitoring and direct control. An individual's attention could be easily diverted from a closed circuit television or other monitoring system. Without a guard at unlocked accesses, entry and damaging activity could be quickly accomplished. The action might be unobserved, or response might be delayed to the point where damage or escape could not be deterred. Neither a fence, locked gate, or guard can prevent determined unlawful entry. However, these features are necessary for deterrence, and may prevent whimsical vandalism which could result in a serious hazard. Clearly, where accesses are neither locked nor guarded, there is no immediate deterrent to entry. Also, under § 193.2903(f) where positive identification of persons entering a plant through an unlocked access relies on visual recognition or picture badges, an attentive guard is necessary. Concern about employee safety is specious, since the rule requires provisions in this respect, and a variety of measures are available for emergency egress.

With regard to § 193.2907(a), the TPSSC and some commenters recommended that the proposed requirement that protective enclosures have "sufficient strength and configuration" to obstruct access be changed to a less definitive expression

such as "designed and constructed," arguing that the change would be more appropriate performance language. MTB does not agree, since the existing wording is in performance terms and "strength" together with "configuration" are the principal features necessary to make an enclosure protective.

With regard to § 193.2907(b), while some commenters expressed agreement, most proposed deletion of some or all of this paragraph. The majority, including the TPSSC, proposed to delete subparagraphs (b)(1)-(3), while others recommended deletion of the entire paragraph, claiming that the performance language of paragraph (a) was a sufficient design standard. Some said the proposed specifications in paragraph (b) were too rigid. (Others, who proposed deletion or modifications of paragraph (a) argued that the specification of paragraph (b) made (a) unnecessary). Still others asserted the operator should have latitude in enclosure design. MTB believes a prescriptive type of standard is necessary for protective enclosures. Otherwise, the characteristics of enclosure would be left to subjective judgment, making conformance unlikely and enforcement impossible. The USCG uses a similar standard, and concurs with MTB's position.

Many other commenters took exception only with paragraphs (b)(1) or (b)(3). TPSSC had concern specifically for existing facilities, and commenters argued that fences should not have to be replaced or relocated, if: under (b)(1), an existing fence has lighter gauge wire than No. 11; under (b)(3), barbed wire is angled inward so that it does not encroach on the property of others; under (b)(3), razor ribbon is used in lieu of barbed wire; and under (b)(3), the overall height is seven rather than eight feet. MTB agrees that where existing fencing meets certain alternative standards and has effectively provided security, it is acceptable. Accordingly, a new paragraph (c) provides for this circumstance.

Commenters and the TPSSC, who proposed deletion of paragraph (b)(1) thru (b)(3) in favor of performance language under (a), proposed specific changes to paragraph (b)(4), using performance terms. MTB believes the prescriptive language of (b)(4) is necessary for the reasons discussed with respect to its position on subparagraphs (b)(1) thru (b)(3).

Security Communication

In accordance with the original intent of § 193.2909 and views generally expressed by some commenters, MTB has modified this section to require that

communication with law enforcement officials need only be available to personnel having supervisory security duties. The designation of personnel makes clear that the link is in the hands of persons directly in charge of security, since delay caused by indirect contact thru a plant manager, or potential chaos from a link between every person engaged in security and law officials, could denigrate the effectiveness of security. Also, only "prompt" rather than "direct" means of communication is now required so as to permit telephonic communication without the connotation of a "hot line." However, between on duty plant security personnel and specified facilities, "direct" communication is considered necessary and is clearly convenient by intercom or radio.

Security Lighting

The TPSSC and six commenters pointed out the transposition in the proposed value of lighting intensity under the NPRM version of § 193.2911. MTB has corrected the value to read 2.2 lux (0.2 ftc) in the final rule. This level of illumination is adopted since NRC standard 10 CFR 70.50(b)(5) and other standards uniformly prescribe the value for security lighting.

A number of commenters proposed the use of performance language instead of specified minimum lighting intensity, arguing that a prescribed minimum might conflict with local ordinances or otherwise be objectionable. This rationale was also given for suggesting that the protective enclosure not be lighted at all.

Considering the very low minimum level of lighting generally recognized as necessary for security reasons, MTB doubts serious objections would arise over the lighting level. MTB does not agree with suggestions that performance language is more appropriate since a minimum intensity is needed regardless of the means of providing light. The notion of not lighting the protective enclosure because of potential community objections was not taken seriously, because lighting is only required if a security warning system is not provided, and this alternative is always available if lighting is a problem. More lighting than the minimum level required by § 193.2911 may be needed to comply with the monitoring requirements of § 193.2913, depending on the effect of local conditions around the facility being monitored.

This is the last of nine sections that is shown to have a high estimated cost impact in the Draft Evaluation. Minimum and maximum estimated incremental costs for the NPRM when

compared to the former baseline, NFPA 59A (1975 edition), which has no counterpart, were \$8.343 and \$10.064 million, respectively.

Changes in the final rule, requiring lighting that would exceed the minimum specified 2.2 lux intensity under certain conditions, is estimated to increase these costs to \$8.68 and \$10.49 million. However, when compared to the new baseline, § 9-8.4 in NFPA 59A (1979 edition) which except for specifying a minimum intensity has requirements equivalent to those in the final, the estimated incremental costs of the final rule is reduced to \$22 and \$27 thousand for the minimum and maximum number of facilities, respectively.

Security Monitoring § 193.2913

Despite recommendations by five commenters, the word "each," used in describing the enclosure and the facility to be monitored, has been retained in § 193.2913 because its use is appropriate to assure that every protective enclosure and specified facility, whether one or many, will be properly monitored. However, the word "direct," describing "visual observation," has been deleted in accordance with comments by the TPSSC and several commenters in order to clarify MTB's intent that television is an acceptable means of monitoring. Although the term "schedule," referenced with respect to "security procedures under § 193.2903," has not been deleted, the word "schedule" is not intended to forbid a random inspection interval. It is expected that the procedures under § 193.2903 would spell out a formulation for random inspection tours appropriate for optimum security of the plant.

Alternative Power Sources

In § 193.2915, an error in numbering the referenced section, noted by the TPSSC and five commenters, has been corrected from § 193.927 to § 193.2445. Recommendations by several of these commenters to change the word "and" to "or," appearing between "security lighting" and "security warning systems," is inappropriate since this would denote that alternative power for only one of the two systems would satisfy the requirement, when, at a given plant, security might be reliant on both.

Security Warning Signs

While only a few commenters objected to § 193.2917, they did not support their objections with significant rationale. The vast majority of commenters and the TPSSC signified acceptance of the NPRM wording, which remains unchanged in the final rule.

In consideration of the foregoing, Parts 192 and 193 of Title 49 of the Code of Federal Regulations are amended as follows:

PART 192—TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS

§ 192.12 [Revoked]

1. Section 192.12 is revoked in the text of the rules and the table of sections.

2. The table of sections of Part 193 is amended by adding a new § 193.2017 under Subpart A; a new § 193.2304 under Subpart D; new §§ 193.2707-193.2719 under Subpart H; and new Subparts F, G, I, and J as follows:

PART 193—LIQUEFIED NATURAL GAS FACILITIES: FEDERAL SAFETY STANDARDS

Subpart A—General

Sec.	*	*	*	*	*
193.2017	Plans and procedures.				
*	*	*	*	*	*

Subpart D—Construction

*	*	*	*	*
193.2304	Corrosion control overview.			
*	*	*	*	*

Subpart F—Operations

193.2501	Scope.
193.2503	Operating procedures.
193.2505	Cooldown.
193.2507	Monitoring operations.
193.2509	Emergency procedures.
193.2511	Personnel safety.
193.2513	Transfer procedures.
193.2515	Investigations of failures.
193.2517	Purging.
193.2519	Communication systems.
193.2521	Operating records.

Subpart G—Maintenance

193.2601	Scope.
193.2603	General.
193.2605	Maintenance procedures.
193.2607	Foreign material.
193.2609	Support systems.
193.2611	Fire protection.
193.2613	Auxiliary power sources.
193.2615	Isolating and purging.
193.2617	Repairs.
193.2619	Control systems.
193.2621	Testing transfer hoses.
193.2623	Inspecting LNG storage tanks.
193.2625	Corrosion protection.
193.2627	Atmospheric corrosion control.
193.2629	External corrosion control; buried or submerged components.
193.2631	Internal corrosion control.
193.2633	Interference currents.
193.2635	Monitoring corrosion control.
193.2637	Remedial measures.
193.2639	Maintenance records.

Subpart H—Personnel Qualifications and Training

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Sec.
 193.2707 Operations and maintenance.
 193.2709 Security.
 193.2711 Personnel health.
 193.2713 Training; operations and maintenance.
 193.2715 Training; security.
 193.2717 Training; fire protection.
 193.2719 Training; records.

Subpart I—Fire Protection

193.2801 Scope.
 193.2803 General.
 193.2805 Fire prevention plan.
 193.2807 Smoking.
 193.2809 Open fires.
 193.2811 Hotwork.
 193.2813 Storage of flammable fluids.
 193.2815 Motorized equipment.
 193.2817 Fire control equipment.
 193.2819 Gas detection.
 193.2821 Fire detection.

Subpart J—Security

193.2901 Scope.
 193.2903 Security procedures.
 193.2905 Protective enclosures.
 193.2907 Protective enclosure construction.
 193.2909 Security communications.
 193.2911 Security lighting.
 193.2913 Security monitoring.
 193.2915 Alternative power sources.
 193.2917 Warning signs.

3. In § 193.2005, paragraph (c) is amended to read as follows:

§ 193.2005 Applicability.

(c) The siting, design, installation, and construction of an LNG facility under construction before February 11, 1980, or that is listed in paragraph (a)(2) of this section (except a facility under construction before July 1, 1976) must meet the applicable requirements of NFPA 59A (1972 edition) and Part 192 of this chapter or the applicable requirements of this part, except that no Part 192 standard issued after March 1, 1978, applies to an LNG facility listed in paragraph (a)(2) of this section.

§ 193.2007 [Amended]

4. In § 193.2007, the definition of the term "component" is revised and a definition of "Waterfront LNG plant" is added, both to read as follows:

"Component" means any part, or system of parts functioning as a unit, including, but not limited to, piping, processing equipment, containers, control devices, impounding systems, lighting, security devices, fire control equipment, and communication equipment, whose integrity or reliability is necessary to maintain safety in controlling, processing, or containing a hazardous fluid.

"Waterfront LNG plant" means an LNG plant with docks, wharves, piers, or other structures in, on, or immediately

adjacent to the navigable waters of the United States or Puerto Rico and any shore area immediately adjacent to those waters to which vessels may be secured and at which LNG cargo operations may be conducted.

5. Section 193.2017 is added to read as follows:

§ 193.2017 Plans and procedures.

(a) Each operator shall maintain at each LNG plant the plans and procedures required for that plant by this part. The plans and procedures must be available upon request for review and inspection by the Director or any State Agency that has submitted a current certification or agreement with respect to the plant under section 5 of the Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1674). In addition, each change to the plans or procedures must be available at the LNG plant for review and inspection within 20 days after the change is made.

(b) The Director or the State Agency, after notice and opportunity for hearing, may require the operator to amend its plans and procedures as necessary to provide a reasonable level of safety.

6. Section 193.2304 is added to read as follows:

§ 193.2304 Corrosion control overview.

(a) Subject to paragraph (b) of this section, components may not be constructed, repaired, replaced, or significantly altered until a person qualified under § 193.2707(c) reviews the applicable design drawings and materials specifications from a corrosion control viewpoint and determines that the materials involved will not impair the safety or reliability of the component or any associated components.

(b) The repair, replacement, or significant alteration of components must be reviewed only if the action to be taken—

(1) Involves a change in the original materials specified;

(2) Is due to a failure caused by corrosion; or

(3) Is occasioned by inspection revealing a significant deterioration of the component due to corrosion.

7. Section 193.2431(c) is added to read as follows:

§ 193.2431 Vents.

(c) Venting of natural gas/vapor under operational control which could produce a hazardous gas atmosphere must be directed to a flare stack or heat exchanger in order to raise its

temperature to achieve positive buoyancy and safe venting.

8. Subpart H is amended by adding the following new §§ 193.2707–193.2719:

§ 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 instructions on the facility operations, including controls, functions, and operating procedures; and

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

(b) A written plan of continuing instruction must be conducted at intervals of not more than two years to keep all personnel current on the knowledge and skills they gained in the program of initial instruction.

§ 193.2715 Training; security.

(a) Personnel responsible for security at an LNG plant must be trained in accordance with a written plan of initial instruction to:

(1) Recognize breaches of security;

(2) Carry out the security procedures under § 193.2903 that relate to their assigned duties;

(3) Be familiar with basic plant operations and emergency procedures, as necessary to effectively perform their assigned duties; and

(4) Recognize conditions where security assistance is needed.

(b) A written plan of continuing instruction must be conducted at intervals of not more than two years to keep all personnel having security duties current on the knowledge and skills they gained in the program of initial instruction.

§ 193.2717 Training; fire protection.

(a) All personnel involved in maintenance and operations of an LNG plant, including their immediate supervisors, must be trained in accordance with a written plan of initial instruction, including plant fire drills, to:

(1) Know and follow the fire prevention procedures under § 193.2805(b);

(2) Know the potential causes and areas of fire determined under § 193.2805(a);

(3) Know the types, sizes, and predictable consequences of fire determined under § 193.2817(a); and

(4) Know and be able to perform their assigned fire control duties according to the procedures established under

§ 193.2509 and by proper use of equipment provided under § 193.2817.

(b) A written plan of continuing instruction, including plant fire drills, must be conducted at intervals of not more than two years to keep personnel current on the knowledge and skills they gained in the instruction under paragraph (a) of the section.

§ 193.2719 Training; records.

(a) Each operator shall maintain a system of records which—

(1) Provide evidence that the training programs required by this subpart have been implemented; and

(2) Provide evidence that personnel have undergone and satisfactorily completed the required training programs.

(b) Records must be maintained for one year after personnel are no longer assigned duties at the LNG plant.

9. In Part 193, Subparts F, G, I, and J are added as set forth below.

Subpart F—Operations

§ 193.2501 Scope.

This subpart prescribes requirements for the operation of LNG facilities.

§ 193.2503 Operating procedures.

Each operator shall follow one or more manuals of written procedures to provide safety in normal operation and in responding to an abnormal operation that would affect safety. The procedures must include provisions for—

(a) Monitoring components or buildings according to the requirements of § 193.2507.

(b) Startup and shutdown, including for initial startup, performance testing to demonstrate that components will operate satisfactory in service.

(c) Recognizing abnormal operating conditions.

(d) Purging and inerting components according to the requirements of § 193.2517.

(e) In the case of vaporization, maintaining the vaporization rate, temperature and pressure so that the resultant gas is within limits established for the vaporizer and the downstream piping;

(f) In the case of liquefaction, maintaining temperatures, pressures, pressured differentials and flow rates, as applicable, within their design limits for:

(1) Boilers;

(2) Turbines and other prime movers;

(3) Pumps, compressors, and expanders;

(4) Purification and regeneration equipment; and

(5) Equipment within cold boxes.

(g) Cooldown of components according to the requirements of § 193.2505; and

(h) Compliance with § 193.2805(b).

§ 193.2505 Cooldown.

(a) The cooldown of each system of components that is subjected to cryogenic temperatures must be limited to a rate and distribution pattern that keeps thermal stresses within design limits during the cooldown period, paying particular attention to the performance of expansion and contraction devices.

(b) After cooldown stabilization is reached, cryogenic piping systems must be checked for leaks in areas of flanges, valves, and seals.

§ 193.2507 Monitoring operations.

Each component in operation or building determined under § 193.2805(a)(2) in which a hazard to persons or property could exist must be monitored to detect fire or any malfunction or flammable fluid which could cause a hazardous condition. Monitoring must be accomplished by watching or listening from an attended control center for warning alarms, such as gas, temperature, pressure, vacuum, and flow alarms, or by conducting an inspection or test at intervals specified in the operating procedures.

§ 193.2509 Emergency procedures.

(a) Each operator shall determine the types and places of emergencies other than fires that may reasonably be expected to occur at an LNG plant due to operating malfunctions, structural collapse, personnel error, forces of nature, and activities adjacent to the plant.

(b) To adequately handle each type of emergency identified under paragraph (a) of this section and each fire emergency identified under § 193.2817(a), each operator shall follow one or more manuals of written procedures. The procedures must provide for the following:

(1) Responding to controllable emergencies, including notifying personnel and using equipment appropriate for handling the emergency.

(2) Recognizing an uncontrollable emergency and taking action to minimize harm to the public and personnel, including prompt notification of appropriate local officials of the emergency and possible need for evacuation of the public in the vicinity of the LNG plant.

(3) Coordinating with appropriate local officials in preparation of an emergency evacuation plan, which sets forth the steps required to protect the

public in the event of an emergency, including catastrophic failure of an LNG storage tank.

(4) Cooperating with appropriate local officials in evacuations and emergencies requiring mutual assistance and keeping these officials advised of—

- (i) The LNG plant fire control equipment, its location, and quantity of units located throughout the plant;
- (ii) Potential hazards at the plant, including fires;
- (iii) Communication and emergency control capabilities at the LNG plant; and
- (iv) The status of each emergency.

§ 193.2511 Personnel safety.

(a) Each operator shall provide any special protective clothing and equipment necessary for the safety of personnel while they are performing emergency response duties.

(b) All personnel who are normally on duty at a fixed location, such as a building or yard, where they could be harmed by thermal radiation from a burning pool of impounded liquid, must be provided a means of protection at that location from the harmful effects of thermal radiation or a means of escape.

(c) Each LNG plant must be equipped with suitable first-aid material, the location of which is clearly marked and readily available to personnel.

§ 193.2513 Transfer procedures.

(a) Each transfer of LNG or other hazardous fluid must be conducted in accordance with one or more manuals of written procedures to provide for safe transfers.

(b) The transfer procedures must include provisions for personnel to:

- (1) Before transfer, verify that the transfer system is ready for use, with connections and controls in proper positions, including if the system could contain a combustible mixture, verifying that it has been adequately purged in accordance with a procedure which meets the requirements of AGA "Purging Principles and Practice."
- (2) Before transfer, verify that each receiving container or tank vehicle does not contain any substance that would be incompatible with the incoming fluid and that there is sufficient capacity available to receive the amount of fluid to be transferred;
- (3) Before transfer, verify the maximum filling volume of each receiving container or tank vehicle to ensure that expansion of the incoming fluid due to warming will not result in overfilling or overpressure;
- (4) When making bulk transfer of LNG into a partially filled (excluding cooldown heel) container, determine

any differences in temperature or specific gravity between the LNG being transferred and the LNG already in the container and, if necessary, provide a means to prevent rollover due to stratification.

(5) Verify that the transfer operations are proceeding within design conditions and that overpressure or overfilling does not occur by monitoring applicable flow rates, liquid levels, and vapor returns.

(6) Manually terminate the flow before overfilling or overpressure occurs; and

(7) Deactivate cargo transfer systems in a safe manner by depressurizing, venting, and disconnecting lines and conducting any other appropriate operations.

(c) In addition to the requirements of paragraph (b) of this section, the procedures for cargo transfer must be located at the transfer area and include provisions for personnel to:

- (1) Be in constant attendance during all cargo transfer operations;
- (2) Prohibit the backing of tank trucks in the transfer area, except when a person is positioned at the rear of the truck giving instructions to the driver;
- (3) Before transfer, verify that—
 - (i) Each tank car or tank truck complies with applicable regulations governing its use;
 - (ii) All transfer hoses have been visually inspected for damage and defects;
 - (iii) Each tank truck is properly immobilized with chock wheels, and electrically grounded; and
 - (iv) Each tank truck engine is shut off unless it is required for transfer operations;
- (4) Prevent a tank truck engine that is off during transfer operations from being restarted until the transfer lines have been disconnected and any released vapors have dissipated;
- (5) Prevent loading LNG into a tank car or tank truck that is not in exclusive LNG service or that does not contain a positive pressure if it is in exclusive LNG service, until after the oxygen content in the tank is tested and if it exceeds 2 percent by volume, purged in accordance with a procedure that meets the requirements of AGA "Purging Principles and Practice;"
- (6) Verify that all transfer lines have been disconnected and equipment cleared before the tank car or tank truck is moved from the transfer position; and
- (7) Verify that transfers into a pipeline system will not exceed the pressure or temperature limits of the system.

§ 193.2515 Investigations of failures.

(a) Each operator shall investigate the cause of each explosion, fire, or LNG spill or leak which results in—

- (1) Death or injury requiring hospitalization; or
- (2) Property damage exceeding \$10,000.

(b) As a result of the investigation, appropriate action must be taken to minimize recurrence of the incident.

(c) If the Director or relevant state agency under section 5 of the Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1674) investigates an incident, the operator involved shall make available all relevant information and provide reasonable assistance in conducting the investigation. Unless necessary to restore or maintain service, or for safety, no component involved in the incident may be moved from its location or otherwise altered until the investigation is complete or the investigating agency otherwise provides. Where components must be moved for operational or safety reasons, they must not be removed from the plant site and must be maintained intact to the extent practicable until the investigation is complete or the investigating agency otherwise provides.

§ 193.2517 Purging.

When necessary for safety, components that could accumulate significant amounts of combustible mixtures must be purged in accordance with a procedure which meets the provisions of the AGA "Purging Principles and Practice" after being taken out of service and before being returned to service.

§ 193.2519 Communication systems.

(a) Each LNG plant must have a primary communication system that provides for verbal communications between all operating personnel at their work stations in the LNG plant.

(b) Each LNG plant in excess of 70,000 gallons storage capacity must have an emergency communication system that provides for verbal communications between all persons and locations necessary for the orderly shutdown of operating equipment and the operation of safety equipment in time of emergency. The emergency communication system must be independent of and physically separated from the primary communication system and the security communication system under § 193.2909.

(c) Each communication system required by this part must have an auxiliary source of power, except sound-powered equipment.

§ 193.2521 Operating records.

Each operator shall maintain a record of the results of each inspection, test, and investigation required by this subpart. Such records must be kept for a period of not less than 5 years.

Subpart G—Maintenance**§ 193.2601 Scope.**

This subpart prescribes requirements for maintaining components at LNG plants.

§ 193.2603 General.

(a) Each component in service, including its support system, must be maintained in a condition that is compatible with its operational or safety purpose by repair, replacement, or other means.

(b) An operator may not place, return, or continue in service any component which is not maintained in accordance with this subpart.

(c) Each component taken out of service must be identified in the records kept under § 193.2639.

(d) If a safety device is taken out of service for maintenance, the component being served by the device must be taken out of service unless the same safety function is provided by an alternate means.

(e) If the inadvertent operation of a component taken out of service could cause a hazardous condition, that component must have a tag attached to the controls bearing the words "do not operate" or words of comparable meaning.

§ 193.2605 Maintenance procedures.

(a) Each operator shall determine and perform, consistent with generally accepted engineering practice, the periodic inspections or tests needed to meet the applicable requirements of this subpart and to verify that components meet the maintenance standards prescribed by this subpart.

(b) Each operator shall follow one or more manuals of written procedures for the maintenance of each component, including any required corrosion control. The procedures must include—

(1) The details of the inspections or tests determined under paragraph (a) of this section and their frequency of performance; and

(2) A description of other actions necessary to maintain the LNG plant in accordance with the requirements of this subpart and § 193.2805.

§ 193.2607 Foreign material.

(a) The presence of foreign material, contaminants, or ice shall be avoided or controlled to maintain the operational safety of each component.

(b) LNG plant grounds must be free from rubbish, debris, and other material which present a fire hazard. Grass areas on the LNG plant grounds must be maintained in a manner that does not present a fire hazard.

§ 193.2609 Support systems.

Each support system or foundation of each component must be inspected for any detrimental change that could impair support.

§ 193.2611 Fire protection.

(a) Maintenance activities on fire control equipment must be scheduled so that a minimum of equipment is taken out of service at any one time and is returned to service in a reasonable period of time.

(b) Access routes for movement of fire control equipment within each LNG plant must be maintained to reasonably provide for use in all weather conditions.

§ 193.2613 Auxiliary power sources.

Each auxiliary power source must be tested monthly to check its operational capability and tested annually for capacity. The capacity test must take into account the power needed to start up and simultaneously operate equipment that would have to be served by that power source in an emergency.

§ 193.2615 Isolating and purging.

(a) Before personnel begin maintenance activities on components handling flammable fluids which are isolated for maintenance, the component must be purged in accordance with a procedure which meets the requirements of AGA "Purging Principles and Practices," unless the maintenance procedures under § 193.2605 provide that the activity can be safely performed without purging.

(b) If the component or maintenance activity provides an ignition source, a technique in addition to isolation valves (such as removing spool pieces or valves and blank flanging the piping, or double block and bleed valving) must be used to ensure that the work area is free of flammable fluids.

§ 193.2617 Repairs.

(a) Repair work on components must be performed and tested in a manner which—

(1) As far as practicable, complies with the applicable requirements of Subpart D of this part; and

(2) Assures the integrity and operational safety of the component being repaired.

(b) For repairs made while a component is operating, each operator shall include in the maintenance

procedures under § 193.2605 appropriate precautions to maintain the safety of personnel and property during repair activities.

§ 193.2619 Control systems.

(a) Each control system must be properly adjusted to operate within design limits.

(b) If a control system is out of service for 30 days or more, it must be inspected and tested for operational capability before returning it to service.

(c) Control systems in service, but not normally in operation (such as relief valves and automatic shutdown devices), must be inspected and tested once each calendar year, but with intervals not exceeding 15 months, with the following exceptions:

(1) Control systems used seasonally, such as for liquefaction or vaporization, must be inspected and tested before use each season.

(2) Control systems that are intended for fire protection must be inspected and tested at regular intervals not to exceed 6 months.

(d) Control systems that are normally in operation, such as required by a base load system, must be inspected and tested once each calendar year but with intervals not exceeding 15 months.

(e) Relief valves must be inspected and tested for verification of the valve seat lifting pressure and reseating.

§ 193.2621 Testing transfer hoses.

Hoses used in LNG or flammable refrigerant transfer systems must be—

(a) Tested once each calendar year, but with intervals not exceeding 15 months, to the maximum pump pressure or relief valve setting; and

(b) Visually inspected for damage or defects before each use.

§ 193.2623 Inspecting LNG storage tanks.

Each LNG storage tank must be inspected or tested to verify that each of the following conditions does not impair the structural integrity or safety of the tank:

(a) Foundation and tank movement during normal operation and after a major meteorological or geophysical disturbance.

(b) Inner tank leakage.

(c) Effectiveness of insulation.

(d) Frost heave.

§ 193.2625 Corrosion protection.

(a) Each operator shall determine which metallic components could, unless corrosion is controlled, have their integrity or reliability adversely affected by external, internal, or atmospheric corrosion during their intended service life.

(b) Components whose integrity or reliability could be adversely affected by corrosion must be either—

(1) Protected from corrosion in accordance with §§ 193.2627 thru 193.2635, as applicable; or

(2) Inspected and replaced under a program of scheduled maintenance in accordance with procedures established under § 193.2605.

§ 193.2627 Atmospheric corrosion control.

Each exposed component that is subject to atmospheric corrosive attack must be protected from atmospheric corrosion by—

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

(b) Suitable coating or jacketing.

§ 193.2629 External corrosion control; buried or submerged components.

(a) Each buried or submerged component that is subject to external corrosive attack must be protected from external corrosion by—

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

(2) The following means:

(i) An external protective coating designed and installed to prevent corrosion attack and to meet the requirements of § 192.461 of this chapter; and

(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 date 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) Those 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.

§ 193.2807 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.

§ 193.2800 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 m³ (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 so 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 visible 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 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 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, when 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 identification 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 ft²) 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 m³ (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.

10. Appendix A to Part 193 is amended by adding new material incorporated by reference as set forth below.

Appendix A to Part 193—Incorporation by Reference**II. Documents Incorporated by Reference.****B. American Gas Association (AGA)**

2. Purging Principles and Practice (1975 edition).

G. National Fire Protection Association (NFPA)

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

4. NFPA No. 30, Flammable Liquids (1977 edition).

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

11. Section § 193.2013(c) is revised to read as follows:

§ 193.2013 Incorporation by reference.

(c) Incorporated by reference provisions approved by the Director of the Federal Register.

(49 U.S.C. 1674 (a); 49 CFR 1.53 and Appendix A to Part 1)

Issued in Washington, D.C., on October 17, 1980.

L. D. Santman,
Director, Materials Transportation Bureau.

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