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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 191 and 193

[Docket No. PHMSA-2019-0091]

RIN 2137-AF45

Pipeline Safety: Amendments to Liquefied Natural Gas Facilities

ACTION: Notice of proposed rulemaking (NPRM).

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

SUMMARY: PHMSA proposes updating its regulations for liquefied natural gas (LNG) facilities to incorporate by reference the most recent industry safety standards and to make other changes to account for more than two decades of improvements and technological advancements. This rulemaking also responds to congressional mandates directing PHMSA to integrate risk-based regulatory approaches for certain LNG facilities.

DATES: Comments on this NPRM must be submitted by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. A public meeting of PHMSA's statutory advisory committees will be held on a date to be announced in the *Federal Register*.

ADDRESSES: Submit comments by any of the following methods, identifying docket number PHMSA-2019-0091 at the top of the first page:

- On https://www.regulations.gov, follow instructions to "submit a comment."
- By mail or hand delivery to Docket Management System, U.S. Department of Transportation, 1200 New Jersey Avenue S.E., Washington, D.C. 20590-0001. Hand delivery is available to this address between 9:00 a.m. and 5:00 p.m., Monday

through Friday (except Federal holidays). Include two copies if submitting by mail and include a self-addressed and stamped postcard to receive confirmation of receipt.

Comments may be viewed at https://www.regulations.gov/docket/PHMSA-2019-0091. Comments are posted without changes or edits, including any personal information provided. DOT's privacy statement can be reviewed at https://www.dot.gov/privacy. A plain language summary of the proposed rule is also available in section I.B. that is placed on the rulemaking docket, pursuant to 5 U.S.C. § 553(b)(4).

Confidential Business Information (CBI): You may designate a comment as CBI if your comment contains commercial or financial information that is customarily treated as private and that you actually treat as private by sending to Brianna Wilson, at the contact information listed below, the following: (1) the original document with each page containing CBI marked as "confidential;" (2) a redacted copy with the CBI deleted; and (3) an explanation of why the information you are submitting is CBI. *See* 49 CFR 190.343. Any comment not specifically designated as CBI will be placed in the public docket.

FOR FURTHER INFORMATION CONTACT: Brianna Wilson, Standards and Rulemaking Division, by phone at (771) 215-0969 or by email at brianna.wilson@dot.gov.

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I. Executive Summary

A. Purpose and Scope of the Regulatory Action

PHMSA has been regulating the safety of LNG facilities for more than five decades. When PHMSA issued the first Federal safety standards in 1970, the U.S. LNG industry comprised mostly relatively small "peak-shaving" facilities used to liquefy and store natural gas for delivery to local markets during times of peak demand. The handful of large-scale LNG facilities at that time were primarily built to import natural gas for domestic consumption. The U.S. LNG industry did not have a significant role as an exporter of natural gas.

Market conditions have changed dramatically since the 1970s. U.S. natural gas production has increased significantly, particularly in the past two decades as technological advancements in the oil and gas industry have led to the development of energy resources from the Nation's shale plays. Domestic natural gas demand has continued to grow, and an increasing number of U.S.-based facilities are exporting LNG to foreign markets. These changes have created a need for the construction of new LNG facilities and for the expansion of existing LNG facilities.

Modern operational and maintenance practices within the LNG industry are considerably more sophisticated and robust, reflecting many thousands of hours of experience since the 1970s. New technologies have emerged, such as "membrane" tanks (which employ a thin cryogenic steel inner liner with a load-bearing, concrete outer tank—an approach offering improved storage capacity, reduced material costs, and faster construction schedules than earlier LNG storage tank designs) and pipe-in-pipe (PIP) transfer systems (which provide enhanced containment of releases from cryogenic piping).

PHMSA's oversight of the LNG industry has not kept pace with these dramatic changes. PHMSA's LNG regulations are largely based on the 2001 edition of an industry standard, NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*, and have not been updated since 2006. NFPA 59A-2001 is now seven editions out of date, and multiple stakeholders have called on PHMSA to update its regulations to account for

the latest practices in the siting, design, construction, operation, and maintenance of LNG facilities. For example, in the Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016 (PIPES Act of 2016), Congress directed PHMSA to develop regulations for permanent, small-scale LNG facilities, an issue specifically addressed in the more recent editions of NFPA 59A.[1] In the Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2020 (PIPES Act of 2020), Congress directed PHMSA to develop alternative, risk-based operations and maintenance requirements for large-scale LNG facilities, an approach consistent with modern regulatory frameworks that apply in other industries.[2] The Government Accountability Office (GAO) has also advised PHMSA to update its regulations to align better with current editions of consensus industry standards.[3]

To address these concerns, PHMSA proposes a comprehensive revision to its safety standards for LNG facilities. The proposed amendments would enhance public safety by incorporating the latest consensus industry standards for the siting, design, construction, operation, and maintenance of LNG facilities. These changes will promote the use of new technologies, reduce unnecessary barriers to investment, and provide regulatory certainty for interested stakeholders. PHMSA's proposals will also address outstanding Congressional mandates and GAO recommendations and advance the President's commitments to unleashing American energy, sustaining U.S. defense operations, and ensuring the energy security of the U.S. and its allies.

B. Summary of the Major Regulatory Provisions

[1] PIPES Act of 2016, Pub. L. No. 114-183 (June 22, 2016).

[2] PIPES Act of 2020, Pub. L. No. 116-260 (Dec. 27, 2020).

[3] GAO, *Natural Gas Exports: Updated Guidance and Regulations Could Improve Facility Permitting Processes* (Aug. 6, 2020) (GAO Report).

Below is a high-level summary of the most substantial changes proposed in this document. This NPRM discusses each change in more detail in the "Section-by-Section Discussion of the Proposed Changes."

1. Calibrating Reporting Requirements to Public Safety Risks

PHMSA proposes to amend the reporting requirements for safety-related conditions and incidents. First, PHMSA proposes to clarify that operators of LNG facilities must report safety-related conditions and incidents during initial startup. This clarification would help ensure that operators are reporting incidents and safety-related conditions that occur at the earliest phase in the operational lifetime of an LNG facility, which is critical in determining its long-term integrity. PHMSA also proposes to broaden the definition of incidents and safety-related conditions to encompass hazardous fluids beyond LNG alone; this proposed change will improve risk mitigation and incident response by focusing on the various materials involved in gas processing activities at LNG facilities. Second, PHMSA proposes to revise the incident and annual report forms to eliminate content with little or no safety value, and to update the operator identification number (OPID) and annual report forms to accommodate the new requirements for permanent, small-scale LNG facilities in subpart D.

2. Incorporation by Reference Updated Editions of Leading Industry Standards

PHMSA proposes to incorporate by reference the 2026 edition of NFPA 59A.[4] PHMSA currently incorporates the 2001 edition of NFPA 59A for most purposes. Incorporating the 2026 edition is consistent with PHMSA's longstanding practice of integrating NFPA 59A as a key component of its regulations for LNG facilities. As part of that process, PHMSA proposes to redesignate or to remove certain duplicative or unnecessary regulatory requirements and to modify or to supplement certain provisions in NFPA 59A-2026 (*e.g.*, design wind resistance of

[4] National Fire Protection Association (NFPA), *59A-2026 Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)* (Dec. 9, 2025) (NFPA 59A-2026).

certain LNG facilities; design spill assumptions in hazard modeling) to accommodate significant public safety risks or to facilitate implementation.

Incorporating NFPA 59A-2026 would enhance the requirements for the siting, design, installation, construction, operations, and maintenance of LNG facilities and align PHMSA's regulations with the latest safety-enhancing practices and technologies. It would also reduce certain compliance costs by allowing LNG operators to use those practices and technologies without obtaining special permits or waivers and address outstanding Congressional mandates and GAO recommendations.

3. Improved Alignment Between Facility Siting Requirements and Safety Risks

PHMSA proposes to incorporate by reference the traditional, prescriptive siting requirements in chapter 5 of NFPA 59A-2026. Incorporating chapter 5 would expand the universe of hazards operators must evaluate to comply with the part 193, subpart B siting requirements, ensuring that those analyses are consistent with current knowledge of the public safety risks posed by releases of hazardous fluids from LNG facilities.

PHMSA also proposes to incorporate the new risk-based siting requirements in chapter 19 (*Performance-Based LNG Plant Siting Using Quantitative Risk Analysis (QRA)*) of NFPA 59A-2026. PHMSA expects that the QRA-based approach will improve facility safety by allowing a more sophisticated understanding of public safety risks, enhancing the allocation of resources, and incentivizing deployment of innovative operational practices and technology. PHMSA expects that improved flexibility regarding LNG facility siting and internal layout under the QRA-based approach could enable investment in additional capacity at existing locations.

4. Introduction of Targeted Requirements for Permanent, Small-Scale LNG Facilities

PHMSA proposes to establish requirements for permanent, small-scale LNG facilities by incorporating chapter 17 of NFPA 59A-2026 by reference into a new subpart D. Permanent, small-scale LNG facilities entail lower risks to public safety and the environment than larger

LNG facilities, primarily due to their distinguishable liquefaction processes, lower liquefaction capacity, and smaller LNG storage volumes, and should be regulated accordingly. Incorporating the chapter 17 requirements would also address the rulemaking mandate in section 27(b) of the PIPES Act of 2016 for permanent, small-scale LNG facilities.

5. Integration of an Alternative, Risk-based Operations and Maintenance Framework

Consistent with section 110 of the PIPES Act of 2020, PHMSA proposes to adopt an alternative, risk-based operations and maintenance (O&M) program for FERC-jurisdictional LNG facilities in a new subpart F. The risk-based O&M alternative would be a structured program with procedures developed and implemented to identify, to evaluate, and to mitigate or to eliminate hazards and the resulting risks. Operators employing this approach would have flexibility to tailor a risk-based approach to the specific risks from their facilities. Operators electing to use the risk-based O&M alternative would be required to submit an implementation plan specifying a timeline for integration of program elements.

C. Costs and Benefits

PHMSA estimates the annualized cost savings from the proposed rule to be approximately $98 million (discounted at three percent). PHMSA notes that some of the new compliance costs and many of the cost savings of the proposed rule could not be quantified based on the available data.

PHMSA anticipates significant unquantified safety benefits would result from adopting the safety-enhancing elements of NFPA 59A-2026, as supplemented and qualified by other proposed part 193 amendments. Because LNG facilities are complex systems whose failure generally involves multiple “but for” causes, PHMSA was not able to quantify a reduction in incident risk pursuant to the proposed rule. Other unquantified benefits include increased flexibility for LNG facility siting under the QRA-based approach in NFPA 59A-2026 chapter 19, increased regulatory flexibility for permanent, small-scale LNG facilities subject to the

requirements in NFPA 59A-2026 chapter 17, and the use of new technologies, such as membrane tanks, single-walled ASME (American Society of Mechanical Engineers) containers, and PIP systems, which PHMSA was not able to quantify due to uncertainty around potential uptake of the proposed flexibilities.

The preliminary regulatory impact analysis (PRIA) provided in the docket for this rulemaking includes additional information about the costs, benefits, and other impacts of the proposed rule. The PRIA's quantification of costs and benefits reflects assumptions and estimates based on the information and data available. PHMSA requests information and data from the public regarding the PRIA's evaluation of expected costs and benefits of its proposed requirements. PHMSA has preliminarily determined that, notwithstanding the uncertainties and data limitations discussed in the PRIA, the proposals in the NPRM would be justified by their corresponding compliance costs savings, enhanced regulatory flexibility, or improved public safety benefits.

II. Background

A. LNG as an Energy Source, Industry Growth, and Regulatory Safety

1. LNG as an Energy Source

Natural gas is vital to the energy and economic security of the United States and its allies abroad, serving as an economic driver and essential fuel source for residential, commercial, and industrial purposes. Total annual U.S. natural gas consumption has increased from 5.0 Tcf in 1949 to 33.5 Tcf in 2025.[5] Global natural gas consumption similarly is expected to grow from 152.9 Tcf to 194.3 Tcf by 2050 due to increasing demand in emerging markets and developing economies.[6] Domestic U.S. and international demand for natural gas has made it an important

[5] U.S. Energy Info. Admin. (EIA), *Natural Gas: U.S Gas Total Consumption*, available at: https://www.eia.gov/dnav/ng/hist/n9140us2a.htm (last visited Apr. 23, 2026).

[6] EIA, *International Energy Outlook 2023 Table: World Natural Gas Consumption by Region*, available at: https://www.eia.gov/outlooks/aeo/data/browser/#/?id=6-IEO2023&region=0-0&cases=Reference&start=2020&end=2050&f=A&linechart=Reference-d230822.21-6-IEO2023&map=&ctype=linechart&sourcekey=0.

driver of the U.S. economy; a smaller U.S. natural gas sector in 2018 contributed over 3.4 million jobs and $408 billion to U.S. Gross Domestic Product (GDP).[7]

Increased reliance on natural gas from a variety of applications is contributing to this growing demand. First, natural gas is a critical source of electric power generation capacity and grid stability. In addition to providing dispatchable electricity, natural gas electric power generation also supplies grid attributes (*e.g.*, inertia) increasingly vital to grid stability as more intermittent renewable energy generation capacity joins the grid and baseload coal and nuclear plants retire. Second, natural gas is essential for many industrial feedstock and process heat applications, as well as commercial and residential heating and cooking purposes. Third, natural gas is an increasingly vital fuel source in the transportation sector, powering maritime vessels (*i.e.*, marine bunkering), fueling truck fleets, and providing an alternative gas supply during pipeline testing activities.

But many regions—both within the United States and the wider world—do not have reliable access to natural gas. Some regions are far-removed from natural gas supply reservoirs; others have limited pipeline infrastructure enabling transportation of natural gas in gaseous form or are vulnerable to supply interruptions on natural gas pipelines. Reliable natural gas supply in such circumstances may turn on access to LNG—natural gas that has been cooled to low temperatures (minus 260°F or minus 162°C) and converted to a liquid state. This conversion process, known as liquefaction, reduces the volume of natural gas to approximately 1/600th of its volume in a gaseous state. The reduction in volume makes LNG efficient for transportation and storage purposes in areas with limited natural gas resources or limited pipeline supply of natural gas.

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[7] Am. Gas Ass'n (AGA), *Benefits to the Economy through the Direct Use of Natural Gas* (July 9, 2020), available at: https://www.aga.org/research-policy/resource-library/benefits-to-the-economy-through-the-direct-use-of-natural-gas/.

Prior to liquefaction, the natural gas must be treated (pre-treatment) to remove impurities and extract heavy hydrocarbons (extraction). The pre-treatment, hydrocarbon extraction, and liquefaction processes may involve a number of hazardous fluids—including materials that are flammable (*e.g.*, methane, ethane, ethylene, propane, butane, pentane, other heavy hydrocarbons including aromatic hydrocarbons, hydrogen sulfide, and anhydrous ammonia); toxic (*e.g.*, aromatic hydrocarbons, hydrogen sulfide, and anhydrous ammonia); and corrosive (*e.g.*, anhydrous ammonia, amine solution, and aromatic hydrocarbons). Such hazardous materials can be present in either gaseous or liquid form at different stages of these processes. Larger LNG facilities, such as import or export terminals, will typically employ more complex liquefaction processes (and different, and larger quantities of, hazardous fluids) than smaller LNG facilities, such as peak shavers and mobile and temporary facilities. After liquefaction, LNG is stored and transported in specialized tanks that are insulated and refrigerated to maintain low temperatures. When needed for use, LNG undergoes a regasification process in which it is warmed and converted back into its gaseous state. The vaporized natural gas can then be injected into a pipeline system for distribution or used as fuel for natural gas-operated equipment.

The flexibility arising from the transportation and storage of LNG has made it a vital element in natural gas supply infrastructures around the world. Within the United States, LNG peak shaving facilities provide local customers with access to natural gas during times of peak demand. There is also increasing interest in developing small-scale, mobile, or temporary LNG facilities to support novel applications (*e.g.*, ensuring continuity of power to data centers and for industrial applications). And U.S. LNG export facilities are a critical energy resource for a variety of countries—including strategic U.S. allies in Asia and Europe—which either have limited native energy resources, desires to diversify their energy portfolios, or plans to transition away from coal for electric power and process heat generation. Recent supply disruptions of

LNG exports from international LNG suppliers like Qatar have also underscored the unique value of U.S. LNG exports to the energy security of America's trading partners.

2. Growth and Increasing Domestic and International Significance of the U.S. LNG Industry

The U.S. LNG industry has undergone significant changes in the two decades since PHMSA last amended its part 193 regulations. The design and configuration of the 117 regulated LNG facilities in service at that time reflected the more limited role of natural gas within the domestic U.S. economy and consisted mostly of the following:

- Peak-shaving plants designed to store surplus natural gas for use during high demand periods, such as summer and winter. Peak-shaving plants ensure reliability by liquefying and storing natural gas when demand is low and re-gasifying and distributing natural gas when demand is high. Natural gas shortages in the 1970s drove a wave of construction of peak-shaving plants. Operators began slowly retiring those plants in subsequent decades. The number of peak-shaving plants decreased from 75 in 2006 to 67 in 2018.
- Satellite plants serving peak-shaving purposes but lacking the processing equipment required to convert natural gas to LNG. Specially equipped trucks (or tanks transported on rail flatcars) deliver LNG to satellite plants, where the LNG is stored and later re-gasified and injected into natural gas distribution systems to meet demand. In 2006, there were 23 satellite plants.
- Mobile and temporary LNG plants designed to be easily movable rather than permanent structures. Mobile LNG plants, such as skid-mounted or trailer-mounted units, can be relocated as needed. Temporary LNG plants are used for short-term applications, providing supply during planned construction and maintenance activities or to meet unanticipated demand. Mobile and temporary LNG plants are compact and often located near end users to minimize transportation costs and enhance accessibility. In 2006, there were nine mobile and temporary facilities.

- Large-scale terminals for importing LNG for domestic use, exporting LNG to foreign markets, or both. In 2006, the United States was a net importer of natural gas; there were four import terminals and one export terminal representing an aggregate 4.877 Bcf/d vaporization capacity. These terminals played a relatively small role in the U.S. and global energy economy in 2006.

The shale gas revolution has fundamentally reshaped domestic and international energy markets over the past two decades. Newly abundant natural gas supplies have resulted in a rapid expansion of natural gas power generation capacity and industrial and commercial applications within the United States—a trend that is expected to accelerate due to onshoring of industrial capacity and skyrocketing demand for continuous electric generation capacity supporting super intelligence and data centers.[8] The number of part 193-regulated U.S. LNG facilities has increased in response to these recent market developments. As of 2025, there are 69 peak shaving plants, many of which are larger, and more complex, than the smaller plants typical in 2006. The number of other PHMSA-jurisdictional LNG plants has increased as well: in 2004, there were 22 satellite plants, 8 mobile or temporary facilities, and 4 import terminals (representing 4.877 Bcf/d import capacity); in 2025 there were 32 satellite plants, 43 mobile or temporary facilities, and 9 import terminals (representing 14.934 Bcf/d import capacity). Abundant natural gas supplies have also resulted in proliferation of so-called "small-scale" applications of LNG catering to niche markets, including off-grid power generation, localized peak-shaving, industrial equipment usage (such as oil and gas drilling equipment), and transportation fuels for vehicles, rail, or maritime use.[9]

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[8] *See* Sturgeon (Xcel) & Hummel (Chart Industries), *Transcript of Oct. 2025 Public Meeting*, Docket ID PHMSA-2019-0091-7624, at 67:12–70:20, 72:20–77:16 (Oct. 25, 2025).

[9] *See* Hummel (Chart Industries), *Transcript of Oct. 2025 Public Meeting*, Docket ID PHMSA-2019-0091-7624, at 72:20–77:16 (Oct. 25, 2025); Christa Marshall, *Data Centers Increasingly Turn to Off-Grid Gas*, EE News (Feb. 5, 2026).

But the most significant change since 2006 has been the emergence of enormous U.S. natural gas export capacity. The United States now boasts eight operational, PHMSA-jurisdictional export terminals providing ca. 17.0 Bcf/d of capacity. Sixteen additional projects (providing an additional ca. 31.28 Bcf/d capacity) either are in construction or are expected to begin construction in the near future.[10] And the United States—a net importer of natural gas in 2006—exported approximately 15.1 Bcf/d of LNG in 2024, making it the world's largest LNG exporter, responsible for roughly 21 percent of worldwide LNG supply.

LNG exports have become critical to U.S. economic prosperity and national security. A 2026 study predicts that through 2040 U.S. LNG exports will contribute an aggregate of around $1.4 trillion to U.S. GDP, more than $2.9 trillion in total revenues for U.S. businesses, $206 billion in Federal and State tax revenues, and more than $630 billion in labor income. The industry will support an average of over a half-million U.S. jobs annually.[11] U.S. LNG exports also reduce trade deficits with economic competitors and have become a focal point for U.S. policymakers in recent tariff negotiations with U.S. trading partners.[12] U.S. LNG exports are a vital form of support for key U.S. allies as well. Europe and Asia were the top destinations for U.S. LNG exports in 2025.[13] Japan alone imported 222.9 Bcf of U.S. LNG in 2025, roughly 4.0 percent of the U.S. LNG exports for 2025. The Netherlands imported 645.8 Bcf of U.S. LNG

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[10] PHMSA, *Liquefied Natural Gas (LNG) Annual Data – 2010 to Present*, available at: https://www.phmsa.dot.gov/data-and-statistics/pipeline/gas-distribution-gas-gathering-gas-transmission-hazardous-liquids (last visited Apr. 14, 2026); FERC, *U.S. LNG Export Terminals – Existing, Approved Not Yet Built, and Proposed*, available at: https://www.ferc.gov/media/us-lng-export-terminals-existing-approved-not-yet-built-and-proposed (last visited Apr. 14, 2026).

[11] S&P Global, *Price and Economic Impacts of an Accelerating Export Industry: U.S. LNG Impact Study – Phase 4* (July 2026).

[12] Reuters, *U.S. LNG Producers Climb as EU Agrees to $750 Billion in Energy Purchases* (July 28, 2025), available at: https://www.reuters.com/business/energy/us-lng-producers-climb-eu-agrees-750-billion-energy-purchases-2025-07-28/.

[13] EIA, *Today in Energy: U.S. Natural Gas Exports to Grow Nearly 30% by 2027 as LNG Facilities Ramp Up* (Apr. 16, 2026), available at: https://www.eia.gov/todayinenergy/detail.php?id=67484.

in 2025, the most of any country and roughly 11.7 percent of U.S. LNG exports that year.[14] Exports to Europe increased following Russia's invasion of Ukraine; in 2022, Europe received 69 percent of all LNG exports from the United States, up from 34 percent in 2021. From January through November 2025, Europe received 68 percent of U.S.-origin volumes.[15]

3. The Regulatory Framework and Industry Efforts to Ensure LNG Facility Safety

Multiple Federal agencies play a role in ensuring the safety of onshore LNG facilities.[16] These agencies exercise their respective authorities through a variety of administrative tools—including implementing regulations, guidance, orders, and enforcement actions—that can govern different phases of the lifecycle (including authorization, construction, and operations) of LNG facilities. The States also have a role in administering the Federal safety framework for intrastate LNG facilities. Industry, too, has pursued continuous safety improvement, developing voluntary (but widely adopted) consensus and industry codes, standards, recommended practices, guidelines reflecting safety-enhancing best practices, and technological advances that have outpaced the development of Federal safety regulatory regimes. These mutually reinforcing approaches have yielded a strong historical safety record for all PHMSA-jurisdictional LNG facilities.

a. The Regulatory Framework Ensuring Safety

Guardrails for Federal agencies' exercise of their respective regulatory authorities over the safety of LNG facilities are set forth in a series of interagency agreements and memoranda of understanding. Noteworthy among those interagency efforts are: a 2004 Interagency Agreement between PHMSA, FERC, and the USCG governing waterfront LNG facilities (typically FERC-

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[14] EIA, *U.S. Natural Gas Exports and Re-Exports by Country*, available at: https://www.eia.gov/dnav/ng/NG_MOVE_EXPC_S1_A.htm (last visited Apr. 22, 2026).

[15] EIA, *Today in Energy: Ten Years After First Sabine Pass Cargo, U.S. LNG Exports are Still on the Rise* (Feb. 24, 2026), available at: https://www.eia.gov/todayinenergy/detail.php?id=67224.

[16] PHMSA has not attempted to identify here the entire universe of Federal agencies whose regulatory schemes could touch on the diverse activities of PHMSA-jurisdictional LNG facilities but instead focused on those playing the most prominent role in their safety regulation.

jurisdictional import and export facilities);[17] a 2018 Memorandum of Understanding between FERC and PHMSA regarding PHMSA's role in FERC's environmental analyses supporting LNG facility certificate applications;[18] and a 2020 Annex to a 2004 Memorandum of Understanding between DOT and DHS outlining the respective roles of PHMSA and the DHS agencies (including TSA, USCG, and CISA) regarding the physical and cybersecurity of PHMSA-jurisdictional LNG facilities.[19]

PHMSA

PHMSA's authority to regulate the safety of LNG facilities is derived from the Pipeline Safety Laws (49 U.S.C. § 60101 *et seq.*). The Natural Gas Pipeline Safety Act of 1968 authorized DOT to prescribe and to enforce minimum Federal safety standards for gas pipeline facilities and persons engaged in the transportation of gas, including the conversion and storage of gas by LNG facilities.[20] Subsequent amendments to the Pipeline Safety Laws directed DOT to establish and to enforce safety standards specific to LNG facilities.[21] The PHMSA Administrator exercises this authority on behalf of the Secretary pursuant to a delegation at 49 CFR 1.97.[22]

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[17] *Interagency Agreement Among the Federal Energy Regulatory Commission, United States Coast Guard, and Research and Special Programs Administration for the Safety and Security Review of Waterfront Import/Export Liquefied Natural Gas Facilities* (Feb. 10, 2004), available at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/InteragencyAgreementLNG%2CFeb2004.pdf (2004 Interagency Agreement).

[18] *Memorandum of Understanding Between the Department of Transportation and the Federal Energy Regulatory Commission Regarding Liquefied Natural Gas Transportation Facilities* (Aug. 31, 2018), available at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/news/64706/ferc-phmsa-mou.pdf (2018 Memorandum of Understanding).

[19] *Annex to the Memorandum of Understanding Between the Department of Homeland Security and the Department of Transportation Concerning Transportation Security Administration and Pipeline and Hazardous Materials Safety Administration Cooperation on Pipeline Transportation Security and Safety* (Feb. 26, 2020), available at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/regulatory-compliance/phmsa-guidance/73466/phmsa-tsa-mou-annexexecuted.pdf (2020 Annex).

[20] Pub. L. No. 90-481.

[21] 49 U.S.C. § 60103; *see* Pub. L. No. 114-183; Pub. L. No. 116-260.

[22] For additional information on the history of PHMSA's authority to regulate the safety of LNG facilities, see RSPA, *Associate Administrator Decision Denying Petition for Rulemaking from the Commonwealth of Massachusetts and the State of Rhode Island*, Docket ID PHMSA-RSPA-2004-19208-0007 (Oct. 25, 2006).

PHMSA has prescribed comprehensive minimum safety standards for LNG facilities at part 193. These safety standards consist of siting, design, installation, construction, testing, maintenance, and operations (including fire protection and physical security) requirements. PHMSA also requires owners and operators of LNG facilities to submit annual, incident, and safety-related condition reports. PHMSA oversees compliance with the part 193 regulations by conducting inspections; investigating incidents; and, if necessary, initiating enforcement actions.[23] PHMSA also plays an important role in FERC's exercise of its authority under sections 3 or 7 of the Natural Gas Act (NGA, 15 U.S.C. § 717 *et seq*.). Pursuant to the 2004 Interagency Agreement between PHMSA, FERC, and the USCG, PHMSA serves as a cooperating agency supporting FERC's compliance with the National Environmental Policy Act (NEPA, 42 U.S.C. § 4321 *et seq.*) in connection with certificates for new and modified LNG facilities. The 2018 Memorandum of Understanding elaborated on that historical role, as it provides that PHMSA's participation in FERC's NEPA reviews will also entail issuance of a letter of determination on an applicant's compliance with PHMSA's part 193, subpart B siting requirements.

PHMSA's enabling statutes and implementing regulations also prescribe important limits on its authority to regulate LNG facilities. For example, because PHMSA's statutory authority only extends to the transportation of gas by pipeline, part 193 has historically only applied to LNG facilities that receive gas from or deliver gas to a part 192-regulated pipeline.[24] Part 193

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[23] 49 U.S.C. § 60112 *and* 49 CFR 190.233 (corrective action order authority based on PHMSA decision that a pipeline facility is or would be "hazardous"); 49 U.S.C. § 60117(m) *and* 49 CFR 190.239 (notice of proposed safety order authority based on PHMSA determination that a pipeline facility has a condition posing a "pipeline integrity risk"); 49 U.S.C. § 60117(p) *and* 49 CFR 190.235–190.237 (emergency order authority based on PHMSA determination that an unsafe condition or practice "constitutes or is causing an imminent hazard"); 49 U.S.C. § 60122 *and* 49 CFR 190.221–190.225 (civil penalty authority based on PHMSA determination that a person violated a pipeline safety law, regulation, or order); 49 U.S.C. § 60118(b) *and* 49 CFR 190.217 (compliance order authority based on PHMSA determination that a person is violating a pipeline safety law, regulation, or order).

[24] *See, e.g.*, PHMSA, *LNG Plant Requirements: Frequently Asked Questions,* at G1, available at: https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-plant-requirements-frequently-asked-questions (last visited Sep. 11, 2025) (LNG FAQs).

has also not applied to LNG facilities used either by ultimate consumers of LNG or natural gas (§ 193.2001(b)(1)) or in natural gas treatment or hydrocarbon extraction that do not store LNG (§ 193.2001(b)(2)). The Pipeline Safety Laws at 49 U.S.C. § 60101(a)(14)(B) explicitly prohibit PHMSA from regulating structures or equipment at LNG facilities located in navigable waters as defined by the Federal Power Act (16 U.S.C. § 796), a prohibition codified by regulation at 49 CFR 193.2001(b)(4). In addition, part 193 regulations codify at § 193.2001(b)(3) the allocation of regulatory authority between the USCG and the Research and Special Projects Administration (RSPA, PHMSA's predecessor agency) memorialized within a 1978 Memorandum of Understanding, whereby RSPA disclaimed regulatory authority for matters other than siting with respect to the "marine cargo transfer system and associated facilities" at waterfront LNG facilities.[25]

Other documents inform PHMSA's exercise of its statutory authority over LNG facilities. The 2004 Memorandum of Understanding between DOT and DHS reflects post-9/11 legislation re-allocating primary responsibility for transportation security from DOT to the then newly established DHS (though the Memorandum contemplates that DOT operating administrations will support DHS security efforts and retain their pre-existing statutory authority to ensure the safety of different modes of transportation in ways that could overlap with DHS's security mission). Subsequently negotiated annexes (most recently the 2020 Annex negotiated between TSA and PHMSA) elaborate on each agency's respective responsibilities and commit to mutual collaboration on information sharing, critical infrastructure security and resilience, strategic planning, and development of standards and guidance. The 2004 Interagency Agreement between PHMSA, FERC, and USCG similarly memorializes commitments among those agencies for cooperation in their respective operations-phase inspections of LNG facilities.

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[25] *See* MTB, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9188 (Feb. 11, 1980).

PHMSA exercises jurisdiction over 23 FERC-authorized (including existing, certificated but not-yet-built) onshore LNG import and export terminals; there are two additional LNG import and export terminal applications currently under FERC review that would be regulated by PHMSA as well. PHMSA also regulates more than 69 LNG peak-shaving facilities, 43 mobile/temporary facilities, and 32 satellite facilities.[26]

Federal Energy Regulatory Commission (FERC)

Under the NGA, FERC issues orders authorizing the siting, construction, expansion, and operation of LNG import and export terminals (NGA, section 3 (codified at 15 U.S.C. §§ 717b and 717b-1)) and certificates of public convenience and necessity for some LNG peak shaving facilities (NGA, section 7 (codified at 15 U.S.C. § 717f)).[27] As part of the application process, FERC requires operators to submit detailed site-specific engineering, design, and operations information; evidence that the facility will safely receive or deliver LNG; and procedures and design features to mitigate potential hazards to the public resulting from accidental releases or natural catastrophes.[28] Most of the information submitted to FERC during the application process would be considered process safety information required to be addressed under the PIPES Act of 2020.

Furthermore, FERC requires applicants to explain how the proposed project will comply with applicable Federal regulations, including part 193, in implementing NEPA and the NGA.[29] FERC engages PHMSA as a cooperating agency as part of the application review process in analyzing compliance with the part 193 siting requirements. In addition, FERC evaluates the engineering information submitted by an applicant against the applicable regulations and

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[26] PHMSA, *LNG Annual Data – 2010 to Present*.

[27] *See* 15 U.S.C. §§ 717a(11), b(e), f. FERC also has the authority to approve the design, construction, and siting of natural gas import and export facilities. *See* 15 U.S.C. § 717b(a); *see also* 42 U.S.C. § 7151(b) (2012); U.S. Dep't of Energy, *Delegation Order No. 00-004.00A* (May 16, 2006).

[28] *See* 18 CFR part 153; 18 CFR 380.12(m)–(o).

[29] *See* 18 CFR 380.12(o)(14).

additional codes, standards, and other recommended and generally accepted good engineering practices (RAGAGEPs) listed by the applicant or that are routinely applied to LNG facilities. FERC similarly engages USCG as another cooperating agency under NEPA in reviewing waterway suitability assessments (WSAs).

FERC orders for LNG facilities typically contain conditions memorializing a broad range of applicant commitments and FERC-imposed requirements directed toward safety and environmental protection. Such conditions include, but are not limited to, submitting for review and approval: final designs of various engineering and process safety information, completed process hazard analyses (PHAs), management of change (MOC) procedures and logs, pre-start-up safety reviews (PSSRs), O&M procedures, including preventative and predictive maintenance plans (*e.g.*, mechanical integrity procedures), hot work procedures, contractor oversight procedures, and emergency response plans developed in consultation with Federal, State, and local emergency management agencies and emergency responders. Moreover, FERC requires an implementation plan and schedule for meeting the conditions in its orders, authorizes initiation of various activities, and conducts annual or biennial inspections to verify compliance during construction, commissioning, and operations. FERC also requires operators to notify its staff of significant non-scheduled events, including safety and security-related incidents, and to submit semi-annual reports of modifications in design of facilities and operating conditions and abnormal operating and maintenance experiences, including release of hazardous fluids.

FERC exercises jurisdiction over 23 (including existing, certificated but not-yet-built) LNG import and export terminals onshore or in State waters, as well as 13 LNG peak-shaving plants involved in interstate gas transportation.[30] Additional LNG import and export terminal applications are currently under FERC formal application or pre-filing review.

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[30] FERC, *U.S. LNG Export Terminals – Existing, Approved Not Yet Built, and Proposed*; FERC, *U.S. LNG Import Terminals – Existing, Approved Not Yet Built, and Proposed*, available at: https://www.ferc.gov/

Department of Homeland Security (DHS)—United States Coast Guard (USCG)

USCG's regulatory authority over onshore, waterfront LNG facilities arises from statutes governing the safety and security of ports and navigable waterways.[31] USCG exercises primary regulatory authority for safety within marine cargo transfer areas at waterfront LNG plants, which USCG refers to as the marine transfer area for LNG, and has adopted regulations at 33 CFR part 127 governing the design, construction, maintenance and operations of those facilities—but has historically deferred to PHMSA's evaluation under 49 CFR part 193, subpart B of the hazards arising from their siting. USCG also exercises primary responsibility for physical security of the marine cargo transfer area as well as the entirety of waterfront LNG facilities and has issued regulations at 33 CFR part 105 governing the submission and approval of FSPs. Title 33 CFR part 101 (Subpart F) also governs cybersecurity requirements of LNG facilities under 33 CFR part 105.

USCG regulations address the suitability of waterways for LNG marine traffic in connection with waterfront LNG facilities (33 CFR 127.007 and 127.009), and vessel engineering and construction safety (46 CFR part 154) and security (33 CFR part 104) for LNG ship traffic in connection with waterfront LNG facilities; USCG reviews operator-submitted WSAs documenting compliance with those regulations for each such LNG facility. USCG also performs reasonable examinations and inspections at waterfront LNG facilities to verify compliance with its regulations and any obligations imposed in connection with its review of

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media/us-lng-import-terminals-existing-approved-not-yet-built-and-proposed (last visited Apr. 14, 2026); FERC, *Jurisdictional Peakshavers* (Nov. 2, 2020), available at: https://www.ferc.gov/sites/default/files/industries/gas/indus-act/lng/lng-peakshavers.pdf.

[31] *E.g.*, Magnuson Act of 1950 (46 U.S.C. § 70051); Ports and Waterways Safety Act of 1972, as amended (46 U.S.C. Ch. 700); Maritime Transportation Security Act of 2002 (46 U.S.C. Ch. 701). PHMSA notes that the proposed amendments to 49 CFR parts 191 and 193 do not modify, limit, supersede, or otherwise affect existing Coast Guard authorities or requirements applicable to waterfront LNG facilities, marine transfer areas, mobile or temporary LNG facilities at or near waterfront locations where Coast Guard requirements may apply, including facility security, waterway suitability, and Captain of the Port authorities. In addition, PHMSA clarifies that compliance with 49 CFR part 193, including any incorporated NFPA 59A-2026 provisions, does not relieve an operator of any applicable Coast Guard requirement.

FSPs and WSAs.[32] In addition, USCG regulations require that operators notify the appropriate Federal agency of suspicious activities, security breaches, and transportation security incidents.[33]

USCG exercises jurisdiction over 23 (including existing, certificated but not-yet-built) waterfront LNG import and export terminals, as well as 4 bunkering facilities.[34]

Department of Homeland Security (DHS)—Transportation Security Agency (TSA) and Cybersecurity and Infrastructure Security Agency (CISA)

The Homeland Security Act of 2002 consolidated homeland security responsibilities within DHS. Congress transferred two DOT operating administrations to DHS in that legislation: the USCG and TSA.[35] Subsequently, Congress passed the Cybersecurity and Infrastructure Security Agency Act of 2018, establishing CISA within DHS and assigning CISA primary responsibility for coordinating cybersecurity protection for the Nation's energy infrastructure.[36]

In 2010, TSA issued the initial edition of its Pipeline Security Guidelines to assist operators of gas pipelines and LNG facilities in the development and evaluation of comprehensive security programs at their facilities. TSA's Pipeline Security Guidelines, which have been updated several times (most recently in April 2021), set forth non-binding guidance pertaining to corporate security policies, security vulnerability assessments, physical security measures, and cybersecurity efforts.[37] TSA conducts voluntary visits with pipeline operators as part of its Corporate Security Review Program. TSA personnel work with operator personnel

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[32] 33 CFR 127.011.

[33] 33 CFR 101.305.

[34] Int'l Mar. Org, *Fuel Supply: Supply of Alternative Fuels*, available at: https://futurefuels.imo.org/latest-information/fuel-supply/ (last visited Apr. 21, 2026).

[35] Pub. L. 107-296, 116 Stat. 2135, 2249–50 (codified as amended at 6 U.S.C. § 468(b)) (transferring the USCG's authorities, functions, personnel, and assets to DHS). Congress established TSA in the Aviation and Transportation Security Act of 2001 (Pub. L. 107-71, 115 Stat. 597, 597–98 (codified as amended at 49 U.S.C. § 114)) and assigned it primary responsibility for transportation security in all modes of transportation. 49 U.S.C. § 114(d).

[36] Pub. L. 115-278, 132 Stat. 4169–72.

[37] TSA, *Pipeline Security Guidelines* (Apr. 2021), available at: https://www.tsa.gov/sites/default/files/pipeline_security_guidelines.pdf.

during these visits to analyze FSPs and policies and compare practices against the Pipeline Security Guidelines.

Following the 2021 Colonial Pipeline ransomware attack, TSA issued Security Directives imposing mandatory cybersecurity requirements on a limited number of critical pipeline facilities, including certain peak shaving facilities. TSA issued Security Directive Pipeline-2021-01 (Security Directive) requiring owners and operators of critical pipeline facilities to take crucial measures to enhance pipeline cybersecurity.[38] This Security Directive requires operators of those facilities (1) to report confirmed and potential cybersecurity incidents to CISA; (2) to designate a Cybersecurity Coordinator to be available 24 hours a day, seven days a week; (3) to review current practices by performing a cybersecurity vulnerability assessment; and (4) to identify any gaps and related remediation measures to address cyber-related risks and report the results to TSA and CISA.[39]

On July 20, 2021, TSA issued Security Directive Pipeline-2021-02 requiring operators of TSA-designated critical facilities to implement additional protections against cyber intrusions and degradation of critical infrastructure, including development and execution of Cybersecurity Implementation, Response, and Assessment Plans as well as annual Cybersecurity Assessment Plan reporting to CISA.[40] Subsequent renewals of each of those Security Directives have clarified and expanded pertinent programmatic and reporting requirements.[41]

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[38] On May 8, 2021, the Colonial Pipeline Company announced that it had halted its pipeline operations due to a ransomware attack. This attack temporarily disrupted critical supplies of gasoline and other refined petroleum products throughout the East Coast of the United States. *See* TSA, *Ratification of Security Directive, Security Directive Pipeline–2021–01*, 86 FR 38209 (July 20, 2021); DHS, *DHS Announces New Cybersecurity Requirements for Critical Pipeline Owners and Operators* (May 27, 2021), available at: https://www.dhs.gov/news/2021/05/27/dhs-announces-new-cybersecurity-requirements-critical-pipeline-owners-and-operators.

[39] TSA, *Ratification of Security Directive, Security Directive Pipeline–2021–01*, 86 FR 38209 (July 20, 2021).

[40] TSA, *Ratification of Security Directive, Security Directive Pipeline–2021–02*, 86 FR 52953 (Sep. 24, 2021).

[41] TSA, *Security Directive Pipeline–2021-01G* (Jan. 6, 2026); TSA, *Security Directive Pipeline-2021-02F* (May 1, 2025). TSA Pipeline Security Directives are maintained at https://www.tsa.gov/sd-and-ea.

States

The Federal Pipeline Safety Laws preserve a role for States in regulating the safety of LNG facilities. State authorities may obtain a certification from PHMSA to regulate the safety of intrastate LNG facilities not subject to the jurisdiction of FERC under the NGA—typically peak shaving, mobile/temporary, and satellite LNG facilities.[42] Certified State authorities may prescribe and enforce additional or more stringent safety standards for intrastate LNG facilities, so long as those safety standards are compatible with the Federal requirements in the Pipeline Safety Regulations (49 CFR parts 190–199). As of February 2026, 41 State authorities are certified to regulate approximately 149 intrastate LNG facilities.[43]

b. Industry Efforts Promoting LNG Facility Safety

The LNG industry plays an active role in ensuring the safety of PHMSA-jurisdictional LNG facilities, particularly through the development of voluntary consensus industry standards and recommended practices. The leading industry standard for LNG facilities is NFPA 59A. First published in 1967, PHMSA has incorporated NFPA 59A by reference into the Federal safety standards for LNG facilities since 1972.[44] The most recent edition of NFPA 59A, published in 2026, includes mandatory standards for the siting, design, construction, operation, and maintenance of LNG facilities. This edition incorporates a comprehensive list of other

[42] PHMSA also notes that most LNG facilities not subject to FERC authority under the NGA are approved by State regulators (*e.g.*, public utility commissions). Those State regulators may either list safety requirements among the terms and conditions of such approvals or accept regulatory commitments by project sponsors to adopt certain safety requirements.

[43] The Pipeline Safety Laws at 49 U.S.C. § 60106 also permit PHMSA to make an agreement with a State authority authorizing it to participate in the oversight of interstate LNG facilities and other gas pipeline facilities. No State with interstate LNG facilities has entered into such an agreement. *See* PHMSA, *LNG Plant Safety Programs: Participating States in the Federal/State Cooperative Partnership* (Apr. 2026), available at: https://www.npms.phmsa.dot.gov/Documents/LNG_CoopAgreementsMap.pdf.

[44] 37 FR 21638 (amending part 192 to create a new § 192.12 that will establish Federal safety standards for liquefied natural gas facilities at § 192.12 and incorporating, by reference, the 1971 edition of NFPA 59A).

consensus industry standards addressing particular topics as well as several informational annexes providing guidance to facilitate compliance with its mandatory provisions.[45]

A technical committee (Technical Committee) is responsible for drafting each edition of NFPA 59A to ensure its provisions reflect the latest safety-enhancing advances in operator practices and technologies. The Technical Committee consists of 35 principal experts and 21 alternates from State and Federal government and the LNG industry. Collectively, the Technical Committee has extensive expertise on all aspects of LNG safety. PHMSA and FERC are among the government participants on the Technical Committee, with representatives of each of those agencies serving as voting members.

The process employed by the Technical Committee in updating NFPA 59A has been accredited by the American National Standards Institute (ANSI). Development of each edition of NFPA 59A lasts between three to five years and involves a four-step process: (1) public input; (2) public comment; (3) NFPA Technical Committee meeting; and (4) standards council action. Public input from industry stakeholders and members of the general public is accepted for consideration in the Technical Committee's development of the initial draft of an updated edition. Once the initial draft is developed, the Technical Committee posts that initial draft (accompanied by reports summarizing and responding to input from the public and Technical Committee members) on a publicly available website and solicits comments. After analyzing any comments received, the Technical Committee prepares the second draft (and potentially subsequent drafts) pursuant to a similar process and posts its responses to the comments received on the previous draft. After the Technical Committee approves the revised draft, the NFPA Standards Council approves issuance of the updated standard.

c. The LNG Industry's Strong Safety Record Since 2006

[45] Standards listed in NFPA 59A-2026's mandatory provisions and informational annexes are also generally themselves mature documents (building on successive editions issued over many years) resulting from extensive discussions among industry technical experts and government regulators on technical issues.

The U.S. LNG industry has a remarkably strong safety record. Since 2010, there has been more than a 50 percent increase in the number of all PHMSA-jurisdictional LNG facilities—121 facilities in 2010 compared to the 181 facilities in 2024. That increase has not led to more incidents. Incident data across all PHMSA-jurisdictional LNG facilities shows that there have been three or fewer significant incidents reported in each of the past 15 years.[46] In 11 out of those 15 years, one or fewer significant incidents were reported. Zero significant incidents were reported in six of those years, and only two reportable injuries occurred during that entire 15-year period—one at a peak shaving facility in 2014 and one at a mobile and temporary facility in 2023. And there was only a single fatality (at a mobile/temporary facility—not the more complex LNG export or peak shaving facilities).

The same strong safety record holds if the 15-year data is examined for each type of LNG facility. For LNG export facilities, there were no significant incidents reported in 10 out of the 15 years even as the number of those facilities has more than doubled between 2010 and 2024. Peak shaving facilities reported only three significant incidents, and mobile and temporary LNG facilities had only one significant incident—even as the number of each of those facilities increased since 2010. And non-marine baseload and satellite facilities had no significant incidents during the 15-year period even as the number of those facilities increased more than 100 percent.

4. Broad Demand for Updated PHMSA Regulations on LNG Facility Safety

Despite the significant changes that have occurred throughout the LNG industry, PHMSA has not updated its part 193 regulations since 2006. Instead, PHMSA has leaned more heavily on guidance in the form of its LNG FAQs implementing its part 193 regulations to accommodate

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[46] PHMSA, *Liquefied Natural Gas (LNG) Incident Data – January 2011 to Present*, available at: https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data (LNG Incident Report Data). By "significant" PHMSA means an incident involving fatality, injury, or total property damage of $50K or more in 1984 dollars.

innovations in facility design, function, construction and operational practices, and technology. But PHMSA's LNG FAQs—which have been updated nine times since their introduction in 2014—are not legally binding and do not provide interested stakeholders with the regulatory certainty needed to make informed decisions. PHMSA's delay in updating its part 193 regulations has in turn encouraged FERC to exercise its statutory authority to impose more legally binding, safety-related conditions in authorizing new LNG projects. Although this case-by-case approach is done with PHMSA and USCG as cooperating agencies and includes a fairly consistent set of conditions, PHMSA's or USCG's recommendations are subject to FERC's consideration, which can inject further uncertainty into the regulatory framework. As discussed in more detail below, a broad consensus has been reached about the need to update part 193 regulations to address these and other concerns.

Executive Orders

Noting that modern LNG facilities "bear little resemblance to the small peak shaving facilities" typical when PHMSA first issued its part 193 regulations in February 1980, President Trump in his first term issued Executive Order (E.O.) 13868, *Promoting Energy Infrastructure and Economic Growth*, directing PHMSA to issue a final rule updating its part 193 regulations no later than May 2020.[47] E.O. 13868 directed PHMSA to ensure that those updated regulations employed "risk-based standards to the maximum extent possible."

In his second term, President Trump has issued a series of executive orders encouraging investment in the Nation's energy infrastructure and the use of risk-informed regulations ensuring the safety of those facilities. On his first day in office for his second term, the President issued E.O. 14156, *Declaring a National Energy Emergency*, identifying the integrity and expansion of U.S. energy infrastructure to support affordable domestic energy prices and robust

[47] E.O. 13868, *Promoting Energy Infrastructure and Economic Growth*, 84 FR 15495 (Apr. 19, 2019).

energy exports as a U.S. national and economic security priority.[48] That same day, President Trump issued E.O. 14154, *Unleashing American Energy*, requiring agencies to reduce undue burdens on the identification, development, or use of domestic energy resources to protect U.S. energy and national security, singling out the contribution of LNG exports to U.S. national security and economic growth.[49] Later his first month in office, President Trump issued E.O. 14192, *Unleashing Prosperity Through Deregulation*, requiring agencies to identify opportunities to alleviate unnecessary regulatory compliance burdens imposed on industry and the general public.[50] Lastly, in response to disruptions in LNG supply routes due to regional conflicts, President Trump issued a Determination under the Defense Production Act of 1950 (Pub. L. No. 81-774) to promote expansion of (*inter alia*) U.S. LNG export capacity to sustain U.S. defense operations and ensure the energy security of U.S. allies.[51]

Congressional Mandates

Congress has repeatedly called on PHMSA to update its part 193 regulations. On June 22, 2016, Congress enacted the PIPES Act of 2016.[52] Section 27 directed PHMSA to review and to update the minimum safety standards for LNG facilities and to ensure that those regulations appropriately address the public safety risks posed by permanent, small-scale LNG pipeline facilities.

On December 27, 2020, Congress enacted the PIPES Act of 2020.[53] Section 110 of that legislation directed PHMSA to review existing part 193 regulations governing operations and maintenance (including those pertaining to fire protection, security, and training) and to establish

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[48] E.O. 14156, *Declaring a National Energy Emergency*, 90 FR 8433 (Jan. 29, 2025).

[49] E.O. 14152, *Unleashing American Energy*, 90 FR 8353 (Jan. 29, 2025).

[50] E.O. 14192, *Unleashing Prosperity Through Deregulation*, 90 FR 9065 (Feb. 6, 2025).

[51] *Presidential Determination Pursuant to Section 303 of the Defense Production Act of 1950, as amended, on Natural Gas Transmission, Processing, Storage and Liquefied Natural Gas Capacity* (Apr. 20, 2026).

[52] Pub. L. No. 114-183.

[53] Pub. L No. 116-260.

a framework by which operators of "large-scale" LNG facilities can design and employ alternative, risk-based regulatory approaches. PHMSA's regulatory framework governing operators' risk-based alternatives must achieve a level of safety that is equivalent to, or greater than, the level of safety required by the minimum part 193 standards existing as of December 2020. Section 110 also requires PHMSA to review and to approve LNG facility implementation plans created under that alternative regulatory framework specifying a timeline for integration of elements mandated by statute. Congress directed that PHMSA codify the regulatory amendments required by section 110 by no later than December 2023.

GAO Recommendations

On August 6, 2020, GAO published a report titled *Natural Gas Exports: Updated Guidance and Regulations Could Improve Facility Permitting Processes* (GAO-20-619).[54] In that report, GAO made nine recommendations, including one to PHMSA that "the Administrator of PHMSA should conduct a standards-specific review of regulations that incorporate standards and, if necessary, update the regulations or document its decision for not updating them. (Recommendation 5)."[55] This rulemaking, if codified, would update the incorporated-by-reference standards and resolve Recommendation 5.

Regulated Community and Members of the Public—Historical Petitions for Rulemaking and Public Meetings

Industry and members of the public have repeatedly called on PHMSA to update its part 193 regulations. Since 2006, PHMSA has received several petitions for rulemaking on diverse topics including: pressure relief device (PRD) inspection periodicities;[56] application of updated editions of NFPA 59A to peak-shaving, satellite and small-scale LNG facilities;[57]

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[54] GAO Report.

[55] *Id*.

[56] AGA & Interstate Nat. Gas Ass'n of Am. (INGAA), *Petition to Modify Language in 49 CFR 193.2619*, Docket ID PHMSA-2018-0070-0001 (June 19, 2018).

[57] AGA, *Petition to Amend part 193 NFPA 59A 2020*, Docket ID PHMSA-2019-0091-0005 (Jan. 21, 2020).

targeted application of updated editions of NFPA 59A to LNG export terminals;[58] incorporation by reference of consensus industry standards governing concrete LNG storage containers;[59] and implementation of the PIPES Act of 2020 section 110 mandate.[60] PHMSA has also received petitions for rulemaking from members of the public, including a number of petitions submitted by a single commenter pertaining to vapor cloud dispersion modeling methodologies within PHMSA's siting analyses.[61] The discussions in section IV below respond to those petitions.

In addition, PHMSA has held multiple public meetings in the last two decades focused on improved safety at LNG facilities, including: a February 2005 workshop on LNG safety regulations; a May 2016 public workshop on LNG regulations; a February 2020 meeting; and a November 2022 forum on LNG research and development to improve part 193 regulations.[62] PHMSA has also held several meetings (including meetings in December 2007 and January 2025) of the Gas Pipeline Advisory Committee (GPAC) to consider proposed revisions to regulations pertinent to part 193-regulated facilities. In each of the meetings above, stakeholders from industry and environmental advocacy groups alike have emphasized the need for review and update of PHMSA's part 193 regulations.

2025 Advance Notices of Proposed Rulemaking and Public Meeting

In response to the Presidential directives, Congressional mandates, and broad stakeholder interest in updated part 193 regulations, PHMSA in May 2025 issued an Advance Notice of

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[58] Ctr. for LNG (CLNG), *Petition for Rulemaking*, Docket ID PHMSA-2019-0091-0004 (Oct. 5, 2020). This petition was subsequently withdrawn in 2021. *See* CLNG, *Request to Withdraw Petition for Rulemaking*, Docket ID PHMSA-2019-0091-0007 (May 1, 2021).

[59] Am. Concrete Inst. (ACI), *Petition for Rulemaking to Amend 49 CFR part 193*, Docket ID PHMSA-2019-0091-0008 (May 3, 2021); ACI, *Letter Update to ACI Petition_ACI*, Docket ID PHMSA-2019-0091-0011 (Nov. 9, 2023); ConocoPhillips, *Support for PHMSA Rulemaking - ACI 376*, Docket ID PHMSA-2019-0091-0009 (Nov. 18, 2021).

[60] *See* Am. Petrol. Inst. (API), CLNG & INGAA, *Pipeline Safety Amendments to Large-Scale LNG Facilities*, Docket ID PHMSA-2019-0091-7623 (Nov. 18, 2025).

[61] Havens, *Workshop on LNG Regulation - Petition for Rulemaking*, Docket ID PHMSA-2022-0076-0001 (June 8, 2022).

[62] Materials for each of those meetings are available on PHMSA's *Public Meetings* webpage, available at: https://primis-meetings.phmsa.dot.gov/ (last visited Jan. 25, 2026).

Proposed Rulemaking (ANPRM) soliciting stakeholder feedback on a variety of LNG-related topics informing its development of this NPRM.[63] PHMSA received over 7,618 comments. In parallel, PHMSA issued another ANPRM responding to E.O. 14154 soliciting stakeholder feedback on opportunities to "unleash American energy" by reducing undue burdens imposed by its Pipeline Safety Regulations—including its part 193 regulations.[64] PHMSA received another 528 comments in response to that ANPRM, with 79 of those comments identifying potential amendments of part 193 regulations. In October 2025, PHMSA also held a public meeting to discuss LNG issues consisting of moderated panel discussions supplementing the administrative record developed from those ANPRMs and earlier public meetings.[65] A diverse spectrum of stakeholders—including LNG industry operators and trade associations, State regulatory officials, and members of the public—expressed a uniform desire in each of these proceedings for PHMSA to update its regulations, even as they expressed diverse opinions as to the form those updates should take. PHMSA addressed those comments and discussions where pertinent within the discussions in section IV below.

III. Section-by-Section Discussion of the Proposed Changes in part 191

PHMSA proposes to delete § 193.2011. Section 193.2011 simply directs operators of LNG facilities to report incidents, safety-related conditions, and annual pipeline summary data in accordance with the requirements in 49 CFR part 191. Part 191 applies on its own terms to LNG facilities, rendering the reference in § 193.2011 unnecessary. PHMSA discusses proposed revisions to part 191 reporting requirements in this section.[66]

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[63] PHMSA, *Pipeline Safety: Amendments to Liquefied Natural Gas Facilities*, 90 FR 18949 (advanced proposal May 5, 2025) (May 2025 ANPRM).

[64] PHMSA, *Pipeline Safety: Mandatory Regulatory Reviews To Unleash American Energy and Improve Government Efficiency*, 90 FR 23660 (advanced proposal June 4, 2025).

[65] PHMSA, *Pipeline Safety: Liquefied Natural Gas Facilities Public Meeting 2025*, 90 FR 47901 (Oct. 2, 2025).

[66] PHMSA acknowledges multiple industry comments on the May 2025 ANPRM regarding the burden imposed on some stakeholders from occasionally overlapping USCG, FERC, and PHMSA reporting requirements. *See, e.g.*, API, CLNG, INGAA, AGA, Am. Pub. Gas Ass'n (APGA), Northeast Gas Ass'n (NGA) (Joint Trade Associations),

A. Section 191.3—Definitions

Incident

PHMSA proposes to revise the definition of an "incident" to include the release of any hazardous fluid (as defined under proposed § 193.5) from an LNG facility. Section 191.3 is currently limited to releases of LNG, LPG, refrigerants, or natural gas. PHMSA has preliminarily determined that releases of hazardous fluids involved in the processing of gas within an LNG facility—including LNG, LPG, natural gas (which is composed predominantly of methane), ethane, ethylene, propane, butane, pentane, other heavy hydrocarbons (including aromatic hydrocarbons, hydrogen sulfide, and anhydrous ammonia), as well as toxic (*e.g.*, aromatic hydrocarbons, hydrogen sulfide, and anhydrous ammonia), and corrosive (*e.g.*, anhydrous ammonia, amine solution, and aromatic hydrocarbons) materials—should be treated as reportable incidents. Such reporting will facilitate Federal and State emergency response actions as well as regulatory oversight in identifying facility/operator-specific or industry-wide safety concerns.

LNG facility

PHMSA proposes to revise the definition of an "LNG facility" to reflect the new code sections for part 193 proposed in this NPRM. Specifically, PHMSA proposes to revise the definition of "LNG facility" in § 191.3 to cite proposed § 193.5 instead of the current § 193.2007.

LNG plant

PHMSA proposes to add a definition for an "LNG plant" aligned with the definition of that term in NFPA 59A-2026 ("an LNG facility or collection of LNG facilities functioning as a unit") for clarity.

Comments on the ANPRM, Docket ID PHMSA-2019-0091-7611, at 12 (July 7, 2025). PHMSA notes that each agency imposes different timing, content, and format requirements, complicating review of such information for trend analysis purposes. In addition, such facilities are a minority of those subject to PHMSA part 191 requirements. PHMSA therefore expects that synchronization of reporting requirements across Federal agencies will require additional coordination among the affected agencies.

B. Section 191.22—National Registry of Operators

On September 12, 2014, PHMSA issued an advisory bulletin to owners and operators of gas and hazardous liquid pipelines to clarify the notifications required for certain construction-related events.[67] PHMSA believes that the guidance in that advisory bulletin could also assist LNG operators in determining what constitutes new construction or construction-related activities and clarify when to make required notifications proposed in this rulemaking. Accordingly, PHMSA encourages operators to provide the required notification(s) no later than 60 days prior to whichever of the following construction-related activities occur first: material purchasing and manufacturing; plant site or right-of-way acquisition; construction equipment move-in activities; onsite or offsite fabrications; or plant site or right-of-way clearing, grading, and ditching. Although the notification prior to the first occurring construction-related activity is strongly encouraged and will benefit both PHMSA and the operator, these activities may not necessarily represent the commencement of construction for purposes of triggering the minimum 60-day notice period under the regulations.[68] PHMSA does not in this NPRM propose any modification to corresponding § 191.22 regulatory text but solicits comment as to how it can clarify the 60-day notice period for new construction in § 191.22 or any other sections of part 191.

PHMSA also proposes updating OPID forms and instructions to require operators of permanent, small-scale LNG facilities availing themselves of the regulatory flexibilities in subpart D to memorialize that designation. Existing facilities opting for that designation would need to update their OPIDs consistent with a new § 191.22(c)(2)(vi).

C. Section 191.15—Incident reporting

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[67] PHMSA, ADB-2014-03, *Pipeline Safety: Construction Notification*, 79 FR 54777 (Sep. 14, 2014).

[68] *Id*.

PHMSA is not proposing any changes to the regulatory text at § 191.15 governing incident reporting for LNG facilities. However, PHMSA is proposing changes to the incident report form for LNG facilities (PHMSA F7100.3) and its accompanying instructions to address the proposed revisions to §§ 191.3 and 193.5 related to the addition of "hazardous fluids." PHMSA also proposes to delete blocks C.1f to C.1i on PHMSA F7100.3 consistent with comments on its May 2025 ANPRM. The comments noted that the "cost of commodity" information did not contribute to safety or inform the calculation of the monetary threshold for incident reporting.[69] PHMSA notes that proposed changes to calculation of the monetary threshold within the § 191.3 definition of "incident" under consideration in a parallel rulemaking would—if adopted—apply to LNG facility incident reporting as well.[70]

D. Section 191.17—Annual reporting

PHMSA is proposing to revise the annual report form for LNG facilities (PHMSA F7100.3-1) and its accompanying instructions to address the proposed revisions to §§ 191.3 and 193.5 related to releases of "hazardous fluids" generally, as well as to memorialize operator election as a "permanent, small-scale LNG facility" pursuant to the requirements in proposed subpart D.[71]

E. Section 191.23—Reporting safety-related conditions

PHMSA proposes to revise the safety-related condition reporting requirements for LNG facilities to enhance safety monitoring and oversight. These changes would expand the scope of reporting to include releases of all hazardous fluids at LNG facilities and clarify that safety-

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[69] Joint Trade Associations, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7611, at 11.

[70] *See* PHMSA, *Pipeline Safety: Property Damage Definition for Reporting Incidents on Gas Pipelines and Accidents on Hazardous Liquid and Carbon Dioxide Pipelines*, 91 FR 22096 (proposed Apr. 24, 2026).

[71] In parallel with issuance of this NPRM, PHMSA has notified the public of its intention to modify previously approved information collections to replace the annual National Pipeline Mapping System filing requirement for LNG facilities with a one-time submission via the LNG facility annual report form. *See* PHMSA, *Pipeline Safety: Information Collection Activities*, 91 FR 36946 (June 18, 2026). Should PHMSA adopt those modifications, any final rule in this rulemaking proceeding would make a conforming revision to § 191.29(a) to delete the reference in that provision to "or liquefied natural gas facility."

related conditions during initial start-up (but not during earlier commissioning activities) must be reported.

First, PHMSA proposes to revise the list of safety-related conditions in § 191.23(a) to include the release of hazardous fluids involved in the processing of LNG. As discussed earlier, PHMSA proposes in § 191.3 to expand the definition of an "incident" to include releases of all hazardous fluids at an LNG facility. That change would require operators to notify PHMSA of incidents that involved releases of hazardous fluids. Similarly, PHMSA proposes to revise the notification requirements at § 191.23 to specify that releases of hazardous fluids at an LNG facility are reportable safety-related conditions. Including all hazardous fluids would ensure that PHMSA has a complete picture of safety-related conditions and would help identify potential risks and hazards associated with the release of substances used in processing activities—not just LNG—at an LNG facility.

Second, PHMSA proposes in § 191.23 to add a new paragraph (c) to clarify that each operator of an LNG facility must report any safety-related condition that occurs during initial startup as equipment and components begin commercial operation. Currently, § 191.23 requires LNG operators to notify PHMSA of safety-related conditions that occur while an LNG facility is "in service." PHMSA has interpreted "in service" for these purposes to mean any time a hazardous fluid is introduced into an LNG facility, including during both commissioning and subsequent initial startup. PHMSA understands that historical reading is appropriate as to the latter but not the former.

Safety-related conditions present risks that are relevant throughout the life of an LNG facility, beginning at the point of initial start-up.[72] In contrast, commissioning activities pertain to

[72] PHMSA is also aware that FERC requires reporting of safety-related conditions occurring during initial startup activities. Given that PHMSA regulates LNG facilities not under FERC jurisdiction (such as intrastate and small-scale facilities), PHMSA cannot solely rely on communications with FERC to have awareness of safety-related conditions arising during initial start-up activities.

equipment and components that are not yet "in service," but rather are being evaluated for subsequent placement "in service." Though PHMSA acknowledges that some commissioning activities involve the introduction of hazardous fluids, commissioning activities are necessarily directed toward identifying and curing potential issues under controlled and closely monitored conditions as a predicate for subsequent initial start-up activities; requiring operators to report these issues as safety-related conditions is not appropriate in such circumstances. However, should an event occur during commissioning that qualifies as an "incident," operators would still remain obliged to notify PHMSA pursuant to § 191.3.[73] PHMSA expects that this revision to § 191.23 will allow operators to focus on identifying, evaluating, and curing system integrity concerns exposed during commissioning activities, rather than on filing safety related condition reports to PHMSA with potentially limited safety value.

F. Section 191.25—Filing safety-related condition reports.

PHMSA proposes to change § 191.25 to streamline the reporting process for safety-related conditions identified under § 191.23. These changes include adding references to the newly proposed § 191.23(c) for LNG facilities and an editorial change for underground natural gas facilities, ensuring clarity and completeness in reporting procedures.

IV. Section-by-Section Discussion of the Proposed Changes in part 193

PHMSA proposes to update part 193 by referencing the latest edition of NFPA 59A and, where necessary, providing exceptions from or modifications to certain requirements. These changes would retain NFPA-59A-2026 as the core of the part 193 regulations for LNG facilities,

[73] PHMSA is also aware that other regulators (*e.g.*, FERC) may impose their own reporting requirements and closely monitor commissioning-related activities for LNG facilities within their jurisdiction. PHMSA is also aware that individual operators may (*e.g.*, by contract) conflate "commissioning" and "initial start-up" activities; however, both PHMSA and NFPA 59A-2023 understand these phases to be generally distinguishable and sequential. *See, e.g.*, NFPA 59A-2026 at 18.8.1 (characterizing testing and verification activities during commissioning as a condition precedent to start-up operations).

subject to certain additional or unique requirements. PHMSA also proposes to redesignate and to renumber various provisions throughout part 193 for clarity.

A. Incorporation by Reference of NFPA 59A-2026

PHMSA has incorporated NFPA 59A by reference into its regulations for LNG facilities since the early 1970s.[74] Part 193 currently incorporates by reference the 2001 edition of NFPA 59A into various requirements. The 2006 edition is incorporated by reference for purposes of certain specific requirements pertaining to LNG storage tanks.[75]

PHMSA's historical approach to incorporating NFPA 59A-2001 has presented challenges to operators in developing their compliance strategies. First, PHMSA does not incorporate the entirety of NFPA 59A-2001 by reference; rather, part 193 limits that incorporation to NFPA 59A-2001's siting requirements (§ 193.2051), design requirements (§ 193.2101), construction requirements (§ 193.2301), equipment requirements (§ 193.2401), and certain fire protection requirements (§ 193.2801). Moreover, the broad language PHMSA uses in incorporating NFPA 59A-2001 within these requirements creates regulatory uncertainty. Stakeholders have expressed concern regarding the extent to which specific NFPA 59A-2001 provisions are incorporated by reference into certain regulatory requirements (*e.g.*, design or construction).[76] The conflict preemption clause that PHMSA employs in connection with its incorporation by reference of NFPA 59A-2001 only contributes to that uncertainty. Part 193 fails

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[74] *See* Office of Pipeline Safety, *Liquefied Natural Gas Systems*, 37 FR 21638 (Oct. 13, 1972). PHMSA subsequently incorporated updates to NFPA-59A again in 1976 (NFPA 59A-1972, *in* MTB, *Part 192—Transportation of Natural and Other Gas by Pipeline; Minimum Federal Safety Standards*, 41 FR 13586, 13590 (Mar. 13, 1976)), 1980 (NFPA 59A-1979, *in* MTB, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9185 (Feb. 11, 1980)), and 2000 (NFPA 59A-1996 *in* RSPA, *Pipeline Safety: Incorporation of Standard NFPA 59A in the Liquefied Natural Gas Regulations*, 65 FR 10950 (Mar. 1, 2000)).

[75] PHMSA, *Update of Regulatory References to Technical Standards*, 71 FR 33402 (June 9, 2006); PHMSA, *Periodic Updates of Regulatory References to Technical Standards and Miscellaneous Edits*, 75 FR 48593 (Aug. 11, 2010).

[76] Pipeline Safety Tr. (PST), *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7613, at 9–10 (July 7, 2025).

to provide a clear standard as to what qualifies as a "conflict" between the pertinent sections of NFPA 59A-2001 and applicable regulations.

Second, NFPA 59A-2001 does not reflect the latest advancements in LNG facility design, function, construction, operational practices, and technologies. NFPA has been updated seven times since the publication of the 2001 edition; the current edition is a far more comprehensive and detailed document than its predecessor.[77] PHMSA has attempted to bridge the gap between the 2001 and more recent editions of NFPA 59A by providing industry with additional guidance on certain topics, but stakeholders are correct that agency guidance cannot itself create legally binding obligations.[78] The 2026 edition of NFPA 59A incorporates more recent editions of other industry standards (*e.g.*, ASME Boiler and Pressure Vessel Code) that are used in manufacturing LNG equipment. Continuing to reference an outdated edition of NFPA 59A (which, in turn, incorporates older editions of other industry standards) imposes unnecessary regulatory burdens. Operators must either order manufacturers to follow older standards in designing and constructing LNG equipment or overcome expensive and time-consuming procedural hurdles (*e.g.*, special permit applications or a finding of "safety equivalence" pursuant to section 1.2 of NFPA 59A-2001) simply to follow the latest manufacturing techniques.[79]

To address these concerns, PHMSA proposes to incorporate the latest edition of NFPA 59A by reference and to expand reliance on the mandatory provisions in that standard in part 193.[80] NFPA 59A-2026 is a consensus standard generated by industry and Federal and State

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[77] NFPA 59A-2001 contained 36 pages of mandatory provisions across 11 chapters, supplemented by 6 pages of non-mandatory, informational annexes. In contrast, NFPA 59A-2026 contains 65 pages of mandatory content across 19 chapters, supplemented by 28 pages of non-mandatory, informational annexes.

[78] *See*, *e.g.*, Blue Eng'g & Consulting (BLUE), *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7503 (July 1, 2025) (discussing LNG FAQs).

[79] *See, e.g.*, Williams Cos., *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7612 (July 7, 2025).

[80] PHMSA understands "mandatory provisions" consists of those provisions with imperative language (*e.g.*, "shall") within chapters 4 through 19 of NFPA 59A-2026. PHMSA proposes to exclude the contents of chapter 1 (Administrative) from those mandatory provisions of NFPA 59A-2026 due to potential tension with statutory provisions pertaining to the scope of PHMSA's jurisdiction, retroactive application of certain safety requirements, and special permits granting waivers from part 193 requirements.

regulators; public safety advocates have also endorsed its incorporation by reference in part 193.[81] PHMSA expects that greater reliance on NFPA 59A-2026 will improve LNG safety, as the mandatory provisions in that standard contain far more detailed and comprehensive requirements than its 2001 counterpart. The technically rigorous, transparent process employed in the development of each edition of NFPA 59A ensures that the latest edition aligns with current practices in the LNG industry.[82] NFPA 59A-2026 also includes informational annexes to assist stakeholders in understanding its mandatory requirements.

B. Subpart A—General

Subpart A sets forth general rules governing application, interpretation, and implementation of part 193 regulations. It also contains a general requirement for operators to have and maintain plans and procedures as required by part 193.

PHMSA proposes to retain the existing provisions in subpart A, subject to the redesignation and revision of certain provisions. PHMSA is not proposing to incorporate the "Administrative" provisions in NFPA 59A-2026 due to potential inconsistencies with the requirements in the Pipeline Safety Laws.[83]

B.1. Section 193.1—Scope of part.

PHMSA proposes to redesignate in a new § 193.1 much of the language currently located in § 193.2001 describing the scope of the part 193 requirements. To provide additional clarity

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[81] Earthjustice & Env't Def. Fund (EDF), *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7596, at 1 (July 7, 2025).

[82] The NFPA website (https://www.nfpa.org/codes-and-standards/nfpa-59a-standard-development/59a) contains extensive documentation elaborating on the technical basis for revisions within each of the post-2006 editions of NFPA 59A and memorializing the Technical Committee's consideration of those revisions.

[83] Among those provisions of NFPA 59A-2026 that PHMSA declines to incorporate by reference is the "equivalency" language at section 1.4. PHMSA has in the past employed similar language in section 1.2 of NFPA 59A-2001 to assist operators in overcoming the practical consequences of PHMSA's delay in updating its part 193 regulations. *See* LNG FAQs, D5–D6. However, PHMSA understands that NFPA 59A-2001 language was never explicitly incorporated by reference into its part 193 regulations. In addition, PHMSA regulations at § 190.341 allow operators to apply for special permits requesting waivers of part 193 requirements, and PHMSA has broad authority to exercise its enforcement discretion to minimize liability risks arising from future delays in updating its regulations.

and ensure consistency with the terminology used in the USCG regulations for waterfront LNG facilities, PHMSA proposes to modify the exception in 49 CFR 193.1(b)(3). The exception, as currently codified at § 193.2001(b)(3), limits the applicability of part 193 to marine cargo transfer systems at waterfront LNG facilities to matters related to siting.

The term "marine cargo transfer system" is not defined in part 193 or used in the parallel USCG regulations for waterfront LNG facilities. Instead, the USCG regulations use the term "marine transfer area for LNG," which is defined as "that part of a waterfront facility handling LNG between the vessel, or where the vessel moors, and the last manifold or valve immediately before the receiving tanks." That definition is consistent with the current limitation on part 193 applicability in § 193.2001(b)(3), which also refers to "the marine vessel and the last manifold (or in the absence of a manifold, the last valve) located immediately before a storage tank" in describing a marine cargo transfer system.

Rather than having parallel provisions that use slightly different terminology, PHMSA proposes to incorporate the phrase "marine transfer area for LNG as defined in 33 CFR 127.005" directly into the new version of the scope requirements in § 193.1(b)(3). PHMSA also proposes to eliminate the remaining language from the current provision in § 193.2001(b)(3), which is not necessary as the definition of "marine transfer area for LNG" in 33 CFR 127.005 incorporates the relevant breakpoints used in delineating the scope of part 193 at waterfront LNG facilities. PHMSA does not intend this change to be substantive in nature or to alter the longstanding approach used in prescribing the scope of part 193's applicability at waterfront LNG facilities.

B.2. Section 193.3—Applicability.

PHMSA proposes to redesignate the applicability requirements currently prescribed in § 193.2005 under a new § 193.3. Consistent with historical practice, § 193.3 would continue to reference the effective date of any final rule in this proceeding in prescribing the applicability of any part 193 subparts governed by the statutory retroactivity prohibition at 49 U.S.C.

§§ 60103(c) and 60104(b)(2). PHMSA also proposes to clarify the scope of that prohibition by stating in § 193.3(a) that the requirements in the non-retroactive subparts do not apply to existing LNG facilities or to proposed LNG facilities that an appropriate authority approved before those requirements went into effect. In addition, PHMSA proposes to remove from § 193.3(b) the current requirement at § 193.2005(b)(2) that PHMSA approve exceptions from retroactive application of updated part 193 design, installation, and construction requirements for so-called "in-kind" replacements of facilities designed, installed, and constructed in accordance with original facility specifications. This proposed change will improve alignment with analogous provisions (particularly section 1.4.4) in NFPA 59A-2026. PHMSA also proposes a revision to § 193.3(b)(2) to clarify application of the "in-kind" replacement provision to LNG storage tanks replacement projects that increase capacity or relocate the tank(s).

B.3. Section 193.5—Definitions.

PHMSA proposes to redesignate the existing § 193.2007 as a new § 193.5 and to incorporate by reference the definitions in chapter 3 of NFPA 59A-2026 in lieu of the existing definitions in § 193.2007, subject to certain exceptions and modifications as discussed below. PHMSA understands that the definitions listed in NFPA 59A-2026 chapter 3 as supplemented or substituted by the definitions in the new § 193.5 would govern the meaning of both NFPA 59A-2026 and part 193.

Administrator

PHMSA proposes to retain the existing definition of "Administrator" in § 193.5. NFPA 59A-2026 includes a definition of an "Authority Having Jurisdiction (AHJ)" and in various places references the need for AHJ approval. For purposes of PHMSA's application of the NFPA 59A-2026 provisions being incorporated into part 193 referencing an AHJ or "approval," the AHJ will typically (unless PHMSA has resolved the issue generically via part 193 regulatory text) be the PHMSA Administrator (or his delegate) by way of an operator-

specific § 190.341 special permit process.[84] However, some NFPA 59A-2026 references to an "AHJ" may implicate the prerogative of other regulatory authorities; in those cases, PHMSA proposes to include within part 193 provisions disclaiming administration of an AHJ authorization called for by NFPA 59A-2026 language.[85]

Component

PHMSA proposes to retain within § 193.5 the existing definition of "component," albeit with revisions to improve readability. PHMSA also proposes to add a reference to "pressure vessel" within the list of examples of "components" for additional clarity.

Design Pressure

PHMSA proposes to retain at § 193.5 the existing definition of "design pressure." Section 193.2007 currently defines "design pressure" to mean "the pressure used in the design of components for the purpose of determining the minimum permissible thickness or physical characteristics of its various parts . . . ." NFPA 59A-2026 adopts a similar definition for "design pressure" but, unlike NFPA 59A-2001, omits the statement "when applicable, the static head must be included in the design pressure to determine the thickness of any specific part." Because NFPA 59A-2026 removed that statement, PHMSA proposes to retain the current definition in part 193.

Design Spill

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[84] PHMSA does not generally understand references within NFPA 59A-2026 to "AHJ approvals" to implicate the procedural machinery at § 190.9—an exception from this general rule being approval of model evaluation protocols (MEPs) and model validation databases (MVDs) in connection with siting analyses.

[85] PHMSA acknowledges requests by multiple industry stakeholders for improved allocation of responsibilities among different Federal agencies with statutory authority over LNG facilities—with some calling for each agency to have primary responsibility for one or another dimension of LNG facilities activities. *See, e.g.*, Joint Trade Associations, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7611, at 2–3. The fact that multiple Federal agencies share overlapping regulatory oversight authority over LNG facilities reflects congressional intent; PHMSA is, therefore, constrained in its ability to impose by amendments to its part 193 regulations boundaries on other agencies' exercise of their statutory prerogatives. That said, PHMSA will work with other Federal agencies to update pertinent interagency agreements to address this concern.

PHMSA proposes to add at § 193.5 a new definition for the term "design spill," which would mean "a potential spill or release from LNG and hazardous fluid containers, piping, and equipment at liquefaction, storage, transfer, or other process areas in an LNG facility." NFPA 59A-2026 uses but does not define the term "design spill." PHMSA proposes to address that omission by defining the term "design spill" in the new § 193.5.

Determine

PHMSA proposes to retain at § 193.5 the existing definition of "determine." Section 193.2007 currently defines "determine" as meaning to "make a decision based on an appropriate investigation using scientific methods and sound engineering judgment, including documentation that demonstrates the basis of the decision." NFPA 59A-2026 uses but does not define the term "determine." PHMSA proposes to retain the existing definition in part 193 to address that gap and provide interested stakeholders with additional regulatory certainty.

Emergency

PHMSA proposes to retain at § 193.5 and to revise for clarity the existing definition of "emergency." Section 193.2007 currently defines an "emergency" to mean "a deviation from normal operation, a structural failure, or severe environmental conditions that probably would cause harm to people or property." NFPA 59A-2026 does not define the term "emergency." PHMSA proposes to retain the current definition to address that gap and to provide interested stakeholders with additional regulatory certainty.

Exclusion Zone

PHMSA proposes to retain at § 193.5 and to revise the existing definition of "exclusion zone" with minor revisions. Section 193.2007 currently defines "exclusion zone" to mean "an area surrounding an LNG facility in which an operator or government agency legally controls all activities in accordance with § 193.2057 and § 193.2059 for as long as the facility is in operation." NFPA 59A-2026 does not define or use the term "exclusion zone." PHMSA

proposes to retain the existing definition in part 193 with an updated reference to subpart B siting requirements to accommodate other changes proposed in the NPRM. PHMSA is also proposing a minor revision to the existing regulatory text ("area *within or* surrounding an LNG facility") to account for the fact that exclusion zones may surround an LNG facility even as they may be within the boundary of an LNG plant consisting of multiple LNG facilities.

Gas

PHMSA proposes to retain at the new § 193.5 the existing definition of "gas." Section 193.2007 currently defines "gas" as "except when designated as inert, . . . natural gas, other flammable gas, or gas which is toxic or corrosive." NFPA 59A-2026 does not define the term "gas." PHMSA proposes to retain the existing definition to provide interested stakeholders with additional regulatory certainty.

Hazardous Fluid

PHMSA proposes to retain at the new § 193.5 the existing definition of "hazardous fluid," albeit with certain revisions. Section 193.2007 currently defines the term "hazardous fluid" to mean "gas or hazardous liquid." The terms "gas" and "hazardous liquid" are further defined, respectively, as "except when designated as inert, . . . natural gas, other flammable gas, or gas which is toxic or corrosive" and "LNG or a liquid that is flammable or toxic." NFPA 59A-2026 provides a slightly different definition for "hazardous fluid" in that it uses the term "ignitible" in lieu of "flammable," ostensibly to improve the scientific precision of the defined term. NFPA 59A-2026 also refers to both "gas" and "hazardous liquids" as potentially including corrosive substances.

PHMSA proposes to retain the existing reference to "flammable" rather than to substitute the term "ignitible" in the definition. The term "flammable" has long been used in the existing definition at § 193.2007 and mirrors corresponding statutory language at 49 U.S.C.

§ 60101(a)(2)–(a)(4). PHMSA notes that the substitution of "ignitible" may not entirely resolve ambiguity in the regulatory language.[86]

PHMSA expects that the revised definition of "hazardous fluid" at § 193.5 will enhance safety at LNG facilities. Both the existing part 193 regulations and comparable provisions of NFPA 59A-2001 are largely directed toward addressing the public safety risks associated with LNG. However, subsequent editions of NFPA 59A have increasingly used the broader term "hazardous fluid," expanding the scope of public safety risks (and corresponding LNG facility equipment, components, and processing activities) addressed under the provisions in that standard. PHMSA further notes that the revised definition conforms with the proposed revisions to the reporting requirements for LNG facilities at § 191.3, which would expand the incident, annual, and safety-related condition reporting to include the non-exhaustive list of "hazardous fluids" described in section III.A above.

Hazardous Liquid

PHMSA proposes to retain at § 193.5 and to revise the existing definition of "hazardous liquid." Section 193.2007 currently defines "hazardous liquid" as "LNG or a liquid that is flammable or toxic." NFPA 59A-2026 does not define this term. PHMSA's enabling statute acknowledges at 49 U.S.C. § 60101(a)(4)(B)–(C) that a hazardous liquid can be a substance that is "corrosive," and some of the materials present in liquid form within processes at LNG facilities (*e.g.*, hydrogen sulfide, anhydrous ammonia) are in fact corrosive for human tissue. For that reason, PHMSA proposes to add the term "corrosive" to the existing definition of hazardous liquid in part 193.

Impounding System

[86] *See* BLUE, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7503, at 11 (criticizing the introduction of the "ignitable" language as "add[ing] additional vagueness.").

PHMSA proposes to retain at § 193.5 and to revise the existing definition of "impounding system." Section 193.2007 currently defines "impounding system" as "an impounding space, including dikes and floors for conducting the flow of spilled hazardous liquids to an impounding space." NFPA 59A-2026 does not define an "impounding system" but uses the term throughout the document. To provide additional regulatory certainty, PHMSA proposes to retain the definition for "impounding system" in part 193. However, PHMSA proposes to replace the term "impounding space" with "impounding area" for clarity by adopting the more modern term used by newer editions of NFPA 59A.

Liquefied Natural Gas or LNG

PHMSA proposes to retain at § 193.5 and to revise for editorial clarity the existing definition of LNG. Section 193.2007 currently defines "LNG" as "natural gas or synthetic gas having methane (CH_4) as its major constituent which has been changed to a liquid." PHMSA proposes to clarify that definition by replacing the word "which" with "that" to ensure a more precise definition.

LNG Facility

PHMSA proposes to retain at § 193.5 and to revise the existing definition of "LNG facility." Section 193.2007 currently defines "LNG facility" as a "pipeline facility that is used for liquefying natural gas or synthetic gas or transferring, storing, vaporizing liquefied natural gas, including on-site power generation facilities." PHMSA proposes to add to this definition an explicit reference to "on-site power generation facilities." That addition is consistent with PHMSA's longstanding understanding that "on-site power facilities" are "LNG facilities" subject to the requirements in part 193.[87] PHMSA further notes that this addition enhances public safety

[87] A 1980 final rule explicitly included power generation facilities within the scope of LNG facilities. *See* RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9189, 9197–98 (Feb. 11, 1980). PHMSA consistently has held this to be the case since, even as a reference to power generation facilities in § 193.2051 was omitted for other reasons. *See, e.g.*, RSPA, *Pipeline Safety: Incorporation of Standard NFPA 59A in the Liquefied Natural Gas Regulations*, 65 FR 10958 (Mar. 1, 2000).

by ensuring that on-site power generation facilities (some of which may use fuels that are themselves flammable or explosive) are subject to the same safety standards as other LNG facilities.

Maximum Allowable Working Pressure (MAWP)

PHMSA proposes to retain in § 193.5 the current definition of "maximum allowable working pressure (MAWP)." Section 193.2007 currently defines MAWP as "the maximum gauge pressure permissible at the top of the equipment, containers, or pressure vessels while operating at design temperature." NFPA 59A-2026 adopts a similar definition, except that it specifies the maximum pressure permissible at the top of "completed equipment." PHMSA is not aware of the reasoning behind the reference in NFPA 59A-2026 to "completed equipment" in defining MAWP. To avoid introducing unnecessary confusion as to whether "equipment" is completed or not, PHMSA proposes to retain the existing part 193 definition of MAWP.

Normal Operation

PHMSA proposes to retain at § 193.5 and to revise for clarity the existing definition of "normal operation." Section 193.2007 currently defines "normal operation" as "functioning within allowable ranges of pressure, temperature, flow, and other operating criteria consistent with the requirements of this part." NFPA 59A-2026 does not define this term. Accordingly, PHMSA proposes to retain the current definition without change.

Operator

PHMSA proposes to retain at § 193.5 and to revise the existing definition of the term "operator" to align with the definition of "liquefied natural gas pipeline facility" in 49 U.S.C. § 60101(a)(14). Section 193.2007 currently defines LNG facility as "a pipeline facility that is used for liquefying natural gas or synthetic gas or transferring, storing, or vaporizing liquefied natural gas." Though an LNG facility is a type of "pipeline facility" as that term is defined in the Pipeline Safety Act, 49 U.S.C. § 60101(a)(18) and 49 CFR 193.2007, NFPA 59A-2026 does not

define this term. Moreover, section 193.2007 currently defines an "operator" as a "person who owns or operates an LNG facility." To ensure consistency with the definitions in the Pipeline Safety Act and implementing regulations, PHMSA proposes to revise the definition of "operator" in part 193 to mean "a person who owns or operates a pipeline facility." PHMSA notes that a person seeking authorization to construct and operate planned LNG facilities is an "operator" for purposes of this definition.

Person

PHMSA proposes to retain at § 193.5 and to revise for readability the existing definition of "person" in part 193. Section 60101(a)(17) of the Pipeline Safety Act defines a "person" as "in addition to its meaning under section 1 of title 1 (except as to societies), includes a State, a municipality, and a trustee, receiver, assignee, or personal representative of a person."[88] Similarly, section 193.2007 currently defines a "person" as "any individual, firm, joint venture, partnership, corporation, association, State, municipality, cooperative association, or joint stock association, and includes any trustee, receiver, assignee, or personal representative thereof." NFPA 59A-2026 does not define this term. The proposed definition improves readability by replacing the phrase "and includes" with "including" and standardizing capitalization for regulatory entities (*e.g.*, State), thereby ensuring the language is consistent with conventions elsewhere in part 193 regulations.

Pipeline Facility

PHMSA proposes to retain at § 193.5 but to revise for readability the existing definition of "pipeline facility" in part 193. Section 193.2007 currently defines "pipeline facility" to mean "new and existing piping, rights-of-way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation." An LNG

[88] 1 U.S.C. § 1 (defining "person" to "include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals").

facility is a type of pipeline facility. NFPA 59A-2026 does not define this term. The proposed definition includes LNG facilities to reinforce that an LNG facility is a type of pipeline facility.

Piping

PHMSA proposes to retain at § 193.5 but to revise for clarity the existing definition of "piping" in part 193. Section 193.2007 currently defines "piping" as "pipe, tubing, hoses, fittings, valves, pumps, connections, safety devices or related components for containing the flow of hazardous fluids." NFPA 59A-2026 does not define this term. The proposed definition enhances specificity by replacing the general term "pipe" with the more precise "line pipe" language used elsewhere in PHMSA regulations.

Transfer Piping

PHMSA proposes to retain at § 193.5 but to revise for clarity the existing definition of "transfer piping" in part 193. Section 193.2007 currently defines "transfer piping" as "a system of permanent and temporary piping used for transferring hazardous fluids between any of the following: Liquefaction process facilities, storage tanks, vaporizers, compressors, cargo transfer systems, and facilities other than pipeline facilities." PHMSA believes that, as currently written, the phrase "a system of permanent and temporary piping" might imply the transfer system must include both permanent and temporary piping for the term to meet the definition, which is not the case.[89] Therefore, PHMSA proposes to revise the definition of "transfer piping" to mean "a system of permanent or temporary piping, or both, used for transferring hazardous fluids between any of the following: liquefaction process facilities, storage tanks, vaporizers, compressors, cargo transfer systems, and facilities other than pipeline facilities."

Transfer System

[89] *See* PHMSA, PI-10-0200, *Interpretation Response re Mount Bay Hope Liquefied Natural Gas Transfer System* (Mar. 25, 2010), available at: https://www.phmsa.dot.gov/regulations/title49/interp/pi-10-0020 (discussing definition of "transfer piping" and "transfer system").

PHMSA proposes to retain at § 193.5 the existing definition of "transfer system" in part 193. Section 193.2007 currently defines "transfer system" to "include [] transfer piping and cargo transfer systems." NFPA 59A-2026 does not define a transfer system; however, the term is used throughout the document and part 193. PHMSA proposes to retain the definition to support operators' understanding of the regulations.

Vaporization

PHMSA proposes to retain at § 193.5 the existing definition of "vaporization" in part 193. NFPA 59A-2026 does not define vaporization; however, the term is used throughout the document and part 193. PHMSA proposes to retain the definition to support operators' understanding of the regulations.

B.4. Section 193.7—Rules of regulatory construction.

PHMSA proposes to revise the requirements in the existing § 193.2009 and to relocate them to a new § 193.7. The provision defines regulatory terms used in part 193, such as "must" and "shall."

B.5. Section 193.9—What documents are incorporated by reference partly or wholly in this part?

PHMSA proposes to incorporate by reference new or updated editions of consensus industry standards currently referenced in part 193. PHMSA also proposes to incorporate by reference additional consensus industry standards to improve enforceability. Below is a list of new or updated standards proposed for incorporation by reference into part 193; any standards not listed below that are currently incorporated by reference into PHMSA regulations would no longer be incorporated by reference into part 193.

As discussed in section IV.A. above, PHMSA proposes to incorporate the mandatory provisions in the latest 2026 edition of NFPA 59A as the core of its regulatory framework for LNG facilities. NFPA 59A-2026 is therefore discussed first in this section IV.B.5, with other standards proposed to be incorporated by reference in PHMSA regulations appearing by the

issuing standards development organizations thereafter. Most of the standards listed thereafter for incorporation by reference within part 193 are listed as mandatory references in chapter 2 of NFPA 59A-2026.

PHMSA also proposes incorporation by reference of one additional standard currently incorporated by reference at § 193.2013 and another standard informing compliance with the alternative risk-based O&M approach at subpart F. In contrast, PHMSA does not propose to include within § 193.9 standards not discussed below—even if those standards were listed among the mandatory references listed in NFPA 59A-2026 chapter 2 or the informational references within NFPA 59A-2026 Annex C. Instead, those standards should be considered non-binding guidance assisting operators in developing their part 193 compliance strategies. Similarly, PHMSA does not propose to incorporate by reference some of the consensus industry standards discussed in section IV.G below, even as PHMSA understands those resources could function as non-binding guidance informing operators' development of the risk-based O&M alternative framework mandated by section 110 of the PIPES Act of 2020. PHMSA invites public comment on whether to incorporate any industry standard referenced in NFPA 59A-2026 or otherwise applicable to the LNG industry.

The standards listed below for inclusion within the new § 193.9 are reasonably available to interested parties in several ways. First, PHMSA has negotiated agreements with some standards development organizations to make viewable copies of the standards available to the public at no cost. Organizations that have agreed to the public access requirements of the statutory mandate discussed above include the American Petroleum Institute (API), the American Gas Association (AGA), ASTM International (formerly the American Society for Testing and Materials), and the National Fire Protection Association (NFPA). Those organizations' standards can be accessed through the websites listed in the proposed § 193.9 regulatory text. Second, interested persons may obtain (on loan from PHMSA) physical copies of

standards issued by organizations with which PHMSA has not at the time of publication of this NPRM been able to reach a general agreement for free online access. Those organizations include the American Society of Mechanical Engineers (ASME), the American Society for Nondestructive Testing (ASNT), American Concrete Institute (ACI), American Society of Civil Engineers (ASCE), Brazed Aluminum Plate-fin Heat Exchanger Manufacturers' Association (ALPEMA), Center for Chemical Process Safety (CCPS), Compressed Gas Association (CGA), CSA Group (CSA), International Society of Automation (ISA), National Board of Boiler and Pressure Vessel Inspectors (NBBI), and UL Solutions. Interested persons seeking a loan of a physical copy of a standard issued by those organizations may contact the PHMSA standards library (at the email address: phmsaphpstandards@dot.gov; such requests should include a phone number, physical address, and an email address), or through the contact information listed in the proposed § 193.9 amendatory text. Additional information regarding standards availability can be found at https://www.phmsa.dot.gov/standards-rulemaking/pipeline/standards-incorporated-reference.

NFPA 59A-2026

As discussed in section IV.A. above, PHMSA proposes to incorporate by reference into part 193 the mandatory provisions in the 2026 edition of NFPA 59A. PHMSA proposes to delete all existing references to the 2001 and 2006 editions of NFPA 59A. NFPA 59A-2026 provides minimum fire protection and safety requirements for the location, design, construction, security, operation, and maintenance of liquefied natural gas (LNG) plants.

Standards Incorporated by Reference in NFPA 59A-2026

PHMSA proposes to incorporate by reference into part 193 certain consensus industry standards that are referenced in the mandatory provisions in chapter 2 of NFPA 59A-2026. PHMSA identifies these new standards in the table below, which would be incorporated into the new § 193.9. PHMSA has reviewed the content and preliminarily concluded that each standard

contributes to the improvement of public safety. PHMSA notes in the table below the provisions of NFPA 59A-2026 that are proposed for incorporation and the purpose for doing so. PHMSA solicits comment on these provisions and on any additional standards that should be incorporated by reference within a final rule.[90]

[90] PHMSA acknowledges that the above table does not identify every mandatory standard listed in chapter 2 of NFPA 59A-2026. PHMSA has tried to limit the standards proposed for incorporation by reference to those that are most critical to the understanding and enforceability of the design, installation, construction, and operations and maintenance requirements in NFPA 59A-2026.

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
NFPA 13, Standard for the Installation of Sprinkler Systems (2025)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum requirements for design and installation of automatic fire sprinkler systems and exposure protection sprinkler systems
NFPA 14, Standard for the Installation of Standpipe and Hose Systems (2024)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum requirements for installation of standpipes and hoses in water-based fire protection systems
NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection (2022)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum requirements for design, installation, maintenance, and testing of water spray fixed fire protection systems
NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection (2025)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum requirements regarding the design and installation of pumps supporting liquid fire protection systems
NFPA 22, Standard for Water Tanks for Private Fire Protection (2023)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum design, construction, installation, and maintenance of tanks and accessory equipment supplying water for private fire protection systems

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances (2025)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water system) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains robust requirements for installation of private fire service mains supplying water to various water-based fire protection systems in industrial applications
NFPA 30, Flammable and Combustible Liquids Code (2024)	• 7.5.1 (design and construction requirements for hazardous fluid storage containers and equipment) • 13.3.1 (design and construction requirements for flammable or combustible liquid dikes, impounding walls, and drainage channels)	Contains robust requirements for safeguarding against fire and explosion hazards from storing, dispensing, handling, transferring, and using flammable and ignitable liquids within indoor and outdoor liquid storage containers and tanks, piping systems, storage areas, and processing facilities
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines (2024)	• 7.6.8 (combustion engine and gas turbine installation requirements)	Contains installation requirements for reduction of fire hazards associated with stationary combustion engines and gas turbines
NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work (2024)	• 4.11.2 (welding, cutting, and hot work requirements for construction, installation, and maintenance)	Contains robust requirements governing hot work associated with welding, cutting, heat treating, grinding, and other applications
NFPA 54, National Fuel Gas Code (2024)	• 10.2.1.3 (design, construction, installation and other requirements for process piping for fuel gas systems)	Contains robust requirements for the safe design, installation, operation, maintenance, purging, and inspection of piping, equipment, accessories, and appliances using or containing fuel gas

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
NFPA 56, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems (2023)	• 18.7.5.4 (requirements for cleaning, drying, purging, and tightness testing in maintenance and other activities)	Contains robust operating, notification, and training procedures for purging systems of hazardous fluids to reduce the risks of fire and explosions during pipe system maintenance
NFPA 58, Liquefied Petroleum Gas Code (2024)	• 7.5.1 (design and construction requirements for hazardous fluid storage containers and equipment) • 13.3.2 (design and construction requirements for dikes, impounding walls, and drainage channels for LPG) • 15.6.2 (design and construction requirements for LPG tank vehicles)	Contains robust material, design, construction and other requirements for protection against hazards associated with releases from liquefied petroleum (LP) gas (*e.g.*, propane) systems
NFPA 59, Utility LP-Gas Plant Code (2024)	• 7.5.1 (design and construction requirements for hazardous fluid storage containers and equipment) • 13.3.2 (dikes, impounding walls, and drainage channels for LPG)	Contains robust material, design, construction and other requirements for protection against hazards associated with releases from liquefied petroleum (LP) gas (*e.g.*, propane) systems in peak shaving or mobile/temporary LNG facilities
NFPA 68, Standard on Explosion Protection by Deflagration Venting (2023)	• 12.6(1) (design requirements for fire and explosion control in facility rooms containing ignitable fluids) • 13.6(3) (design and construction requirements allowing for enclosed drainage channels for ignitable fluids)	Contains robust design, construction, operations, and maintenance requirements for fire and explosion protection devices and systems intended to vent combustion gases and pressures from a deflagration within enclosures
NFPA 70, National Electrical Code (2026)	• 11.9.1 (design and construction requirements for electrical equipment and wiring) • 11.9.2 (installation requirements for fixed electrical equipment and wiring within certain electrically classified areas) • 11.9.6 (sealing and isolation requirements for interfaces between	Contains robust requirements for material, design, installation, maintenance and other requirements to provide protection against fire and explosive hazards associated with electrical systems

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	ignitable fluid system electrical conduit or wiring systems)	
NFPA 72, National Fire Alarm and Signaling Code (2025)	• 16.2.1.5 (flammable gas detection system design, installation, and maintenance) • 16.4.5 (flammable gas detection system design, installation, and maintenance) • 16.4.6 (flammable gas detection system integration testing)	Contains robust requirements for the application, installation, location, performance, and inspection, testing, and maintenance of fire alarm and emergency communications systems
NFPA 85, Boiler and Combustion Systems Hazards Code (2023)	• 18.8.3 (commissioning requirements for fired heaters, boilers, and pressure vessels)	
NFPA 86, Standard for Ovens and Furnaces (2023)	• 18.8.3 (commissioning requirements for fired heaters, boilers, and pressure vessels)	
NFPA 101, Life Safety Code (2024)	• Table 5.3.2.11, FNc (radiant heat flux limits)	Contains robust construction, personnel protection, emergency communication, occupancy, and other requirements to minimize risk of personal injury from smoke, heat, and toxic gasses
NFPA 110, Standard for Emergency and Standby Power Systems (2025)	• 4.8.2(3)(a) (installation requirements for auxiliary generators as secondary source of electrical power)	Contains robust design, installation, maintenance, and other requirements for emergency and standby power systems
NFPA 274, Standard Test Method to Evaluate Fire Performance Characteristics of Pipe Insulation (2023)	• 10.3.1.4(4) (fire resistance requirements for materials used in piping insulation)	Contains testing requirements for determining fire performance characteristics of pipe insulation assemblies
NFPA 496, Standard for	• 11.9.4 (design and installation requirements for electrical equipment	Contains robust requirements for designing and operating

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
Purged and Pressurized Enclosures for Electrical Equipment (2024)	installed within enclosures in electrically classified areas)	purged and pressurized electrical enclosures to reduce the risk of fires, explosions, and other dangers
NFPA 600, Standard on Fire Brigades (2025)	• 16.2.2(9) (requirements for determination of personal protective equipment and training requirements for emergency response personnel) • 16.7.3 (requirements for personal protective equipment and training requirements for emergency response personnel)	Contains robust requirements for organizing, operating, training, and equipping fire brigades
NFPA 750, Standard on Water Mist Fire Protection Systems (2023)	• 16.2.1.5 (fire protection systems design, engineering, and installation requirements) • 16.5.4 (fire protection water systems) • 18.11.10.4 (maintenance requirements for fire protection and hazard detection control systems)	Contains minimum requirements for design, installation, maintenance, and testing of water mist fire protection systems
NFPA 1225, Standard for Emergency Communications Services (2022)	• 16.2.1.5(19) (fire protection design, installation, and testing requirements • 18.11.10.4 (inspection and testing for hazard monitoring systems)	Contains minimum requirements for design, installation, maintenance, and testing of emergency communications systems
NFPA 5000, Building Construction and Safety Code (2024)	• Table 5.3.2.10, FNc (radiant heat flux limits)	Contains robust requirements for the design, construction, materials, and location of buildings and structures to protect against environmental and other hazards
ACI 304R, Guide for Measuring, Mixing, Transportation and Placing of Concrete (2000, reapproved 2009).	• 4.5.4 (design and construction requirements for nonstructural concrete for incidental nonstructural uses)	Contains robust requirements on the handling, measuring, mixing, and installation of concrete used in structures

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
ACI 318, Building Code Requirements for Structural Concrete and Commentary. (2025)	• 4.5.1.1 (material and design requirements for concrete structures that are not LNG containers) • 4.5.5.2 (minimum reinforcement requirements for concrete in incidental nonstructural uses)	Contains robust requirements for the design and construction of structural concrete buildings and non-building structures
ACI 376, Refrigerated Liquefied Gas Containment for Concrete Structures – Code Requirements and Commentary (2023)	• 6.3.2.3 (design and construction of outer concrete containment for double/full/membrane-containment tank systems used as containers of LNG or flammable refrigerants) • 8.2.1.3 (design and construction requirements for concrete and metal-lined composite concrete containers in an LNG storage tank system) • 8.4.8.2 (design and construction requirements governing LNG tank system container drying, purging, and cooling) • 8.4.11.1 (Stationary LNG tank systems foundation design requirements) • 8.4.13.1 (Stationary LNG concrete container design, construction, inspection, and testing requirements) • 8.4.13.3 (Requirements for non-metallic coatings on stationary LNG concrete containers) • 8.4.14.1.5 (MCER response spectral acceleration requirements in connection with maximum considered tsunamis for stationary LNG storage tanks) • 8.4.13.6.5.3 (vertical response spectrum reduction factors for stationary LNG storage tanks) • 8.4.14.9 (triaxial seismic monitoring instrumentation for LNG storage tanks) • 8.4.14.12 (design requirements for stationary LNG storage tank systems and structural components)	Provides minimum requirements for the design, construction, testing, and inspection of reinforced concrete and prestressed concrete structures for the storage and containment of refrigerated liquefied gases
Standards of the Brazed Aluminum Plate-Fin Heat	• 7.6.7.2 (design and fabrication requirements for brazed aluminum plate fin heat exchangers)	Contains robust requirements for design, manufacture, installation, and use of brazed

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
Exchanger Manufacturers Association (2024)		aluminum plate-fin heat exchangers
API 510, Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration (2023)	• 18.11.10.7.1(2) (inspection intervals for certain relief valves protecting hazardous fluid components)	Contains robust requirements for the in-service inspection, repair, alteration, and rerating activities for pressure vessels and pressure-relief devices in hydrocarbon and chemical process vessels
API RP 576, Inspection of Pressure-Relieving Devices (2024)	• 18.11.10.7.2(2) (set-point testing intervals for certain relief valves protecting hazardous fluid components)	Contains recommended inspection and repair practices for self-actuated pressure-relieving devices employed in the oil and gas and petrochemical industries
API Spec 6D, Specification for Pipeline and Piping Valves, 2021 edition w/ Addenda 1–3 (2025) and Erratas 1–3 (2023) (2024)	10.3.4.1(2) (material, design, construction, and installation requirements for valves on piping systems)	Contains requirements for the design, manufacturing, materials, welding, quality control, assembly, testing, marking, documentation, and process controls of valves employed in the oil and gas and petrochemical industries
API Std 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 2013 edition w/ Addenda 1–4 (2025) and Errata 1 (2025)	• 3.3.32 (definition of LNG storage tank) • 8.2.1.2 (design and construction requirements for metal containers on stationary LNG storage tank systems) • 8.4.12 (design and construction requirements for welded metal containers used in low-pressure tank systems for stationary LNG storage) • 8.4.13.4 (material requirements for metallic barriers incorporated in concrete containers used in stationary LNG storage) • 8.4.14.1.5 (MCER response spectral acceleration requirements in connection with maximum considered tsunamis for stationary LNG storage tanks) • 8.4.14.8 (stationary LNG tank system seismic design requirements)	Contains requirements on the design, and construction of large, welded, low-pressure carbon steel above ground storage tanks for use in the oil and gas and petrochemical industries

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 8.4.14.12 (design requirements for stationary LNG storage tank systems and structural components)	
API Std 625, Tank Systems for Refrigerated Liquefied Gas Storage, 2010 edition w/ Addenda 1–5 (2025)	• 8.2.1 (design and construction requirements for stationary LNG storage tank systems) • 8.3.3.1 (stationary LNG tank system marking requirements) • 8.4.2 (design and construction requirements for piping in stationary LNG tank storage systems) • 8.4.7.3 (design requirements for insulation on LNG storage tank systems) • 8.4.8.2 (design and construction requirements governing LNG tank system container drying, purging, and cooling) • 8.4.14.7 (seismic design requirements for secondary liquid container or impounding system on single/double/full membrane tanks used in stationary LNG storage) • 17.6.2 (requirements governing pipe penetration positions on double and full containment tank systems in stationary LNG storage)	Contains robust requirements design, construction, performance criteria, accessories and appurtenances, quality assurance, insulation, and testing/commissioning of low pressure, aboveground, vertical, and cylindrical tank systems storing liquefied gases requiring refrigeration
API Std 650, Welded Tanks for Oil Storage (2021)	• 3.3.32 (storage tank design definition)	Contains minimum requirements for material, design, fabrication, erection, and inspection of aboveground, welded oil storage tanks
API Std 2510, Design and Construction of Liquefied Petroleum Gas (LPG) Installations (2020)	• 7.5.1 (design and construction requirements for containers and equipment for hazardous fluid systems other than LNG) • 13.3.2 (design and construction requirements for dikes, impounding walls, and drainage channels for LPG systems)	Contains minimum requirements for the design and construction of liquefied petroleum gas storage vessels, loading and unloading systems, piping, and related equipment at marine and pipeline terminals, natural gas processing plants, refineries, petrochemical plants, and tank farms
ASCE/SEI 7, Minimum Design Loads	• 8.3.2.1 (requirements for determining design wind, flood, and snow loads for	Contains robust structural design requirements for a broad

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
and Associated Criteria for Buildings and Other Structures w/ Supplement 2 (2022)	LNG tank systems and LNG storage containers) • 8.3.2.2 (requirements for design wind speed for LNG storage containers and other facilities) • 8.4.11.2.2 (requirements governing performance of liquefaction evaluation within pre-design subsurface investigation and evaluation for stationary LNG storage foundations) • 8.4.14.1.1 (requirements governing site-specific investigation of site seismic ground motion and response spectra for seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.1.2 (requirements governing determination of the maximum considered earthquake parameters in seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.1.3.1 (requirements governing determination of the maximum considered tsunami parameters in seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.1.3.2 (requirements governing resistance to tsunamis of outer container foundation in seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.4.2 (requirements governing determination of operating basis earthquake spectra for design of land-based, field-fabricated LNG tank systems) • 8.4.14.12.1 (requirements pertaining to soil-structure interaction in seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.12.2 (requirements pertaining to soil-structure interaction in seismic design of land-based, field-fabricated LNG tank systems) • 8.4.14.12.3 (requirements pertaining to soil-structure interaction in seismic design of land-based, field-fabricated LNG tank systems)	spectrum of environmental hazards

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 8.5.2.1 (requirements governing seismic design of land-based, shop-built ASME container design and construction) • 10.2.2.1(3) (seismic design requirements for Classification C piping systems) • 10.2.2.2 (analysis requirements in seismic design for piping systems and components) • 12.2.1.4 (general LNG plant facilities Classification A buildings, equipment, piping, and structures design resistance requirements against tsunami, wind, ice, flood and snow hazards) • 12.2.2 (general LNG plant facilities Classification B buildings, equipment, piping, and structures design resistance requirements against tsunami, wind, ice, flood and snow hazards) • 12.2.3 (general LNG plant facilities Classification c buildings, equipment, piping, and structures design resistance requirements against tsunami, wind, ice, flood and snow hazards)	
ASME B31.1, Power Plant Piping (2024)	• 18.8.2 (requirements governing commissioning of power plant piping)	Contains robust requirements for the design, materials, fabrication, erection, test, inspection, operation, and maintenance of piping systems used in power generation and industrial facilities
ASME B31.3, Process Piping (2024)	• 8.5.1.12 (design requirements for process piping in ASME containers in stationary LNG storage) • 10.2.1 (design requirements for process piping) • 10.2.4 (requirements governing expansion and contraction of process piping in ASME LNG containers) • 10.3.2.2 (material requirements for process piping in ASME LNG containers)	Contains robust requirements for design, fabrication, assembly, erection, examination, inspection, and testing of process plant pipe materials and components in the petrochemical and other industries

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 10.3.2.3 (material requirements for process piping components in ASME LNG containers) • 10.3.3.3.1 (material, design and construction of bends in process piping within ASME LNG containers) • 10.3.3.3.3(3–4) (verification requirements for field bends fittings on process piping within ASME LNG containers) • 10.3.3.5 (material and design requirements for use of compression-type coupling fittings on process piping within ASME LNG containers) • 10.3.4.1 (material, design, construction, and installation requirements for valves on piping systems) • 10.4.1.3 (installation requirements for tubing joints on piping systems and components) • 10.4.1.4 (installation requirements governing prohibition of expanded, caulked, and pipe joints on piping systems and components) • 10.4.1.5 (installation requirements for design of special components on piping systems and components) • 10.4.1.6 (calculations for piping joint installation) • 10.4.1.9.1 (installation requirements for flanged connections on piping systems and components) • 10.4.3 (installation requirements for welding and brazing on piping systems and components) • 10.6.4 (design requirements for piping supports for piping systems and components) • 10.8 (general requirements for inspection, exam, and testing of piping systems and components) • 10.10.2 (general requirements for the design, installation, and testing of piping and valves on safety relief systems)	

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 10.13.2 (requirements for design, fabrication, examination, testing, and inspection of inner pipe assembly within cryogenic pipe-in-pipe systems) • 10.13.3 (requirements for design, fabrication, examination and testing of outer pipe assembly within cryogenic pipe-in-pipe systems) • 10.13.4.2 (requirements for design, fabrication, examination and testing of outer jacket assembly used as secondary containment within cryogenic pipe-in-pipe systems) • 17.8.2 (requirements governing hazardous fluid process piping) • 18.8.2 (requirements governing commissioning of LNG facility piping)	
ASME B31.4, Pipeline Transportation Systems for Liquids and Slurries (2022)	• 18.8.2 (requirements governing commissioning of LNG facility piping)	Contains robust requirements for the design, materials, construction, assembly, inspection, testing, operation, and maintenance of liquid hydrocarbons and other liquids
ASME B31.5, Refrigeration Piping and Heat Transfer Components (2022)	• 10.3.4.1 (material, design, construction, and installation requirements for valves on piping systems) • 18.8.2 (requirements governing commissioning of LNG facility piping)	Contains robust requirements for materials, design, fabrication, assembly, erection, testing and inspection of refrigerant piping, heat transfer components, and secondary coolant piping
ASME B31.8, Gas Transmission and Distribution Piping Systems (2022)	• 10.3.4.1 (material, design, construction, and installation requirements for valves on piping systems) • 18.8.2 (requirements governing commissioning of LNG facility piping)	Contains robust requirements for materials, design, fabrication, assembly, erection, testing and inspection of as transmission and distribution piping systems in gas service
Boiler and Pressure Vessel Code (2023)	• 3.3.5.2 (definition of pressure vessel) • 7.3.2(2–3) (requirements governing welding or brazing in installation of process equipment) • 7.6.3 (design and fabrication requirements for boilers in process equipment)	Contains robust requirements for materials, design, manufacturing, and construction of boilers and pressure vessels in industrial applications

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 7.6.6 (design and fabrication requirements for pressure vessels in process equipment) • 7.6.7 (design and fabrication requirements for brazed aluminum plate fin heat exchangers) • 8.2.2 (design, construction, and installation requirements for ASME containers) • 8.3.3.2 (identification requirements for LNG tank systems and ASME containers in stationary LNG storage) • 8.5.1.3 (inner container welding requirements for ASME containers in stationary LNG storage) • 8.5.1.4.1 (material requirements for the outer containers of ASME containers in stationary LNG storage) • 8.5.1.4.2 (requirements for use of vacuum isolation for the outer containers of ASME containers in stationary LNG storage) • 8.5.1.4.3 (design requirements for certain heads and spherical outer containers within ASME containers in stationary LNG storage) • 8.5.1.5 (material, design, construction requirements for single-walled containers within ASME containers in stationary LNG storage) • 8.5.1.5.8 (non-destructive testing requirements for certain ASME containers used in stationary LNG storage) • 8.5.1.8.2 (material requirements for piping on ASME containers) • 8.5.1.12 (design and installation requirements for piping on ASME containers) • 8.5.1.13 (ASME container piping compliance documentation requirements) • 8.5.2.1 (seismic design requirements for shop-built ASME containers used in stationary LNG storage)	

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
	• 8.5.4 (testing requirements for inner containers of certain ASME containers used in stationary LNG storage) • 10.2.1 (ASME LNG container process piping design and construction requirements) • 10.4.2.3(1) (shutoff valve installation requirements) • 10.4.3 (welding and brazing requirements for installation of process piping systems and components) • 10.8.4.1 (NDE methods and personnel qualifications for process piping) • 17.1.2 (small-scale LNG requirement threshold criteria) • 17.2 (small-scale LNG control room requirements) • 18.8.3 (requirements governing boiler and pressure vessel commissioning)	
ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials (2024)	• 3.3.15 (flame spread index) • 10.3.1.3 (fire resistance requirements for materials used in piping insulation)	Contains standardized testing protocols to determine materials' behavior (including flame spread observation and smoke density) in response to heat and flame exposure
ASTM E136, Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C (2024)	• 4.10 (criteria for noncombustible material) • 10.3.1.4 (fire resistance requirements for materials used in piping insulation)	Contains test method to assess the combustibility of building materials when exposed to high temperatures
ASTM E2652, Standard Test Method for Assessing Combustibility of Materials Using	• 4.10 (criteria for noncombustible material)	Contains test method to assess the combustibility of building materials when exposed to high temperatures

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C (2022)		
CGA 341, Specification for Insulated Cargo Tank Specification for Nonflammable Cryogenic Liquids (2023)	• 8.5.1.4.2 (requirements for use of vacuum isolation for the outer containers of ASME containers in stationary LNG storage) • 15.6.2(1) (design and construction for LNG tank vehicles)	Contains design, material, and construction requirements for insulated cargo tanks used in transportation of nonflammable cryogenic liquids
CGA S-1.3, Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases (2024)	• 8.5.1.3.4 (requirements governing sizing of inner vessel relief devices on ASME containers in stationary LNG storage)	Contains minimum design and other requirements for pressure relief devices used on compressed gas storage containers constructed in accordance with the ASME Boiler & Pressure Vessel Code
CSA B51, Boiler, Pressure Vessel and Pressure Piping Code (2024)	• 3.3.5.2 (definition of pressure vessel) • 7.6.3 (design and fabrication requirements for boilers in process equipment) • 7.6.6 (design and fabrication requirements for pressure vessels in process equipment) • 7.6.6.1 (design and fabrication of shell and tube heat exchangers in process equipment) • 8.5.4.1 (testing requirements for inner container of certain ASME containers used in stationary LNG storage) • 8.5.4.2 (testing requirements for field-fabricated inner containers of certain ASME containers used in stationary LNG storage) • 8.5.4.3 (testing requirements for field-fabricated outer containers of certain ASME containers used in stationary LNG storage)	Contains design, construction, installation, operations, testing, and repair requirements for boilers, pressure vessels, pressure piping, and fittings in industrial applications

STANDARD	NFPA 59A-2026 SECTIONS REFERENCING (SUBJECT)	SUMMARY DESCRIPTION OF STANDARD
CSA C22.1, Canadian Electrical Code (2024)	• 11.9.1 (design and construction requirements for electrical equipment and wiring) • 11.9.6.4 (limitations on use of certain secondary seal compliance methods to comply with conduit sealing requirements)	Contains robust requirements for material, design, installation, maintenance and other requirements to provide protection against fire and explosive hazards associated with electrical systems.
ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids (2016)	• 11.9.6 (sealing and isolation requirements for interfaces between ignitable fluid system electrical conduit or wiring systems)	Contains construction and testing requirements for process sealing between electrical systems and flammable or combustible process fluids.
UL 723, Test for Surface Burning Characteristics of Building Materials (2018, revised 2023)	• 3.3.15 (flame spread index definition) • 10.3.1.3 (fire resistance requirements for materials used in piping insulation)	Contains standardized testing protocols to determine materials' behavior (including flame spread observation and smoke density) in response to heat and flame exposure.
NBBI, NB 23, National Board Inspection Code, part 2, Inspection, Section 2 (2023)	• 18.10.10.7.1(1) (inspection intervals for certain relief valves protecting hazardous fluid components)	Contains protocols for performing and documenting inspection of pressure equipment in industrial applications.
ASNT SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing (2020)	• 10.8.4.1 (NDE methods and personnel qualifications for process piping)	Contains standardized protocols for the qualification and certification of personnel to perform nondestructive testing of industrial equipment and materials.

American Gas Association (AGA)

PHMSA also proposes to incorporate by reference in § 193.403(a) AGA's *Purging Manual*, Fourth edition, published in September 2018. The *Purging Manual* provides principles

and general procedures for purging pipeline systems containing flammable gas to maintain safety.

In this NPRM, PHMSA proposes new purging requirements in § 193.403, which are discussed in more detail in section IV.F.5. As part of those requirements, PHMSA proposes that purging be performed in accordance with the *Purging Manual* as well as NFPA 59A-2026. Chapter 1 of the *Purging Manual* contains requirements such as requiring operators to prepare written site-specific purging procedures and hazard assessments detailing the sequence of events, a predetermined rate of introduction of a purge medium, and verification of endpoints at properly vented locations. These steps must be followed and carried out by properly trained and qualified individuals. Chapter 1 further requires operators to plan for the safety of plant personnel, such as requiring appropriate personal protective equipment and the identification of hazardous materials. Chapter 6 of the *Purging Manual* contains specific purging requirements for different types of LNG storage tanks.

The Fourth edition of the AGA *Purging Manual* contains a substantial revision to the currently incorporated Third edition to include more comprehensive guidance and modern purging techniques. For example, chapter 1 now requires management of change, lock out/tag out, and instruction and assignment of personnel to be included in written plans. Chapter 6 also expands the general requirements and includes a description of LNG facilities and the physical properties of LNG. The Fourth edition adds LNG trucking cargo tanks to the purging requirements as well. Finally, the Fourth edition also changes the name of the standard from "Purging Principles and Practices" to "Purging Manual." PHMSA believes that these updates will be beneficial to safety.

American Institute of Chemical Engineers, Center for Chemical Process Safety

PHMSA proposes to incorporate by reference into § 193.503 the Center for Chemical Process Safety's (CCPS's) *Guidelines for Hazard Evaluation Procedures* (*Guidelines*), Third

edition, published in April 2008. The *Guidelines* provide principles and general procedures for performing process hazard assessments (PHAs) and evaluating and implementing of the results of PHAs. As discussed in section IV.G, PHMSA proposes in § 193.503 that FERC jurisdictional LNG facilities design and implement their subpart F, PHA-based O&M programs consistent with the *Guidelines*.

B.6. Section 193.11—Plans and procedures.

PHMSA proposes to revise the existing plans and procedures regulations in § 193.2017. First, PHMSA proposes to redesignate the current § 193.2017(a) as a new § 193.11(a) and to modify the regulation to specify that operators must maintain written plans and procedures in accordance with part 193 and NFPA 59A-2026. Currently, § 193.2017 requires operators to maintain plans and procedures and to make them available to PHMSA upon request. Each change to a plan or procedure must be available at the LNG plant for review and inspection within 20 days after the change is made. PHMSA's proposed modifications would retain the current requirements and adopt the provisions in NFPA 59A-2026.

PHMSA proposes to remove § 193.2017(b). Section 193.2017(b) currently states that operators must amend their plans and procedures as necessary to ensure safety. The same obligation is also imposed by regulation in § 190.206. To avoid unnecessary duplication, PHMSA proposes to delete § 193.2107(b) and to maintain this requirement in § 190.206.

PHMSA proposes to redesignate the existing § 193.2017(c) requirements for periodic review of plans and procedures with a new § 193.11(b). PHMSA further notes that, on or before the effective date of a final rule in this proceeding, operators would need to review, and if necessary, to update their plans and procedures to reflect the requirements of the new part 193.

PHMSA proposes in a new § 193.11(c) to require operators to record and to maintain a change log detailing changes to plans and procedures, showing revisions from the previous version. This change log is consistent with widely employed quality control practices to ensure

documentation of effective plans and procedures to facilitate continual process improvement, system integrity evaluation, and failure investigations. Unless a different timeframe for specific plans and procedures is required by another provision of part 193 (and, by extension, NFPA 59A-2026), PHMSA proposes that operators keep a record of the change log for the lifetime of the component(s) governed by the procedures.

B.7. Section 193.13—Mobile and temporary LNG facilities.

PHMSA proposes to update the regulations governing mobile and temporary LNG facilities currently found at § 193.2019.[91] These revisions involve a redesignation to a new § 193.13, as well as editorial changes to enhance readability. PHMSA proposes to align these regulations with the latest safety standards by requiring operators of mobile and temporary LNG facilities to follow the governing provisions in chapter 14 of NFPA 59A-2026.

PHMSA is proposing these changes to address the ambiguity in the existing language of § 193.2019. Similar to other provisions in part 193, § 193.2019 currently includes a broad reference to "applicable sections of NFPA 59A-2001" in describing the requirements applicable to mobile and temporary LNG facilities. The "applicable" provision of NFPA 59A-2001 (specifically, section 2.3.4) contains a limited set of personnel training, design, and operations requirements commensurate with the lower public safety risks posed by those facilities, but lacks threshold criteria defining which facilities are or are not eligible for those regulatory flexibilities. In fact, section 2.3.4 is directed principally at temporary LNG facilities, though NFPA 59A-2001 provides no criteria for distinguishing between "temporary" and more permanent, "stationary" LNG facilities. In addition, the language at current § 193.2019 is potentially overbroad in that it could be read to suggest mobile and temporary facilities are exempted from the entirety of

[91] PHMSA also solicits comment on whether to amend § 193.2019 (repeated in § 193.13 as proposed) to communicate better that PHMSA has regulatory authority to ensure compliance of mobile and temporary facilities with the requirements of part 193 (including those provisions of chapter 14 of NFPA 59A-2026 incorporated therein).

part 193—including the provisions (regulatory definitions, statements of scope, etc.) of subpart A.

Chapter 14 of the updated NFPA 59A-2026 addresses these omissions and enhances the safety requirements governing mobile and temporary LNG facilities. In addition to being explicitly directed toward temporary and mobile LNG facilities, chapter 14 introduces a default, six-month durational criteria for distinguishing between "mobile and temporary" and other (*e.g.*, permanent) LNG facilities. Chapter 14 also includes a process that allows operators to extend that six-month period, either by requesting permission from PHMSA via a special permit application or by complying with additional safety and security requirements for permanent, small-scale LNG facilities.

Further, NFPA 59A-2026 chapter 14 contains more robust safety requirements as compared to section 2.3.4 of NFPA 59A-2001. Chapter 14 of NFPA 59A-2026 retains all of its predecessor's content while introducing references to detailed new requirements for qualification and training of personnel; facility and process equipment design, construction and installation; fire protection systems and physical security; transfer operations; operation and maintenance; and corrosion protection.[92] NFPA 59A-2026 also explicitly authorizes the use of cryogenic PIP systems within mobile and temporary LNG facilities.

Lastly, PHMSA proposes to make clear that the provisions of part 193, subpart A apply to mobile and temporary LNG facilities in addition to the requirements in chapter 14 of NFPA 59A-2026. Consistent with current part 193 requirements, operators of mobile and temporary LNG facilities that meet the requirements of NFPA 59A-2026 would be exempt from the other requirements of part 193.

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[92] PHMSA notes that design, installation, and construction requirements in chapter 14 would—pursuant to the statutory retroactivity prohibitions at 49 U.S.C. §§ 60103(c) and 60104(b)—not apply to existing mobile and temporary facilities as those facilities are relocated from place-to-place. However, PHMSA expects that the proposed spacing requirements at NFPA 59A-2026, Table 6.3.1 would apply to these facilities each time they are relocated given that those facilities are (by definition) relocated throughout their lifecycles.

B.8. Section 193.15—Investigations of failures.

PHMSA proposes to retain and to update the failure investigation requirements currently found at § 193.2515. The proposed revisions include redesignating the current § 193.2515 as a new § 193.15 and adding requirements to improve the quality of information on failures at LNG facilities. The current requirements in § 193.2515 are similar to the incident analysis and documentation requirement at section 18.2.2(7) of NFPA 59A-2026. However, the NFPA provision is limited to safety-related incidents and has no minimum property damage threshold. And though section 18.5 of NFPA 59A-2026 helpfully requires operators to establish incident investigation procedures, the language within that provision provides few specifics on the content that must be included in those procedures. PHMSA proposes the following revisions to address these concerns.

First, in paragraph (a), PHMSA proposes to expand the scope of failure investigation requirements to include hazardous fluid releases. Section 193.2515(a) currently limits the failure investigation requirements to explosions, fires, LNG spills, or leaks. Adding hazardous fluid releases to the list will promote public safety and is consistent with the changes that PHMSA is proposing elsewhere to part 193.

Second, in paragraph (a), PHMSA proposes to expand the scope of the failure investigation requirements to include events that occur during commissioning or operation. This modification will ensure that investigations cover all phases of LNG facility development and operation and is consistent with the other changes that PHMSA is proposing elsewhere to part 193.

Third, in paragraph (a)(2), PHMSA proposes to increase the property damage threshold for failure investigations from the current $10,000 to align with the incident reporting requirements in part 191. When PHMSA introduced the property damage threshold in the failure investigation requirements in 1980, the incident reporting criteria did not include any comparable

limitation and set a $5,000 property damage threshold for serious leaks requiring prompt telephonic reporting.[93] PHMSA subsequently amended the incident reporting requirements in part 191 to add a monetary property damage threshold, which is now adjusted on a periodic basis to account for inflation,[94] but has never updated the property damage threshold at § 193.2515. PHMSA proposes to address that omission by aligning the current language at § 193.2515 with the property damage threshold for LNG facility incident reporting in part 191. This change would account both for historic and future inflation and address concerns expressed by some commenters in responding to the recent ANPRMs that expanding the failure investigation requirements to include hazard fluids releases could significantly increase their compliance burdens with little safety benefit.[95]

In a new § 193.15(c), PHMSA proposes that operators maintain investigation records for a minimum of five years. The proposed five-year recordkeeping requirement is consistent with § 193.2521, which currently requires operators to maintain records from each inspection, test, and investigation for a period of at least five years. NFPA 59A requires tests, surveys, and inspection records to be maintained for the life of the facility but does not address the retention of investigation records. This five-year duration also aligns with the record retention requirements for maintenance activity on components prescribed in section 18.13.1 of NFPA 59A-2026, and the five-year incident investigation report recordkeeping requirements in the Occupational Safety and Health Administration (OSHA) process safety management (PSM) regulations at 29 CFR 1910.119(m)(7).

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[93] *See* MTB, *Liquefied Natural Gas Facilities; Federal Safety Standards*, 45 FR 70390, 70393–94 (Oct. 23, 1980).

[94] *See* RSPA, *Transportation of Natural and Other Gas by Pipeline; Annual Reports and Incident Reports*, 49 FR 18956 (May 3, 1984); PHMSA, *Pipeline Safety: Gas Pipeline Regulatory Reform*, 86 FR 2210 (Jan. 11, 2021).

[95] *See, e.g.*, Williams Cos., *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7612.

C. Subpart B—LNG Facility Siting

PHMSA's siting requirements for LNG facilities date to a rulemaking proceeding initiated in the 1970s and completed in 1980. As with the other regulations adopted in that proceeding, PHMSA incorporated multiple levels of conservatism into the siting requirements to address uncertainties and limitations in the data available at that time. Although PHMSA has updated certain aspects of those requirements over time, including by approving more modern versions of the models used to determine the amount of property that must be owned or controlled to site an LNG facility at a particular location, the underlying conservatism embodied in the 1980 regulations has remained largely unchanged. That degree of conservatism is no longer justified given the significant advancements in LNG safety that have occurred in the past two decades, many of which are reflected in the enhanced safety requirements throughout recent editions of NFPA 59A.

As discussed in more detail below, PHMSA is proposing substantial revisions to its siting requirements to address these concerns. First, PHMSA proposes adopting an updated version of the traditional, prescriptive approach for siting LNG facilities. The prescriptive approach would be consistent with the provisions in NFPA 59A-2026 chapter 5 and would serve as the default set of siting requirements. Second, PHMSA proposes adopting a more sophisticated quantitative risk assessment (QRA)-based approach for siting LNG facilities. The QRA-based approach would be consistent with the provisions in NFPA 59A-2026 chapter 19 and would only apply on an elective basis.

PHMSA believes that adopting these changes would eliminate much of the unnecessary conservatism embodied in the current regulations, generating significant cost savings without compromising safety. Additional information about the development of PHMSA's siting regulations, and the proposed prescriptive and QRA-based siting approaches, is provided in the following sections.

C.1. Role of Siting in PHMSA's Safety Framework

By way of background, the siting requirements in subpart B date to a rulemaking proceeding initiated by one of PHMSA's predecessor agencies, the Materials Transportation Board (MTB), in the late 1970s. MTB undertook that effort to address concerns with the then-current version of the Federal safety standards for LNG facilities, which relied almost entirely on the provisions in a historical edition of NFPA.[96] MTB subsequently divided that rulemaking effort into two different proceedings, one of which focused on establishing O&M requirements for LNG facilities,[97] and the other of which focused on establishing design, construction, installation, testing, and siting requirements for LNG facilities.[98]

Of particular importance for this proceeding, MTB took a very conservative approach in both proceedings, issuing final rules in 1980 that included layers of mutually reinforcing requirements, many of which incorporated cautious assumptions or relied on near-worst-case scenarios selected to provide robust protective safety margins.[99] MTB recognized that this approach imposed significant costs on operators, but concluded that those costs were justified by the limited historical release data for LNG facilities and the potential consequences of an incident.

The original part 193 siting regulations were a product of that philosophy. Highlighting the lack of meaningful safety standards in effect at the time, MTB focused on addressing the risks associated with two hazards: (1) thermal radiation, *i.e.*, the amount of heat that would be

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[96] *See* MTB, *LNG Facilities; Federal Safety Standards*, 42 FR 20776, 20778 (advanced proposal Apr. 21, 1977).

[97] *See generally* MTB, *Liquefied Natural Gas Facilities; Federal Safety Standards*, 45 FR 70390, 70391 (Oct. 23, 1980) (describing safety value of each of the different operations and maintenance proposals for the new part 193).

[98] *See* MTB, *LNG Facilities; Federal Safety Standards*, 44 FR 8142, 8151 (proposed Feb. 8, 1979) (discussing the mutually-reinforcing and (at times) redundant layers of design, construction, and installation requirements).

[99] *See* RSPA, *LNG Facilities: Federal Safety Standards*, 45 FR 9220, 9221–92 (proposed Feb. 11, 1980) (evaluating operations and maintenance requirements); RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9186–87, 9195 (Feb. 11, 1980) (evaluating construction, design, installation, testing, and siting requirements).

produced if an LNG spill ignited and (2) vapor-gas dispersion, *i.e.*, the dimensions of the vapor-gas cloud that would form as a result of an LNG spill, which could ignite or act as an asphyxiant.[100] MTB proposed an inherently conservative approach employed in regulating other high-consequence industrial facilities to address these risks. MTB required owners or operators to exercise control over an "exclusion zone," *i.e.*, a buffer area around an LNG facility that could not be accessed by the public.[101]

To provide broad safety margins, MTB required operators to use conservative assumptions (*e.g.*, emissive heat flux, flame length, flame tilt angle, and radiant heat exposure levels; neglect of active mitigation measures; assumption of 100 percent fatality or harm within exclusion zones) in calculating the extent of the exclusion zone for thermal radiation. The calculation needed to be made either by using a simple, default mathematical model that would yield "conservatively safe exclusion zone[s]" or by using an alternative, MTB-approved model that incorporated "additional and more valid information when it becomes available."[102] MTB employed a similar approach in setting the boundaries of the exclusion zone for flammable vapor-gas dispersion, requiring the use of near-worst case assumptions (*e.g.*, a uniform concentration of methane half its actual lower flammable limit (LFL); default worst-case wind and atmospheric stability and design spill parameters) in response to an ignition scenario that MTB admitted was far less likely than the localized fire risk addressed in its thermal radiation

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[100] MTB, *LNG Facilities; Federal Safety Standards*, 42 FR 20776 (advanced proposal Apr. 21, 1977).

[101] Notably, exclusion area boundaries employed in the context of commercial nuclear power facilities pursuant to 10 CFR 100.11, which were often characterized as posing similarly high-consequence public safety risks to those posed by LNG facilities. *See, e.g.*, Comptroller General, Report No. EMD78-28, *Liquefied Energy Gases Safety, Vol. 1*, at 21-5 (July 31, 1978).

[102] *See* MTB, *LNG Facilities; Federal Safety Standards*, 44 FR 8142, 8149–50 (proposed Feb. 8, 1979); RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9191–94 (Feb. 11, 1980); MTB, *Liquefied Natural Gas Facilities; Reconsideration of Safety Standards for Siting, Design, and Construction*, 45 FR 57402, 57406–08 (Aug. 28, 1980).

hazard analysis.[103] This approach addressed probability of release characteristics and operating conditions by selecting assumptions MTB judged appropriately conservative in light of occurrence frequency and potential consequence magnitude.

Although subject to minor adjustments over time, the underlying approach of layering conservativism upon conservatism is still embodied in the current siting regulations. Subsequent rulemakings have adopted newer, and more accurate, models for calculating exclusion zones—even as they rejected stakeholder calls to update some of the conservative parameters that had been employed in addressing historical uncertainties.[104] PHMSA has continued to rely on legacy editions of NFPA 59A that incorporate additional layers of conservatism within the modeling of hazard distances (which subpart B regulations then translate into exclusion zones). Specifically, subpart B has since 2004 referenced NFPA 59A-2001 chapter 2's prescriptive siting requirements, which employ many of the conservative assumptions for modeling thermal radiation (section 2.2.3.2) and flammable vapor-gas (sections 2.2.3.3 and 2.2.3.4) hazards that PHMSA's predecessors had previously adopted in regulation.[105] In other places where NFPA 59A-2001 departed from historical, conservative modeling assumptions, PHMSA and its predecessors either retained those assumptions in subpart B text or supplemented them in FAQs.[106] These extra layers of conservatism affect the design and layout of LNG facilities, either

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[103] *See* MTB, *LNG Facilities; Federal Safety Standards*, 44 FR 8142, 8150–51 (proposed Feb. 8, 1979); RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9195 (Feb. 11, 1980); MTB, *Liquefied Natural Gas Facilities; Reconsideration of Safety Standards for Siting, Design, and Construction*, 45 FR 57401, 57047 (Aug. 28, 1980).

[104] *See* RSPA, *Liquefied Natural Gas Regulations – Miscellaneous Amendments*, 62 FR 8402 (Feb. 27, 1997) (adopting the LNGFIRE I computer model for thermal radiation hazards and the DEGADIS model for flammable vapor dispersion hazards); RPSA, *Pipeline Safety: Incorporation of Standard NFPA 59A in the Liquefied Natural Gas Regulations*, 65 FR 10950, 10952–53 (Mar. 1, 2000) (adopting LNGFIRE III for thermal radiation modeling while rejecting less demanding thermal radiation wind speed and flammable vapor cloud explosive limit assumptions).

[105] §§ 193.2051, 2057(a), 2059(a).

[106] *See, e.g.*, § 193.2059(b)(1) (assuming a safety factor of 2—or a 2.5 percent concentration of methane—when calculating hazard distances for flammable vapor cloud dispersion). PHMSA initially issued its LNG FAQs March 2014, and has supplemented or revised them ten times since, most recently in September 2025. PHMSA notes that even as it is proposing to discard some of the historical assumptions in LNG FAQs, operators would retain discretion to use those conservative, proven assumptions going forward as appropriate for their facility.

by constraining the configuration or spacing of components and systems within a site or requiring the installation of additional onsite mitigation measures (*e.g.*, vapor shields) to accommodate the exclusion zone requirements.

Finally, PHMSA and its predecessors have supplemented the subpart B exclusion zone framework with additional siting requirements. For example, RSPA's incorporation by reference in 2004 of the siting requirements within chapter 2 of NFPA 59A-2001 introduced prescriptive requirements covering everything from soil and geotechnical site investigation (section 2.1.4) to process equipment spacing (section 2.2.6). PHMSA has also read broad language at section 2.1.1(d) of NFPA 59A-2001 to require operators to consider "[o]ther [siting-related] factors," including releases of hazardous fluids other than LNG, in conducting their exclusion zone analyses.[107] These changes, when combined with the inherent conservatism used in developing the exclusion zone requirements, have resulted in a siting regime for LNG facilities that no longer appropriately reflects the risks to public safety, particularly given the significant advancements in industry standards and practices that have occurred in the past four decades.

C.2 Prescriptive Siting Requirements (NFPA 59A-2026, Chapter 5)

This rulemaking proposes to modernize PHMSA's default, prescriptive siting requirements in subpart B. These requirements are currently governed by a patchwork of industry standards, part 193 regulatory provisions, and non-binding guidance—all of which magnify the inherent conservatism already provided through the other requirements (design, installation, testing, construction, operations, and maintenance) in part 193. Although the LNG industry has an excellent safety record as discussed in section II.A.3.c above, PHMSA does not agree that the conservative approach traditionally used in the siting requirements is necessary to maintain that level of safety. Rather, PHMSA believes that a more modern approach consistent

[107] LNG FAQs, H1–H3. The expansion of part 193 siting requirements over time has been accompanied by expansion of other part 193 elements enhancing defense-in-depth from the safety risks of releases.

with the enhanced safety provisions in NFPA 59A-2026 can be used to determine whether an LNG facility can be safely sited at a particular location.

PHMSA therefore proposes to incorporate by reference into subpart B the prescriptive siting requirements in chapter 5 of NFPA 59A-2026. Those requirements would serve as the default siting provisions in lieu of the current reference to chapter 2 of NFPA 59A-2001. PHMSA also proposes to supplement the provisions in NFPA 59A-2026 chapter 5 with a handful of additional regulatory requirements in subpart B. Adopting these changes would align the siting requirements with the latest hazard modeling techniques and current standards and practices in the LNG industry. In addition, PHMSA proposes to codify or to eliminate current non-binding guidance on LNG facility siting to improve regulatory certainty and to reduce unnecessary compliance burdens. PHMSA expects the proposed changes to the default, prescriptive siting requirements in subpart B will reduce public safety risks, particularly when combined with the other safety-enhancing proposals discussed elsewhere in this NPRM.

a. Sections 193.101 and 193.103(a)—Improved Hazard Modeling Under NFPA 59A-2026

PHMSA proposes to incorporate by reference into new §§ 193.101 and 193.103 certain enhanced hazard assessment and modeling requirements from chapter 5 of NFPA-2026. Specifically, PHMSA proposes to incorporate sections 5.2.1, 5.2.2, and 5.3.2 of NFPA 59A-2026 into these regulations, subject to certain exceptions and supplemental provisions as discussed below. PHMSA proposes to incorporate by reference into other subparts of part 193 provisions in chapter 5 of NFPA 59A-2026 that are better understood as design, rather than siting, requirements. PHMSA's discussion of those proposals is included in section IV.D of this NPRM.

The hazard modeling requirements in subpart B are currently based on the provisions in chapter 2 of NFPA 59A-2001 and certain additional regulatory requirements. NFPA 59A-2001 at section 2.1.1(d)—and, by extension, PHMSA's subpart B regulations at § 193.2051—requires operators to evaluate all "factors . . . that have a bearing on the safety of plant personnel and the

surrounding public" when siting a new LNG facility or making significant expansions or other alterations to an existing LNG facility. PHMSA guidance at LNG FAQ H1 characterizes that regulatory language as requiring evaluation of releases from systems containing any hazardous fluid.

In addition, § 193.2051 requires operators to consider the effects of failure of certain equipment (*e.g.*, storage tank penetrations, piping ruptures) resulting in the release of LNG in conducting a siting analysis. The specific LNG releases that must be considered, otherwise known as "design spills," generally reflect industry understanding of (in some cases) worst-case, plausible failures based on historical data. Sections 193.2057 and 193.2059 require operators to use certain models to predict the extent of the thermal radiation and flammable vapor-gas dispersion that would result from such a failure. The models, authorized by regulation or approved by PHMSA after an evaluation, calculate "hazard distances" bounding a "hazard footprint" at certain prescribed thresholds or "endpoints."[108] NFPA 59A-2001 (at sections 2.2.3.2 and 2.2.3.3) assigns escalating safety requirements based on the magnitude of safety consequence associated with different endpoints. Operators must establish (or otherwise maintain) legal control of all activities within hazard footprints bounded by endpoints correlating to the most consequential risks: fatality and irreversible harm. The exclusion zone requirements in subpart B incorporate these concepts from NFPA 59A-2001.

The hazard modeling requirements in chapter 5 of NFPA 59A-2026 are more advanced than the comparable provisions in NFPA 59A-2001, improve subpart B's hazard analyses with the risk profiles of modern facilities (many of which can contain large quantities of hazardous fluids other than LNG), and provide a more robust evaluation of hazard phenomena. For

[108] https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-exclusion-zones. PHMSA has developed model evaluation protocols (MEPs) for source term calculation, flammable vapor cloud dispersion hazards, toxic vapor cloud dispersion hazards, vapor cloud explosion hazards, and boiling liquid expanding vapor cloud explosion hazards. PHMSA expects to issue an MEP for thermal radiation hazards in spring 2026.

example, rather than providing that operators merely "consider" unspecified siting-related factors potentially affecting safety as provided by NFPA 59A-2001, NFPA 59A-2026 section 5.2.1 specifies illustrative factors (process hazards, security threats, adjacent facility hazards, weather and geological conditions, and safety measures incorporated in facility design and operational practices) for operators to consider in conducting site evaluations. In addition, section 5.3.2.13 of NFPA 59A-2026 provides more detailed requirements for qualitative consideration of the potential for cascading damage than the analogous provisions in section 2.2.3.6 of NFPA 59A-2001.[109]

Chapter 5 of NFPA 59A-2026 expands the requirements for hazard modeling as well. Rather than requiring that operators "consider" most releases of LNG and other hazardous fluids, section 5.3.2.1 of NFPA 59A-2026 explicitly requires modeling of additional hazards (including overpressure effects from vapor cloud explosions (VCEs), toxic effects from toxic vapor dispersion, and thermal radiation effects from fireballs) from releases of hazardous fluids generally. Chapter 5 also provides that such modeling should be informed by specific endpoints correlating to fatality and irreversible harm for each of these new hazard modeling requirements.[110]

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[109] Although PHMSA has approved an MEP and MVD for boiling liquid expanding vapor explosion (BLEVE) hazards, PHMSA understands that neither NFPA 59A-2026 chapter 5, nor § 193.103 as proposed in this NPRM, necessarily require operators to model such hazards. Nor would each operator need to address the BLEVE hazards qualitatively in its siting evaluation pursuant to § 193.103 unless the characteristics of its facility suggest that the probability of a BLEVE hazard merits discussion among other cascading damage scenarios as required by NFPA 59A-2026 section 5.3.2.13. PHMSA understands that the probability of BLEVEs at LNG facilities is typically low and would in any event be exemplary of cascading damage rather than an independent hazard; as such, the probability (and consequence magnitude) associated with BLEVEs would also be mitigated by the suite of part 193 defense-in-depth requirements. PHMSA also understands the more specific language in those NFPA 59A-2026 provisions must be understood against a rule of reason: operators' written siting evaluations could briefly and qualitatively reference information on the factors identified within other documentation supporting regulatory compliance or approvals for their facilities without having to include an exhaustive (quantitative or qualitative) evaluation of those or other factors within a siting analysis.

[110] PHMSA solicits stakeholder comment on whether existing hazard modeling focused on thermal radiation and flammable vapor cloud dispersion provides adequate protection of public safety such that its proposed expansion of modeling to account for new hazards as contemplated by NFPA 59A-2026 would be unnecessary. PHMSA also solicits comment on the appropriateness of the NFPA 59A-2026 endpoints for each of the hazards for which that standard requires modeling. Finally, PHMSA solicits stakeholder comment on whether and to what extent any new

b. Enhancements on NFPA 59A-2026 Hazard Modeling Requirements

PHMSA proposes a series of additional enhancements to the expanded hazard modeling requirements of chapter 5 of NFPA 59A-2026 through targeted subpart B provisions that are intended to address safety risks and lessons learned from recent LNG facility incidents, to ensure continuity with longstanding PHMSA guidance, and to facilitate implementation by operators.

Section 193.103(a)—Siting Package Submission

Consistent with the documentation requirements at NFPA 59A-2026 section 5.2.2, PHMSA proposes to codify LNG FAQ G7, which directs operators to submit a Design Spill Package to PHMSA with engineering drawings, piping and instrument drawings, reports from hazard analyses (including an exclusion zone), and similar items that will inform its review of siting analyses. In codifying this requirement, PHMSA proposes a comprehensive list of information needed in ensuring compliance with subpart B to provide additional regulatory certainty. PHMSA expects that, when submitting the information specified in § 193.103(a), operators will provide it in the form and manner consistent with LNG FAQ DS3.

PHMSA has clarified in its proposed regulatory text codifying the LNG FAQ DS3 submission requirement that operators must submit a written assessment of the effect of active and passive mitigation measures on their hazard analysis. PHMSA acknowledges that operators and hazard modeling practitioners are generally in the best position to identify precisely how a particular mitigation measure will affect the risk profile of an LNG facility. PHMSA will exercise continuing regulatory oversight in reviewing operator submissions.

Section 193.103(b)—Design Spill Criteria

PHMSA proposes to codify in § 193.103(b) the design spill criteria in LNG FAQ DS2 in lieu of the analogous criteria in Table 5.3.2.3 of NFPA 59A-2026. PHMSA's experience is that

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hazard modeling requirement should be limited based on the quantity or type of hazardous fluids other than LNG present at a particular facility.

the undefined term "single accidental leakage source" (SALS) at Table 2.2.3.5 of NFPA 59A-2001 (for spills from process and transfer systems) has been a source of confusion. PHMSA, FERC, and NFPA have developed a series of clarifications characterizing (in some cases) worst-case, plausible spills from different types of transfer and process systems, including the design spill criteria in current LNG FAQs DS2(A) (hole size on process & transfer systems), DS2(B) (full-bore ruptures of single-ply construction expansion bellows), DS2(C) (hole size for pipe-in-pipe systems), and DS2(D) (hole size for truck transfer hoses). Each of these assumptions has been employed in subpart B siting analyses for multiple LNG facilities in the last decade.

First, LNG FAQ DS2(A) provides that a design spill should assume full-bore (or guillotine break) ruptures on transfer and process piping with a diameter less than six inches (*i.e.*, assuming a hole equal to the diameter of the pipe), while operators need only assume a two-inch hole on piping of six inches in diameter and larger. This line-drawing is based on identifying the largest plausible failures on such piping, since historical failure data demonstrates that full-bore ruptures are plausible failure modes on smaller piping, but not on large piping—failures of two inches or smaller hole size represent most of all failure data on piping of six inches or larger. PHMSA acknowledges that NFPA 59A-2026 (at section 5.3.2.3, referencing Table 5.3.2.3) employs different assumptions requiring full-bore ruptures only for piping smaller than three inches in diameter. Having objected to that provision during the standards development process as inconsistent with the results of PHMSA research,[111] PHMSA proposes to adopt the criteria in LNG FAQ DS2(A) instead of the provisions in Table 5.2.3.2 of NFPA 59A-2026.

Second, NFPA 59A-2001 does not include provisions for cryogenic PIP technology, and more recent editions of NFPA 59A exempt PIP transfer systems from the design spill requirements in favor of using (in Table 6.3.1) setback distances. PHMSA recommends in its

[111] Gas Tech. Inst. (GTI), Contract No. DTPH56-15-T-00008, *Statistical Review and Gap Analysis of LNG Failure Rate Table* (Jan. 2017).

LNG FAQ DS2(C) that operators evaluate design spills from a one-inch hole on all PIP transfer systems, regardless of diameter. That design spill parameter reflects PHMSA's understanding that, while unlikely, releases from PIP transfer systems are nevertheless possible—as evinced by the failure of such a system in the 2022 Freeport incident. PHMSA therefore proposes to codify its one-inch hole design spill requirement for PIP transfer systems within the new § 193.103(b).[112]

Third, for single-ply construction expansion bellows and truck transfer hoses, PHMSA proposes to codify at the new § 193.103(b) current guidance in LNG FAQ DS2(B) and (C). That guidance requires modeling of a hole size equivalent to a full-bore rupture for all single-ply construction expansion bellows and truck transfer hoses, regardless of diameter. PHMSA understands these conservative assumptions are warranted as single-ply construction expansion bellows and truck transfer hoses are less robust components with a higher likelihood of full-bore ruptures than fixed piping of equivalent size. Moreover, a fatal incident in September 2023 in Toppenish, Washington, in which a full-bore rupture occurred after a transfer hose detached as a truck pulled away from an LNG facility during transfer operations, demonstrates the importance of adopting this modeling requirement.[113]

Section 193.103(c)—Models for Calculating Source Terms and Hazard Footprints Reviewed Against PHMSA Reference Materials

PHMSA proposes to consolidate and to enhance within a new § 193.103(c) current guidance at LNG FAQs H6 and H7 for the modeling of release source terms (the characterization of immediate-post release parameters) and hazard footprints. Specifically, PHMSA proposes to require that operators perform source term calculation and hazard modeling pursuant to computer

[112] PHMSA is not proposing codification of other prescriptive criteria in LNG FAQs DS2(C)(1)–(3) addressed in provisions of NFPA 59A-2026 setting forth design requirements for pipe-in-pipe systems.

[113] *Wash. Utils. & Transp. Comm'n v. Cascade Nat. Gas Co*., Docket No. PG-230800, *Compl.*, at ¶16 (Mar. 27, 2025).

programs reviewed against PHMSA-approved MEPs and data sets (MVDs). PHMSA understands that evaluation of those computer models by a software developer or a facility operator (rather than PHMSA) against PHMSA-approved MEPs and MVDs will satisfy the comparable provisions in NFPA 59A-2026 at sections 5.3.2.6 and 5.3.2.7.

Subpart B initially required the use of certain specific models for calculating endpoints (and, by extension, hazard footprints) for thermal radiation and flammable vapor-gas hazards from LNG releases.[114] RSPA subsequently revised subpart B to allow approval of alternative hazard models,[115] and sections 193.2057(a) and 193.2059(a) provide criteria that inform such reviews. Subpart B does not prescribe an analogous process for reviewing and approving source term models.

To address that gap, PHMSA has provided guidance in the form of an Advisory Bulletin (ADB-10-07) and LNG FAQs (initially H5-H6) for model developers to use in seeking PHMSA approval of flammable vapor cloud dispersion models evaluated against MEPs and experimental data.[116] PHMSA declined in LNG FAQ H7 to prescribe particular software for calculating source terms for flammable vapor-gas dispersion hazards. PHMSA has continued to work with subject matter experts to develop MEPs and MVDs appropriate for use in reviewing and approving computer models for calculating source terms and hazard footprints with respect to each of the hazards identified in NFPA 59A-2026 section 5.3.2.1. PHMSA's website provides links to those MEPs and the MVD data sets against which the MEPs require models be validated.[117] PHMSA's website also lists the handful of alternative models approved for use in modeling flammable

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[114] MTB, *Liquefied Natural Gas Facilities: New Federal Safety Standards*, 45 FR 9184 (Feb. 11, 1980) (codifying §§ 193.2057(c) (thermal exclusion zones) and 193.2059(c) (flammable vapor-gas exclusion zones)).

[115] *See* RSPA, *Incorporation of NFPA 59A in the Liquefied Natural Gas Regulations*, 65 FR 10950 (Mar. 1, 2000).

[116] *See* PHMSA, ADB-10-07, *Obtaining Approval for Alternative Vapor-Gas Dispersion Models*, 75 FR 33771 (Aug. 31, 2010); LNG FAQs, H5–H6 (Dec. 7, 2015). ADB-10-07 was itself the result of extensive work effort by PHMSA and subject matter experts within the Federal Government and industry on developing robust MEPs and MVDs.

[117] https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-exclusion-zones.

vapor-gas dispersion hazards—each of which were approved only after protracted delay.[118] To date, no one has sought PHMSA approval for software for calculating source terms or for use in modeling other hazards identified in section 5.3.2.1 of NFPA 59A-2026.

PHMSA proposes to establish a developer-and-operator-led review and approval process at § 193.103(c). Software developers will need to review source term and hazard modeling software against the PHMSA-approved MEPs and MVDs; however, such software will no longer require explicit PHMSA approval before use.[119] This approach will ensure the more efficient use of PHMSA's limited resources. PHMSA notes this concern about diversion of resources is particularly acute given this NPRM's proposed expansion of modeling requirements to hazards that had formerly only been addressed qualitatively.

PHMSA also expects that its proposed approach will encourage industry investment in more sophisticated source term and hazard models by eliminating the delays associated with the PHMSA review and approval process, which have served as a barrier to innovation and investment. PHMSA does not expect this approach to have an adverse effect on public safety. Each source term and hazard model would still need to be evaluated by operators against robust, PHMSA-approved, hazard-specific MEPs and comprehensive MVDs, and PHMSA—as well as other (Federal or State) regulators—will continue to have the ability to take appropriate action through the enforcement and oversight process to address any safety concerns.

Lastly, PHMSA acknowledges that pertinent language in NFPA 59A-2026 (at

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[118] PHMSA review of each of the three alternative models listed on its webpage lasted a year or longer—with one (Phast 8.4) review lasting nearly three years.

[119] In the interests of regulatory certainty, PHMSA does not propose that § 193.103(c) would be construed either (1) to require operators to re-validate their computer models should the MEP or MVD for a particular hazard be updated during regulatory review (either in preliminary or final design phases) or subsequent construction and pre-operational phases of a project; or (2) to prohibit operators from validating their computer models against older versions of PHMSA-approved MEPs or MVDs unless PHMSA explicitly prohibits the use of older versions of the MEPs or MVDs when approving updated versions of the same. Should the continued use of a historical MEP or MVD entail unacceptable safety risk, PHMSA (or another cognizant regulatory authority) may exercise its statutory authority to restrict the use of that particular MEP or MVD either generically or in connection with a specific LNG facility project.

sections 5.3.2.6 and 5.3.2.7) and within the MEPs and MVDs reflect the existing § 190.9 approval process. Should this proposal be adopted, PHMSA will interpret those provisions of NFPA 59A-2026 and its MEPs and MVDs as if they memorialized this updated approach. In parallel, PHMSA will work with other stakeholders to ensure that each of NFPA 59A and its MEPs and MVDs are updated to conform with revised regulatory text.

Section 193.103(d)—Cloud Height for Vapor Dispersion Modeling

PHMSA proposes to retain, but to redesignate as a new § 193.103(d), language at existing § 193.2059(b)(3) requiring that operators use an elevation parameter of 0.5 meters when modeling vapor dispersion hazard footprints. This requirement ensures that vapor dispersion modeling focuses on impacts at ground level where members of the public will be located. NFPA 59A-2026 chapter 5 does not address this modeling consideration. Accordingly, PHMSA proposes to maintain the existing requirement.

Section 193.103(e)—Modeling Duration for Vapor Dispersion

PHMSA proposes to adopt within a new § 193.103(e) the duration assumptions for modeling flammable vapor cloud dispersion hazards in LNG FAQ DS8(B). Pursuant to section 5.3.2.4 of NFPA 59A-2026, design spill duration can be capped at 10 minutes—and potentially less when an LNG facility is equipped with automatic shutdown systems—consistent with an expectation that vapor clouds will typically reach a maximum extent well before 10 minutes following initiation of a spill. But vapor clouds may continue expanding after the 10-minute spill duration ends in certain scenarios (*e.g.*, spills from long and large-bore piping with widely spaced isolation valves, or from process and storage vessels). Therefore, PHMSA proposes to qualify incorporation by reference of NFPA 59A-2026 section 5.3.2.4 to require operators continue flammable and toxic vapor dispersion simulation modeling until the vapor cloud reaches its maximum extent—even if that is longer than the design spill duration. Notwithstanding this regulatory language, PHMSA expects operators may continue to use a 10-

minute modeling cut-off time as a placeholder during the preliminary design phase, since the final modeling will depend on factors that are determined later in the design process.

Section 193.103(f)—Uncertainty Factors for Hazard Modeling

Subpart B regulations do not prescribe a safety factor for use in modeling thermal radiation hazards. In contrast, subpart B regulations at § 193.2059(b)(1) require that operators incorporate a safety factor in calculating flammable vapor-gas dispersion footprints: operator modeling of flammable vapor-gas hazards must be based not on the LFL of methane (5.0 percent concentration in air), but half of that value—2.5 percent methane concentration in air (or a safety factor of "2"). The LFL safety factor of 2 was consistent with then-current edition of NFPA 59A when adopted in 1980 and addressed historical concerns with the limitations of contemporaneous modeling approaches.[120] But subsequent NFPA 59A editions no longer incorporate a specific, universally-applicable safety factor,[121] and the PHMSA-approved MEPs contain a methodology for calculating model-specific uncertainty factors based on evaluation of a model results against experimental data within PHMSA-approved MVDs—an approach consistent with NFPA 59A-2026 section 5.3.2.12.

PHMSA proposes to adopt at a new § 193.103(f) a requirement to use uncertainty factors derived from application of PHMSA-approved MEPs and MVDs. That approach is consistent with the comparable provisions in NFPA 59A-2026. PHMSA expects that the robust, hazard-specific evaluation processes and data sets for calculation of uncertainty factors will ensure adequate conservatism in the calculation of hazard endpoints. PHMSA also expects that software developers will have a commercial incentive to improve the accuracy of their computer models to capture increasingly lower uncertainty factors after evaluation against PHMSA-approved

[120] *See* MTB, *Liquefied Natural Gas Facilities: New Federal Safety Standards*, 45 FR 9184, 9185 (Feb. 11, 1980).

[121] *See, e.g.*, RSPA, *Incorporation of NFPA 59A in the Liquefied Natural Gas* Regulations, 65 FR 10950, 10953 (Mar. 1, 2000).

MEPs and MVDs.

Section 193.103(g)—Consideration of Active Mitigation Measures in Hazard Modeling

PHMSA proposes a new § 193.103(g) adopting the approach in section 5.3.2.2.1 of NFPA 59A-2026 for adjusting calculated hazard endpoints to reflect the installation of active mitigation measures. PHMSA has historically allowed operators to adjust modeled hazard endpoints to reflect certain passive design features (*e.g.*, vapor fences). But PHMSA has been reluctant to allow an adjustment for active mitigation measures, an issue not addressed in NFPA 59A-2001.[122] Subsequent editions of NFPA 59A (including NFPA 59A-2026) permit operators to take credit for active mitigation measures in calculating hazard footprints.

PHMSA therefore proposes within a new § 193.103(g) a process for considering active mitigation measures in calculating hazard footprints. This updated approach should align calculated hazard footprints more appropriately with genuine risks and incentivize operators to deploy novel, robust mitigation measures enhancing safety—a particularly valuable result given that PHMSA is elsewhere proposing to expand its hazard modeling requirements to address new hazards (*e.g.*, toxic vapor dispersion) that may warrant different mitigation strategies.

PHMSA has drafted § 193.103(g) to ensure that consideration of active mitigation measures in hazard modeling will be based on a sound, proven basis consistent with evolution of industry best practices and lessons learned. Specifically, the proposal would require each active mitigation measure to be incorporated into the documentation submitted to PHMSA in the § 193.103(a) siting package. Adequate supporting documentation could consist of test or experimental results, reference to the use of the same or a similar active mitigation measure at another LNG facility, or a special permit issued either for that or another facility.[123] Although

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[122] *See* LNG FAQ, H8. PHMSA acknowledges that some "active" mitigation measures may involve both procedural elements requiring human intervention as well as design (passive) elements.

[123] PHMSA will also consider stakeholder input on whether it should accept active mitigation measures for releases of certain (specifically, toxic chemicals appearing in an LNG facility) hazardous fluids incorporated into offsite consequence analyses supporting EPA-approved risk management plans pursuant to 49 CFR part 68.

this may place a burden on first adopters of active mitigation measures, PHMSA expects that burden to be reduced for subsequent users of the same measures, because PHMSA will have already considered whether and how an active mitigation measure should be accounted for in hazard modeling. Adequate supporting documentation could also reference any active mitigation measures accounted for in calculating exclusion zones for approved LNG facilities pursuant to the alternative QRA-based approach in proposed § 193.107. PHMSA expects that this requirement will ensure that use of active mitigation techniques within § 193.103 hazard modeling will be supported by robust quantification of the safety value of such measures that have been endorsed by a cognizant regulatory authority.

Lastly, PHMSA will (as discussed above) defer to an operator's assessment of precisely how an active mitigation measure would affect the performance (or output) of its hazard modeling, provided such assessment is documented in the siting package as contemplated by § 193.103(a). Operators—and not PHMSA—are generally best-positioned to evaluate the facility-specific factors (including, but not limited to, the characteristics of the hazard and the technical/operational practicability and cost of mitigation measures) demonstrating the value of particular mitigation measures.

c. Rescission of LNG FAQs and Miscellaneous Clarifications of NFPA 59A-2026 Hazard Modeling Boundaries

PHMSA proposes to rescind its LNG FAQs if the proposals in this NPRM are adopted in a final rule. Some of those LNG FAQs (in particular, those discussed above) will be redundant with, or superseded by, changes in the hazard modeling methods provided for in the revised subpart B. Other LNG FAQs prescribe a one-size-fits-all (and, in some cases, worst-case) approach on the choice of hazard evaluation parameters that may not resemble plausible release

scenarios for particular facilities or hazards.[124] In lieu of following those parameters, operators should adhere to provisions in NFPA 59A-2026; for other parameters on which NFPA 59A-2026 is silent or explicitly allows flexibility, operators should use sound engineering judgment in selecting plausible, conservative parameters and document their reasoning as required by proposed § 193.103(a) and NFPA 59A-2026 section 5.2.2.

PHMSA discusses below two issues regarding the scope of subpart B hazard modeling analyses that merit additional clarification.

Exemption of Feed Gas and Send-Out Gas Lines from Subpart B Hazard Modeling

LNG facilities are typically connected to pipelines that either supply gas for liquefaction (called "feed gas" lines) or receive gas after regasification (called "send out" lines). These pipelines are collectively referred to as "supply lines" and have historically been considered subject to PHMSA's part 192 requirements rather than its part 193 regulations (and by extension, NFPA 59A). Although neither NFPA 59A-2001 nor current subpart B regulations address the boundary between these regulatory regimes, PHMSA's practice has been to give operators discretion in designating the precise boundary—the "spec break"—where each of the part 192 and 193 regulatory regimes would begin to apply. Operators in practice have typically chosen the first aboveground segment of a supply line within the LNG facility boundary as the "spec break" marking the boundary of part 193 regulations. This approach is consistent with the practical realities that most modeled hazards are pertinent to aboveground (rather than buried) piping and that operators are unlikely to have legal control of areas outside the property lines of their facilities as may be required if they were to draw exclusion zones as supply piping crossed into their facility.

Consistent with that historical practice, NFPA 59A-2026 at section 5.3.2.1 (as well as

[124] Among those LNG FAQs are those demanding the use of high-consequence assumptions regarding hole size (DS4), release height and location (DS5), release location (DS6), process conditions (DS7), system inventory (DS8), and pump configuration and operation (DS10-11).

section 1.1.2(6)) now explicitly excludes "feed gas and send out gas lines" from hazard modeling requirements—but remains silent regarding the meaning of those terms. PHMSA proposes to continue its current policy of deferring to operators in determining the precise boundary between part 193-regulated piping (which would be subject to subpart B hazard modeling requirements) and part 192-regulated as supply lines (which would not be subject to subpart B hazard modeling requirements). This approach ensures continuity with PHMSA's historical approach, which has proven effective in ensuring public safety. Because PHMSA is merely affirming its longstanding approach on this issue, PHMSA does not propose regulatory text memorializing that understanding.

d. Sections 193.5 and 193.105—Retention of Exclusion Zone Framework and Extension to Newly Modeled Hazards

PHMSA proposes in redesignated and revised §§ 193.5 and 193.105 to apply the subpart B "exclusion zone" framework to additional hazards. Consistent with the current definition of "exclusion zone" at § 193.2007, an operator or a governmental authority would be required by the redesignated § 193.5 to have legal control for the life of an LNG facility over activities within certain modeled hazards' footprints—not merely at initial siting as contemplated by the letter of NFPA 59A-2026. PHMSA also proposes to codify at § 193.105(b) longstanding and common-sense guidance providing certain exceptions to the § 193.5 requirement that an operator or a governmental authority maintain legal control over all activities within certain hazard footprints. Specifically, LNG FAQ H5 recognizes exceptions to the default legal control requirement—for exclusion zones that would otherwise extend past a property line onto a public road or a navigable waterway—as a concession to the practical reality that legal control may not be possible in some cases and may not meaningfully contribute to safety given that those areas are not typically locations of prolonged activity by individuals.

In addition, PHMSA proposes a new § 193.105 that would reference NFPA 59A-2026

provisions providing for exclusion zones based on the modeled thermal radiation and flammable vapor dispersion hazard footprints, similar to current regulations at §§ 193.2057 and 193.2059. PHMSA also proposes that § 193.105 would extend PHMSA's traditional exclusion zone framework to the newly modeled hazards discussed above. This proposed expansion will ensure LNG facilities are sited in a manner minimizing risk to nearby commercial, residential, or sensitive establishments.

PHMSA proposes in § 193.105(a) to limit extension of its exclusion zone approach to some hazard endpoints that are newly modeled and that correlate to the most compelling risks of fatality or irreversible harm. Other, less consequential hazard endpoints will be subject to the occupancy and other restrictions set forth in tables (Tables 5.2.9, 5.2.10, and 5.2.11) in NFPA 59A-2026. For toxic vapor dispersion, exclusion zones and occupancy restrictions will (consistent with the approach taken in the quantitative risk assessment siting framework at NFPA 59A-2026 Table 19.8.4.1.1) be based on exposure times of one hour or less for each of AEGL-2 and AEGL-3. Longer exposure times for AEGL-2 and AEGL-3, as well as all AEGL-1 exposure times, would require development of public notification procedures in consultation with applicable State and local emergency response organizations that are consistent with LNG facility emergency response plans.

Extension of the exclusion zone approach to lower consequence (or, for AEGL-2 and AEGL-3, duration-determined) endpoints as contemplated by NFPA 59A-2026 could provide additional safety margin; however, PHMSA expects any incremental benefits would not outweigh the potentially significant additional compliance costs for several reasons. First, the particular public safety risks at issue are either less severe or more contingent (*e.g.*, for AEGL-2 and AEGL-3, time intervals allowing for public notification and evacuation/sheltering) than the acute fatality and irreversible harm risks associated with endpoints to which PHMSA proposes extension of its exclusion zone framework. Second, the incremental safety benefit from broader

application of exclusion zones would likely be mitigated by the universe of other elements (*e.g.*, exclusion zones for other hazards; design, construction, O&M requirements) providing defense-in-depth from public safety risks. Third, should the characteristics of any particular LNG facility warrant broader exclusion zones, other regulatory authorities (*e.g.*, FERC within certificate conditions) may apply such requirements on an as-needed basis.

PHMSA has not compared the differences between the size of the exclusion zones that would be produced under the current regulations at §§ 193.2057 and 193.2059 and changes proposed in the NPRM. PHMSA expects that some of the changes (*e.g.*, codification of conservative FAQ design spill assumptions) may increase the size of exclusion zones for currently modeled hazards, while others (*e.g.*, consideration of active mitigation measures) may reduce them. The cumulative effect of any such changes will turn on the unique characteristics of each LNG facility and the results of computer models for source term and hazard footprint calculation that PHMSA has not yet reviewed.

PHMSA also understands that a before-and-after comparison would provide a poor measure of the safety impact of the proposed amendments; as discussed above, exclusion zones are a single, conservative element within a multi-layer defense-in-depth strategy for addressing public safety risks. PHMSA subject matter experts expect that largest exclusion zones calculated pursuant to the default, prescriptive subpart B approach proposed in §§ 193.103 and 193.105 could be comparable in size to those calculated under current regulations. Moreover, PHMSA's proposed changes to hazard modeling and exclusion zones would provide a more accurate evaluation of public safety risks than current regulations, as PHMSA's proposals would require operators to model and to develop exclusion zones for additional hazards using more realistic assumptions.

C.3 Risk-Based Siting Alternative Using Quantitative Risk Analysis (NFPA 59A-2026, Chapter 19)

PHMSA proposes to retain a set of default, prescriptive siting requirements for all PHMSA-regulated LNG facilities at § 193.103. For operators willing to invest more resources, PHMSA also proposes at § 193.107 to adopt an alternative, QRA-based siting approach consistent with the provisions in NFPA 59A-2026 chapter 19.

As explained in more detail below, the QRA-based approach leverages decades of industry experience to provide a modern, comprehensive siting framework for LNG facilities. It also complements PHMSA's extensive experience administering risk-based regulatory frameworks for other pipeline facilities, including through gas transmission integrity management (part 192, subpart O), gas distribution integrity management (part 192, subpart P), and hazardous liquid pipeline integrity management (§ 195.452) programs. As discussed further in section IV.G, those risk-based regulatory regimes have resulted in improved safety outcomes since their adoption. And chapter 19 itself is the product of 15 years of effort to establish and refine a QRA-based alternative to historical, prescriptive siting requirements elsewhere within NFPA 59A, with the first attempt at a QRA-based siting alternative included within an optional Annex E to the 2009 edition of NFPA 59A.

The table below summarizes anticipated benefits of PHMSA's proposed QRA-based siting approach compared to the default, prescriptive siting requirements at § 193.103:

§ 193.103—Default, Prescriptive Siting Approach (NFPA 59A-2026, ch. 5)	§ 193.107—QRA-Based Siting Approach (NFPA 59A-2026, ch. 19)
Primarily qualitative consideration of probability employing conservative, simplified assumptions (*e.g.*, homogenous risk with a hazard footprint) when evaluating siting risks	Explicit quantification of probabilities (*e.g.*, component failure, release parameters) when evaluating siting risks
Rigid exclusion zones that constrain spacing of key equipment and systems within the facility—thereby limiting expanded capacity	Enhanced flexibility to adjust dimensions of exclusion zones by adopting active and passive mitigation measures—thereby facilitating expanded capacity
Obscures policy judgments regarding acceptable levels of siting risks and trade-offs between mitigation measures addressing those risks	Identifies consensus, quantified values for acceptable siting risks with respect to both society and individuals
Potentially challenging to account for the effects of active/passive mitigation measures on siting risks other than passive spill containment and active emergency shutdown measures	Accommodates evaluation of active/passive mitigation measures on siting risks
Diverges from international practice in evaluating siting risks for LNG facilities	Aligns PHMSA risk evaluation practices with those of commercial entities, other international LNG facility regulators, and other Federal regulators of industrial facilities

PHMSA also proposes exceptions and additions to the QRA-based siting requirements in NFPA 59A-2026 chapter 19 to ensure appropriate implementation and consistency with other part 193 requirements.

C.4 Section 193.107—Proposed Chapter 19 QRA Alternative and Comparison to Chapter 5 Prescriptive Siting Requirements

PHMSA proposes at a new § 193.107 to incorporate by reference the QRA-based siting approach in NFPA 59A-2026 chapter 19. Operators may use the QRA-based siting approach as an alternative to the traditional, prescriptive siting approach in the current subpart B requirements and the proposed § 193.103 (incorporating NFPA 59A-2026 chapter 5). PHMSA expects the QRA-based approach will offer several advantages compared to the traditional siting approach.

First, the QRA-based approach will enhance operator risk assessment comprehensiveness and precision. Although chapters 5 and 19 both require operators to evaluate certain plausible releases in performing a siting analysis, chapter 19 goes further. The QRA-based approach requires operators to consider more release scenarios and integrates explicit quantification of release scenario and parameter probabilities. And rather than simply employing successive layers of conservatism, chapter 19 ensures safety through a more sophisticated approach: modeling for additional hazards and more fulsome integration of probability in quantifying risks of those hazards. Chapter 19's QRA-based approach can also enable advanced modeling techniques—including probit functions[125]—not contemplated in chapter 5's siting regime.

Second, chapter 19's QRA-based approach will allow policymakers to make more informed decisions about individual LNG projects. The layers of additional conservatism embedded in the traditional siting approach are not easily deconstructed and employ opaque policy judgements regarding risk acceptability that tend to obscure the real-world risks that might result from having an LNG facility at a particular location. The QRA-based siting approach is far more transparent; it quantifies potential harm to individuals and society in a manner explicitly accounting for probability. The QRA-based approach also compares quantified risk values for individual and societal harms against explicit, consensus-derived risk tolerance levels. The QRA-based approach more easily accommodates sensitivity analyses as well, which is helpful in identifying the trade-offs available among the various mitigation measures.[126]

Third, the QRA-based approach will reinforce the various safety-enhancing proposals (*e.g.*, related to design, operation, maintenance, etc.) included elsewhere in this NPRM, primarily

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[125] Probit functions quantify factors (*e.g.*, the number of persons exposed, the amount of exposure persons received) to represent the real-world range of risk of fatality or irreversible harm to different individuals, instead of simply using fixed thresholds.

[126] *See, e.g.*, GTI, *Consistency Review of Methodologies for Quantitative Risk Assessment* (Oct. 26, 2020) (GTI 2020 Report) (evaluating 17 different sensitivity cases that varied modeling assumptions and other inputs into the QRA analyses for a hypothetical representative LNG export terminal and LNG peak-shaving facility).

by improving resource allocation and incentivizing new practices and technologies to reduce risks to acceptable levels. The QRA-based approach should help emergency responders in the surrounding community apply limited resources more effectively, focusing on drills and training for particularly high-consequence or high-probability risks. The QRA-based approach elevates the importance of operator mitigation measures by introducing explicit mechanisms for managing estimated individual and societal risks through the implementation of those measures. This enhanced approach can ensure operators direct finite personnel and capital resources toward the highest-risk components and processes.

Fourth, the QRA-based siting approach can enable greater flexibility for operators in selecting the site and internal layout of LNG facilities. As discussed at greater length in section 3.3.1 of the PRIA, the prescriptive approach in NFPA 59A-2026 chapter 5 can constrain the location of LNG facilities. The conservativism embedded in the prescriptive approach requires operators to acquire more land than is necessary from a risk perspective to construct or to expand an LNG facility, or to make adjustments in locating components and equipment within the boundaries of an LNG facility to avoid acquiring more land. Requirements at chapter 6 (plant layout) and elsewhere in NFPA 59A-2026 compound those constraints by prescribing minimum distances for placement of components that may be tied to facility boundaries or the location of other key equipment.[127] PHMSA expects that the hazard footprints drawn pursuant to the QRA-based approach will more closely track actual risk than exclusion zones drawn pursuant to the prescriptive approach, and that operators will have more flexibility in selecting potential sites for new LNG facilities and maximizing the use of the land available at existing LNG facilities.

Fifth, the QRA-based approach will improve alignment of part 193 siting requirements

[127] *See, e.g.*, NFPA 59A-2026 at sections 6.3.1 (minimum separation distances in Table 6.3.1 between LNG containers and tanks containing flammable refrigerants), 6.3.5 (prohibiting ignitable fluid containers in LNG tank impoundments), 6.4 (separation distances for vaporizers), 6.5 (process equipment separation distances), 6.7 (building separation distances), and 6.8 (impoundment location and separation distances).

with global practices. Regulatory agencies worldwide already use QRA for siting hazardous material facilities, including LNG facilities; PHMSA-commissioned studies have found that the most well-developed regulatory regimes employ methodologies largely consistent with NFPA 59A-2026 chapter 19.[128] And other Federal regulators employ chapter 19 and other QRA tools in evaluating the risks of high-consequence materials and industrial facilities within their jurisdictions.[129] PHMSA is also aware of widespread commercial use of QRAs in connection with industrial facilities, as U.S. insurance companies widely adopted QRA in site-specific catastrophe modeling over 20 years ago, and operators of U.S. chemical, manufacturing, and oil and gas facilities now regularly use QRA techniques to improve their risk assessments.[130] Aligning PHMSA's siting regime with these examples will support future refinement of part 193 by facilitating comparison with similar facilities in other industries and jurisdictions.

PHMSA is not proposing to require advance notification or approval of an operator's decision to use the alternative QRA-based siting framework. Nor is PHMSA proposing to incorporate the prohibition in section 19.1.3 on combining the requirements within chapters 5 and 19. Rather, PHMSA proposes that operators opting for a QRA-based siting approach would, pursuant to proposed § 193.101, remain subject to requirements at sections 5.2.1 (written evaluation) and 5.3.1 (impoundment areas).

PHMSA also does not propose adopting the requirement at section 19.2.4 requiring periodic (five-year) re-assessments of QRA analyses. PHMSA does not believe that such re-assessments are necessary given the reevaluation requirement for significant facility

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[128] *See* GTI 2020 Report, at xv, 3 (noting "good agreement" between the chapter 19's content and the overall methodology, failure modes, failure rates, location-specific individual risk criteria for fatality set forth in the LNG regulatory regimes for the United Kingdom, Netherlands, and Singapore).

[129] For example, USCG regulations at 33 CFR 127.008(d) allow use of chapter 19's QRA-based framework as an alternative to WSAs for waterfront LNG fuel facilities.

[130] *See generally* Patricia Grossi & Howard Kunreuther, *Catastrophe Modeling: A New Approach to Managing Risk* (2005).

modifications in NFPA 59A-2026 section 19.1.4.[131] PHMSA also qualifies the direction at NFPA 59A-2026 section 19.1.5 requiring application of a QRA-based alternative to the entirety of a LNG plant; PHMSA proposes that a QRA would only apply to LNG facilities that are new, replaced, relocated or significantly altered, rather than the entirety of an LNG plant (which may comprise several LNG facilities). Lastly, PHMSA proposes a new § 193.107(a) providing that operators must submit to PHMSA documentation material to its evaluation of compliance with § 193.107 requirements governing use of the QRA-based alternative siting framework. PHMSA notes that that such material will often include much of the same material that an operator employing the default, prescriptive approach to siting would need to submit in complying with proposed § 193.103(a); however, each of NFPA 59A-2026 section 19.2.1 and its accompanying NFPA 59A-2026 appendix guidance identifies additional documentation that would need to be submitted.

c. Mechanics of Chapter 19 QRA-Based Approach and Proposed PHMSA Enhancements

PHMSA discusses below the core elements of NFPA 59A-2026's chapter 19 QRA-based siting approach proposed for incorporation by reference into subpart B, as well as pertinent exceptions or additions that PHMSA is proposing to facilitate implementation and improve consistency with other part 193 requirements. PHMSA notes that operators may look to the explanatory guidance in Appendix A to NFPA 59A-2026 for assistance in implementation mechanics for the QRA-based alternative.

System Description & Release Scenario Identification

The first step in performing a siting analysis under chapters 5 and 19 is developing a system description and specifying the LNG and other hazardous material release scenarios to be modeled. Both approaches require operators to identify and evaluate siting-related, facility-

[131] PHMSA notes that requiring periodic re-assessment of LNG facility siting could violate the non-retroactivity prohibition at 49 U.S.C. § 60103(c)(1).

specific information regarding layout, equipment, adjacent activities and hazards, and environmental conditions.

But the scope of release scenarios considered under the two approaches diverges thereafter. First, chapter 19 builds on the generic evaluation requirement at section 5.2.1 by requiring at section 19.5.1 that operators collect a "comprehensive" set of information regarding release scenarios for LNG and other hazardous materials. Chapter 19 also contemplates that the release scenarios considered explicitly account for quantified probabilities of a number of factors (including annual frequency of releases from different types of equipment; conditional probabilities associated with environmental conditions and release parameters) affecting the consequence magnitude and frequency of releases.

Second, chapter 5 (at section 5.3.2) directs operators to establish, based on the information identified pursuant to section 5.2.1, a limited set of sufficiently plausible, (sometimes) worst-case release parameters ("design spills") and release behavior ("source terms") that must be evaluated by computer modeling. Release scenarios judged implausible need not be comprehensively analyzed. In contrast, section 19.5.1 requires operators to use a process hazard analysis to generate a more comprehensive, facility-specific list of possible hazard scenarios (of which "design spills" under chapter 5 could be a subset) and to evaluate various combinations of release conditions (*e.g.*, stream pressure and temperature, physical state, hole size, location, duration) for each scenario. This approach avoids a limitation of the prescriptive approach in chapter 5, which requires operators to evaluate each hazard in isolation and to distil artificially the risks associated with a complex system of an LNG facility and its surrounding environment into a limited set of release parameters yielding a single metric (the hazard endpoint distance). In contrast, the QRA-based approach leverages the latest understanding of (sometimes interrelated) failure modes and equipment failure rates in examining more potential release scenarios and quantifies the likelihood and consequences

resulting from each release. The result is a comprehensive and nuanced view of the risks specific to each LNG facility.

PHMSA expects that a process hazard analysis performed pursuant to section 5.2.1(1) of NFPA 59A-2026, or in connection with the risk-based inspection and maintenance alternative framework (discussed in section IV.G), may satisfy the PHA requirement at section 19.5.1.2 if the analysis is reasonably "comprehensive" and otherwise complies with the requirements of sections 19.5.1 and 19.5.2.

Hazard Modeling

Chapters 5 and 19 both require operators to use computer models to calculate "hazard footprints" for LNG facilities. The hazard footprints depict the areas where individuals may be at risk of fatality or irreversible harm should certain hazard phenomena occur (*e.g.*, jet fires, pool fires, flammable gas/vapor dispersion, etc.). The computer models use threshold values denoting individual risk for hazard phenomena that are largely similar; exposure or concentration levels below these thresholds are not modeled under either approach.[132] Both approaches require operators to assess the contingency of "cascading damages" where primary release scenarios cause secondary releases. Both approaches contemplate that hazard modeling can account for operator mitigation measures.

But chapter 19 requires more comprehensive and sophisticated hazard modeling than chapter 5. Section 19.8 requires operators to consider additional phenomena (pressure vessel bursts, BLEVEs, and oxygen-displacing gas dispersion) not required under chapter 5 in modeling hazard footprints.[133] Chapter 19 incorporates quantified probability values for factors informing risk when calculating hazard endpoints. The probability values pertain not only to release

[132] As discussed further below, chapter 19 also permits use of probit functions in hazard modeling of harms to individuals and society rather than employing chapter 5's approach of assuming 100 percent probability of harm. Operators using probit functions could be said to consider hazard phenomena falling below hazard endpoints.

[133] Chapter 19 defers to the AHJ's judgment as to whether to require operators to model oxygen-displacing gas dispersion hazards; PHMSA proposes such modeling to reduce public safety risks associated that those hazards.

frequency and parameters but may also incorporate probit functions. Chapter 5 uses a far less precise approach: conservative assumptions (*e.g.*, "design spills," source terms, and high rates of harm from exposure within hazard thresholds) are used in hazard modeling in which consideration of probability is embedded but not explicitly quantified.

PHMSA acknowledges the resources supporting QRA-based hazard modeling under chapter 19 are not as mature as those available for hazard modeling under chapter 5. For example, PHMSA-approved MEPs and MVDs are not available for every hazard that must be modeled under chapter 19 (consistent with § 193.103(c) proposed above). PHMSA proposes at § 193.107(c) that operators use computer models for models that have been reviewed against PHMSA-approved MEPs and MVDs where available; for other hazards, operators should employ sound engineering judgment (and document their reasoning consistent with § 193.107(a)) in selecting and using appropriate modeling software and validation data. Operators would be required to validate hazard models against any MEPs and MVDs that PHMSA subsequently approves. Operators using the chapter 19 QRA-based alternative would be required to employ sound engineering judgment (and document their reasoning within materials submitted pursuant to § 193.107(a)) in selecting probit functions in modeling hazard endpoints; PHMSA will generally defer to an operator's choice of probit functions unless a compelling safety concern demands regulatory oversight intervention.[134]

PHMSA also acknowledges that the mechanics of performing hazard modeling in chapter 19 are not as detailed as those in the longstanding approach in chapter 5. PHMSA therefore proposes supplemental provisions to facilitate implementation of chapter 19. For example, consistent with the exclusion of "feed and send-out lines" from the hazard modeling

[134] Operators may consult the Dutch "Green Book" for guidelines on applying probit functions to calculate probabilities of fatality. *See* Comm. for the Prevention of Disasters Caused by Dangerous Substances, *CPR 16E*, *Methods for the Determination of Possible Damage* (1st ed. 1992), available at: https://publications.tno.nl/publication/34634118/X2BfNj/TNO-1992-greenbook.pdf.

requirements at NFPA 59A-2026 section 5.2.1, PHMSA proposes language at § 193.107(d) providing the same exception for hazard modeling and risk analysis under the QRA-based alternative. Lastly, similar to the approach taken in its proposal at § 193.103, PHMSA proposes in § 193.107(a) that operators must document the effect that any active or passive mitigation measures have in assessing their hazard modeling and risk analysis.

Risk Characterization, Evaluation and Tolerance

The QRA-based approach in chapter 19 characterizes, evaluates, and determines tolerable risk levels in a way that is far more sophisticated than the prescriptive approach in chapter 5. For its part, chapter 5 focuses on risk of fatality or irreversible harm to individuals on a hazard-by-hazard basis without estimating societal risk or aggregated risk to an individual at different locations from all modeled hazard phenomena. And, as explained above, the estimates of individual risk in chapter 5 account for probability implicitly within conservative assumptions and do not integrate quantified probabilities in risk calculations. Further, chapter 5 evaluates risks within a framework marked by bright-line simplicity: exclusion zones bounded by one-size-fits-all hazard endpoints prescribed within tables in that chapter determine whether risks to individuals are intolerable (inside the exclusion zone) or tolerable (outside the exclusion zone). Exclusion zones in turn define the outer boundaries of an LNG facility—and consequently the layout of buildings, equipment, and processes within its perimeter.

Chapter 19 uses a more nuanced and sophisticated approach. First, section 19.9.1 requires aggregation of each of the risks of fatality and irreversible harm to individuals across all modeled hazards. Operators calculate the estimated likelihood of fatality and irreversible harm from each hazard and then combine the risk from each to quantify the overall risk to an individual at each location within the LNG facility and surrounding area within the modeled hazard footprints ("location-specific individual risk," or "IR") in a manner which accounts for probabilities in a number of factors informing individual risk. Operators must present these IR values (which are

expressed in terms of annual frequency) visually using topographic maps of constant individual risk ("isopleths") throughout the LNG facility and surrounding area.[135]

Chapter 19 then requires characterization of the aggregated, facility-wide societal risks of fatality and irreparable harm by accounting for the population within each modeled hazard. Section 19.9.2 requires operators to estimate the number of people within the hazard footprints using public demographic or census data. The resulting "number of affected persons" for each hazardous consequence is used to aggregate each of fatality and irreparable harm risks; the resulting "societal risks" appear as a graph of the likelihood of each of fatality and irreparable harm risks against the number of affected people for each hazard ("F-N curves").

Second, chapter 19 at sections 19.10 and 19.11 sets explicit thresholds for intolerable, mitigation-required, and tolerable individual and societal risks against which aggregated IR and societal risks calculated pursuant to section 19.9 are compared (typically in graph form). IR and societal risks falling in the "zone" above the "intolerable" threshold are unacceptable under any circumstances. Intolerable IR risks must be addressed through land use and occupancy restrictions similar to exclusion zones provided in chapter 5 or mitigation to reduce risk to tolerable levels as documented in a follow-on QRA. Intolerable societal risks must be addressed through mitigation by way of re-design of the LNG facility or significant mitigation actions and the QRA must be performed again. Societal risks falling in the "zone" between intolerable and tolerable risks—termed the "as low as reasonably practicable (ALARP) region" in sections 19.10 and 19.11—must be mitigated to the point at which an additional mitigation measure would become unreasonably disproportionate to the incremental risk reduction expected. And IR and societal risks falling in the "zone" below the threshold for tolerable risk would be acceptable without land use restrictions or other forms of mitigation.

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[135] *See generally* GTI 2020 Report, at app. D (depicting IR isopleths and societal risk graphs).

Chapter 19 at section 19.10 sets the following thresholds for intolerable risks:

- The IR must be less than $5x10^{-5}$ annual risk of fatality ($5x10^{-4}$ annual risk of irreversible harm) for all land uses within the control of the operator or subject to an approved legal agreement to protect the general public, and the IR must be less than $3x10^{-7}$ annual risk of fatality ($3x10^{-6}$ annual risk of irreversible harm) for sensitive establishments located outside of land uses controlled by the operator or subject to an approved legal agreement to protect better those sensitive establishments similar to "identified sites" who would be difficult to evacuate in 49 CFR 192.903.[136]
- Societal risk cannot exceed $F*N = 10^{-3}$ (where F is the annual frequency and N is the number of fatalities) or $F*N = 10^{-2}$ (where F is the annual frequency and N is the incidence of irreversible harm), while societal risk below $F*N = 10^{-5}$ (annual risk of fatalities) or $F*N = 10^{-4}$ (annual risk of irreversible harm) are considered fully tolerable, with the ALARP region falling in between those levels.

The risk tolerance thresholds in chapter 19 align with widespread consensus regarding appropriate individual and societal risk thresholds for industrial activity. For example, the thresholds for tolerable individual fatality risks from LNG facilities are comparable to the annual risk of fatality members of the public experience using common modes of transportation.[137] Other U.S. and international regulatory authorities and leading international organizations have

[136] "Sensitive establishments" are institutional facilities that might be difficult to evacuate, including schools, daycare facilities, hospitals, nursing homes, jails, and prisons. Annual individual risks lower than $3x10^{-7}$ (or $3x10^{-6}$) are considered fully tolerable for all populations and create no siting restrictions.

[137] U.S. road travel presents a roughly $1.7x10^{-4}$ annual risk of fatality for a licensed driver. Federal Highway Administration, *Highway Statistics 2023*, § 12.2.1, available at: https://www.fhwa.dot.gov/policyinformation/statistics/2023/. U.S. pedestrians experience a roughly $2.33x10^{-5}$ annual fatality risk from vehicles on average, with that risk as high as $5x10^{-5}$ per resident in major U.S. metro areas. Centers for Disease Control and Prevention, *Pedestrian and Overall Road Traffic Crash Deaths—United States and 27 Other High-Income Countries, 2013–2022* (Mar. 2025); Smarter Growth America, *Dangerous by Design 2024* (May 2024). Meanwhile, the severity of transportation-related injuries can be difficult to quantify, and thus annual risks of "irreversible harm" can be difficult to compare across transportation modes. *See* Sigrun Malm *et al*., *Risk of Permanent Medical Impairment (RPMI) in Road Traffic Accidents*, 52 Ann. Adv. Auto. Med. 93, 93–100 (2008).

adopted comparable levels of tolerable individual risk of fatality for industrial activities.[138] Chapter 19 societal risk tolerance levels are also on par with consensus levels of societal risk tolerance in other jurisdictions and other Federal regulators of industrial activity.[139]

Risk Mitigation

The chapter 19 risk tolerance thresholds create an incentive for operators to develop innovative, and cost-effective, measures to reduce risks to acceptable levels to minimize land use restrictions. Altering the capacity or location of individual facility components and processes can alter the dimensions of isopleths mapping aggregated risks to individuals as well as the plotting of F-N curves depicting margins to intolerable societal risks. Alternatively, if commercial or other considerations limit ability to adjust those variables, an operator can employ active and passive mitigation measures to compensate for the contribution to siting-based risks. For example, an operator may mitigate the risks from a hazard by introducing a vapor barrier to obstruct vapor dispersion or a thermal wall to reduce radiant heat exposure. An operator may also choose to decrease the expected duration of the release by introducing early detection and isolation equipment. Or an operator may adopt equipment and technologies with lower failure rates. Operators can use sensitivity analyses and Layer of Protection Analysis (LOPA)

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[138] For example, the Nuclear Regulatory Commission tolerates $1x10^{-7}$ annual risk of individual fatality from nuclear accidents, and each of the Environmental Protection Agency and the Food and Drug Association tolerate $1.4x10^{-8}$ annual risk of individual fatality from cancer in their regulation of jurisdictional substances. Though these tolerances are more stringent than NFPA 59A, the U.S. Government has historically been less tolerant of risks from cancer and nuclear accidents than from transportation. Australia and Singapore also tolerate $5x10^{-5}$ annual risk of individual fatalities from industrial facilities such as LNG facilities. The International Maritime Organization tolerates higher risks from vessels to members of the public ashore ($1x10^{-4}$ annual individual fatality risk). The most analogous may be U.S. DOT FAA Commercial Space Program's establishment of exclusion zones of the public in the vicinity of new launch locations in 14 CFR 420 based on a public risk criteria of $1x10^{-4}$. PHMSA notes, however, that few other regulators have adopted standards prescribing tolerable levels of irreversible or other non-fatal harms to individuals—a safety-enhancing innovation of NFPA 59A. *See* GTI 2020 Report, at 28.

[139] Like NFPA 59A, FERC's Risk Informed Decision Making Guidance governing dam safety also sets the intolerable societal risk level at $F*N = 1x\ 10^{-3}$ and the fully tolerable societal risk level at $F*N = 1x\ 10^{-5}$ for annual fatalities, with some exceptions. FERC, *Interim Risk Informed Decision Making Guidance*, at 3-12 to 3-14 (Mar. 2016). Belgium and Switzerland also consider a societal fatality risk level greater than a $F*N = 1x\ 10^{-3}$ as intolerable for fixed industrial facilities such as LNG facilities. Switzerland, the United Kingdom, and Hong Kong also consider a societal fatality risk level of $F*N = 1x\ 10^{-5}$ as fully tolerable for hazardous facilities and the transportation of dangerous goods (including LNG facilities).

techniques to quantify the reduction in probability from adding a new layer of detection or protection against hazardous consequences.[140]

Consistent with the approach proposed for addressing active mitigation measures under § 193.103(g), PHMSA will generally defer to an operator's documented (pursuant to § 193.107(a)) selection of active or passive mitigation measures and assessment of the effect of those measures on facility individual and societal risk profiles. PHMSA expects that the enhanced procedural and documentation requirements of the QRA-based alternative will provide adequate assurance of the safety value of specific mitigation measures. PHMSA will extend that deferential approach in assessing whether an operator has mitigated societal risk to levels "as low as reasonably practicable." Because the precise trade-offs between risk reduction and practicability concerns (including costs) of any particular mitigation will turn on a number of facility-specific factors (*e.g.*, the characteristics of the hazard and facility design/technical features and parameters) that operators will be best-positioned to evaluate, PHMSA will refrain from imposing universal requirements or thresholds for such mitigation. PHMSA (as well as other State and Federal regulators, as appropriate) will retain regulatory oversight to ensure the adequacy of mitigation measures taken by operators in response to their chapter 19 siting analyses and take necessary actions to protect public safety.

Lastly, PHMSA notes that its proposal to incorporate by reference the chapter 19 QRA-based approach includes the risk criteria and land use restrictions for tolerable individual risks of fatality and irreversible harm at section 19.10.1 (referencing Tables 19.10.1(a) and (b)). However, consistent with PHMSA's proposal at § 193.105(b) to exempt public roads, rights of

[140] FERC requires operators to describe all layers of protection in detail in its Resource Reports 11 and 13 when approving new or recommissioned LNG facilities. *See* Andrew Kohout, *U.S. Regulatory Framework and Guidance for Siting Liquefied Natural Gas Facilities – A Lifecycle Approach* (2012) (discussing 12 different categories of layers of protection that operators should describe). LOPA can provide specific criteria for evaluating each independent protection layer and determining the probability of failure. Operators can use the Safety Integrity Level benchmarking system to help identify which IPL changes can reduce the hazard to tolerable levels.

way, and navigable waters from the exclusion zone requirements of chapter 5, PHMSA similarly proposes language at § 193.107(e) excluding public roads, rights of way, and navigable waters from the land use restrictions and occupancy restrictions of chapter 19.

C.5 Section 193.109—Minimum Separation Distance from Airport Runways

PHMSA will maintain, but redesignate at a new § 193.109, the existing minimum separation distance between LNG storage tanks and airport runways found at § 193.2155(b). NFPA 59A-2026 chapter 5 does not have a comparable limitation. PHMSA proposes to retain the existing requirement, albeit within subpart B as it is better understood as a siting requirement than a subpart C design requirement. PHMSA has also updated the reference to pertinent Federal Aviation Administration regulations.

C.6 Section 193.101(b)—Delayed Compliance Date

PHMSA proposes to adopt a delayed compliance date at § 193.101(b). Specifically, section 193.101(b) would limit the applicability of the updated subpart B siting requirements to LNG facilities that are designed, constructed, replaced, relocated, or significantly altered five years after the publication date of any forthcoming final rule in this rulemaking proceeding. This delayed compliance date will provide adequate time for development of new or updated hazard modeling computer programs and operator compliance and implementation strategies. PHMSA's proposed delayed compliance date would also give PHMSA the opportunity to work with stakeholders to identify the need for, and issue, any clarifying guidance, as well as to undertake any necessary interagency coordination efforts (including, but not limited to, negotiation of interagency agreements and memoranda of understanding).

Existing facilities, or any new facilities designed, constructed, replaced, relocated, or significantly altered before the delayed compliance date, would only need to comply with

subpart B requirements as currently codified in subpart B.[141] For any operators willing to forgo the delayed compliance date, PHMSA would deem compliance with the subpart B amendments adopted in any forthcoming final rule as complying with the current subpart B requirements.[142]

D. Subpart C—Design, Construction, and Installation

PHMSA proposes to consolidate the current subparts C (design), D (construction), and E (equipment) within a new subpart C, entitled "Design, Construction, and Installation." The new subpart C will consist largely of incorporation by reference of pertinent chapters of NFPA 59A-2026.

As discussed in section IV.A above, subparts C, D, and E currently incorporate by reference "the requirements of NFPA 59A," subject to a regulatory conflict preemption provision. The extent to which the "requirements of NFPA 59A" are incorporated by reference into these subparts is unclear. The preambles of the NPRM and final rules adopting the current regulatory language do not address this question, and the distinctions between each of "design," "construction" and "equipment" requirements often blur in practice. Moreover, part 193's current sorting of requirements among its subparts can be challenging for stakeholders to follow (*e.g.*, location of wind force design requirements at § 193.2067 within subpart B "siting" requirements).

Nor does the organization of 2001 and 2006 editions of NFPA 59A reflect distinctions PHMSA has drawn between the subject matters addressed by different part 193 subparts.[143]

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[141] PHMSA acknowledges that current requirements within subpart B apply to facilities designed, constructed, replaced, relocated, or significantly altered after March 31, 2000; facilities designed, constructed, replaced, relocated, or significantly altered before that date remain subject to earlier versions of part 193 siting requirements.

[142] PHMSA cautions, however, that operators will not be able to pick-and-choose among specific elements of then-codified subpart B and amended requirements adopted in a final rule in this proceeding; instead, they will need to comply with either the then-effective or amended subpart B requirements in their entirety.

[143] NFPA 59A-2001 and NFPA 59A-2006 both employ chapter headings very different from those for each of part 193, subparts C-E. In addition, the requirements in each chapter of those editions of NFPA 59A will typically encompass multiple topics (including design, construction, installation, and specific provisions tailored to different types of equipment in an LNG facility).

More recent editions of NFPA 59A (including NFPA 59A-2026) have only exacerbated this problem. As both the universe of NFPA 59A requirements and the number of chapters in which those requirements are located have expanded, it has become increasingly difficult to distinguish which "requirements of NFPA 59A" correspond to each subpart of part 193—much less whether NFPA 59A requirements would "conflict" with part 193 regulatory text. These interpretive challenges are compounded by the NFPA 59A-2026's inclusion of O&M standards within chapters nominally dedicated to design, installation, and construction (and vice-versa).[144]

To address these concerns, PHMSA proposes to consolidate subparts C, D, and E within a new subpart C, entitled "Design, Construction, and Installation." PHMSA also proposes that new subpart C will incorporate by reference the entirety of certain chapters of NFPA 59A-2026. The NFPA 59A-2026 chapters proposed for incorporation by reference into the new subpart C are listed in the table below.[145] That table also provides a non-exhaustive summary of elements within NFPA 59A-2006 that PHMSA expects would contribute to improve safety as compared to the historical editions of NFPA 59A currently referenced in subparts C, D, and E:

NFPA 59A-2026 Chapter	Notable Safety-Enhancing Elements
Chapter 4: General Requirements	• Introduces robust engineering control processes and recordkeeping requirements for component and equipment design, construction, installation, and testing that are consistent with proven approaches employed in connection with Safety Management Systems on pipelines (sections 4.6 and 4.9) • Employs the leading industry standard (NFPA 110) for design and installation of emergency and backup power systems on hazardous fluid systems (section 4.8.2)

[144] By way of example, NFPA 59A-2026 locates cathodic protection design and installation requirements at section 18.11.13—within chapter 18 (Operating, Maintenance, and Personnel Training). However, throughout chapters dedicated to design and installation requirements, NFPA 59A-2026 includes periodic evaluation and maintenance requirements or broadly requires compliance with consensus industry standards that contain maintenance and operating requirements. *See, e.g.*, NFPA 59A-2026 section 10.12.1 (requiring underground and submerged piping be protected *and maintained* pursuant to NACE SP0169).

[145] PHMSA does not propose that § 193.201 would incorporate by reference design, installation, and construction provisions scattered throughout the chapters listed in this table. Rather, those provisions would be incorporated by reference pursuant to PHMSA's proposed § 193.401 governing operations and maintenance requirements. Should stakeholders identify standards meriting characterizing as design, installation, and construction requirements, they may identify those concerns in their comments on the NPRM, or (after issuance of a final rule) submit a request for interpretation pursuant to § 190.11(b).

NFPA 59A-2026 Chapter	Notable Safety-Enhancing Elements
	• Introduces new provisions defining non-flammable material consistent with leading NFPA consensus industry standards (section 4.10)
Chapter 5: Plant Siting (sections 5.2.3 and 5.2.4)	• Introduces design and installation (impounding areas, secondary containments, grading) requirements for each of all-weather accessibility (section 5.2.3); surface water draining (section 5.2.4)
Chapter 6: Plant Layout	• Introduces new provisions providing for layout considerations arising from expanding NFPA 59A requirements to additional LNG storage technologies (*e.g.*, "membrane containment tanks") (section 6.3.2) • Expands layout requirements to additional facilities (miscellaneous buildings at an LNG facility at section 6.7; impoundments at section 6.8) whose location could affect the hazard profile of the LNG facility in the event of a release of a hazardous fluid
Chapter 7: Process Equipment	• Updates references to ASME BPVC and other standards to ensure that piping and other components at an LNG facility are consistent with recent consensus industry standards governing design, construction, installation, and initial testing of pressure vessels (sections 7.5 and 7.6)
Chapter 8: Stationary LNG Storage	• Incorporates by reference the latest versions of API standards 620 and 625 to ensure that LNG storage tanks are consistent with recent consensus industry standards governing design, construction, installation, and initial testing (section 8.2.1) • Incorporates by reference ACI 376 which governs the manufacture, installation, and initial testing of a critical material—concrete—used in managing the public safety risks associated with LNG storage tanks (section 8.2.1.3) • Imposes requirements to ensure the safe use of additional LNG storage container types, including ASME containers (section 8.2.2) and membrane tanks (various) • Introduces a requirement for LNG storage tanks to withstand flood and hurricane storm surges (section 8.3.2.1), tsunamis (section 8.4.14.1.3.1), and seismic events (section 8.4 and 8.5)
Chapter 9: Vaporization Facilities	• Introduces revisions to improve clarity and specificity of NFPA 59A requirements to assist LNG facility operators in understanding the application of NFPA 59A design, installation, construction, and initial testing requirements pertinent to vaporization facilities
Chapter 10: Piping Systems and Components	• Expands NFPA 59A requirements to all piping systems in hazardous fluid service—analogous sections of NFPA 59A-2001 were limited to piping in cryogenic service (section 10.2) • Introduces enhanced requirements for flammability resistance of piping insulation (section 10.3.1.4) • Introduces enhanced requirements specific to bends in piping in hazardous fluids service (section 10.3.3.3) and piping joints (section 10.4.1) • Introduces enhanced design requirements for blow-down and purge connections on process piping (section 10.9)

NFPA 59A-2026 Chapter	Notable Safety-Enhancing Elements
	• Introduces design, construction, installation, and initial testing requirements extending NFPA 59A protections to cryogenic PIP systems (section 10.13). • Introduces design, construction, installation, and initial testing requirements for subsea and below ground hazardous fluid piping (section 10.14)
Chapter 11: Instrumentation and Electrical Services	• Introduces baseline design performance standard for function of control systems in LNG facilities (section 11.2) • Expands electrical classification area requirements (section 11.9.2) • Introduces requirements for specific plant configurations providing operators greater clarity regarding the application of NFPA 59A-2026 to various systems
Chapter 12: Plant Facilities Design	• Introduces more detailed requirements for design resistance of buildings/components at an LNG facility to natural phenomena (seismic, ice/flood, wind, etc.) consistent with recent versions of the leading industry standard ASCE 7
Chapter 13: Impounding Area and Drainage System Design and Capacity	• Enhances impoundment capacity requirements by employing more conservative assumptions for calculating the minimum capacity (sections 13.1 to 13.5) • Adapts NFPA 59A impoundment requirements to accommodate PIP systems (section 13.7)
Chapter 15: Transfer Systems for LNG and Other Hazardous Fluids	• Introduces expanded detail to improve operator understanding of the application of NFPA 59A design, construction, installation, and testing requirements to LNG and hazardous fluid transfer systems outside of the marine cargo transfer area
Chapter 16: Fire Protection, Safety, and Security (miscellaneous fire protection system design and installation requirements)	• Introduces detailed design and installation requirements for emergency shutdown systems (section 16.3), continuous gas monitoring (section 16.4.2), fire detection equipment (section 16.4.3), water-based fire protection systems (section 16.5), and security enclosures (section 16.8.3)
Chapter 18: Operations, Maintenance, and Training (parts of sections 18.8 and 18.11.13 only)	• Introduces detailed requirements for commissioning of piping, pressure vessels, and controls systems (section 18.8); and enhances design and installation requirements for installed internal and external corrosion protection (section 18.11.13)

PHMSA understands many of the requirements within the above chapters of NFPA 59A-2026 are consistent with routinely imposed FERC conditions for LNG facilities.

PHMSA's preliminary evaluation of the above NFPA 59A-2026 chapters has identified a handful of requirements meriting exceptions or additions through targeted regulatory language in the new subpart C. PHMSA discusses below its proposals along those lines. In addition, PHMSA proposes deletion of the prefatory language found at the beginning of each of current subparts C

(§ 193.2101), D (§ 193.2301), and E (§ 193.2401) limiting retroactive application of design, construction, and equipment requirements. These retroactivity provisions are redundant with the new § 193.3, which would broadly limit retroactive application of design, installation, and construction requirements to existing and certain replacement facilities and equipment.

D.1. Section 193.201—Scope.

PHMSA proposes a new § 193.201(a)–(b) requiring the design, construction, and installation of LNG facilities to comply with the requirements of sections 5.2.3, 5.2.4, 18.8, and 18.11.13 and chapters 4, 6–13, and 15–16 of NFPA 59A-2026, subject to certain exceptions and additions as set forth in subsequent provisions of subpart C. The proposed amendment would replace existing provisions (§§ 193.2101, 193.2303, and 193.2401) describing the scope of application of current subparts C (design), D (construction), and E (equipment). PHMSA also proposes at § 193.201(b)(2) savings language that would incorporate by reference within the new subpart C certain design, construction, and installation standards that appear sporadically within NFPA 59A-2026 chapters that are nominally directed to O&M requirements. PHMSA expects that its proposed language (largely) referencing specific chapters and sections of NFPA 59A-2026, rather than unspecified provisions in that standard, will reduce occasions for conflict between NFPA 59A-2026 and part 193 requirements. Consequently, PHMSA has omitted the conflict preemption provision employed in each of §§ 193.2101, 193.2303, and 193.2401.

PHMSA proposes a new paragraph (c) disclaiming administration of AHJ authorizations within certain provisions of NFPA 59A-2026 incorporated by reference in the new subpart C. PHMSA believes those AHJ authorizations are more consistent with the prerogatives of other regulatory authorities or would add little safety value.[146] Specific AHJ authorizations within

[146] Precisely which other regulatory authority or authorities are the AHJ(s) for each provision will turn on the statutory jurisdiction of each authority. NFPA 59A-2026 provisions not disclaimed by § 193.301(c) may be occasions to request a special permit pursuant to § 190.341.

NFPA 59A-2026 that would be disclaimed include sections 8.2.1.1.1 (LNG storage tank risk assessments); 8.4.7.2.6 (LNG tank insulation repair procedures during facility commissioning); 13.13.3 (choice of source for rainfall amounts in calculating impounding area capacity); design, installation, and construction requirements for facilities within the marine cargo transfer area within section 15.5 (marine transfer and receiving); 15.8.7 (testing periodicity for marine loading/unloading hoses and arms used in transfer operations); and 18.11.13.3.3.1 (documentation of non-corrosive external environment). Paragraph (c) also disclaims from subpart C's incorporation by reference section 16.8.8 (governing periodicity for cybersecurity vulnerability assessments) and other miscellaneous standards throughout the NFPA 59A-2026 chapters and sections listed in § 193.201(b). PHMSA believes these standards are properly understood as O&M requirements rather than as design, installation, or construction requirements. Paragraph (c)(3) also excludes from incorporation into PHMSA regulations language within NFPA 59A-2026 requiring operator-specific "approval" for certain design, construction, installation, or testing related-actions. PHMSA does not believe these operator-specific approvals would add meaningful safety value.

PHMSA acknowledges that classifying particular NFPA 59A-2026 standards as design, construction, and installation requirements, rather than as O&M requirements, may differ from historical practice. For example, PHMSA and its predecessors have asserted that the LNG facility (49 U.S.C. § 60103(c)) statutory prohibition on retroactive application of design, construction, installation, and initial testing only apply to "containers, piping, and control systems *used directly* in the processing and handling of LNG . . . [and do] not apply to facilities that are needed to assure adequate fire protection capabilities, security, or safe operations at an existing plant."[147] PHMSA has understood that reading to mean that *any* LNG facility fire

[147] MTB, *Liquefied Natural Gas Facilities; Federal Safety Standards*, 45 FR 70390, 70391 (Oct. 23, 1980) (emphasis added). RSPA took the same position in subsequent rulemakings. *See* RSPA, *Liquefied Natural Gas Facilities –Clarifying and Updating Safety Standards*, 69 FR 11330, 11331–33 (Mar. 10, 2004).

protection, security, or corrosion protection requirement—even those requiring design modifications or new construction for compliance—are O&M requirements exempt from statutory retroactivity limitations.[148] Successive editions of NFPA 59A have reflected that understanding in locating some design, installation, and initial testing requirements within chapters dedicated to O&M—and, in at least one place, explicitly directing retroactive application to existing facilities.[149]

PHMSA believes that historical understanding is in tension with the language defining the scope of the (49 U.S.C. § 60103(c)) statutory retroactivity prohibition. The retroactivity provision speaks in terms of "liquefied natural gas facilities," which 49 U.S.C. § 60101(a) defines to encompass any right-of-way, facility, building, or equipment—the statutory language contains no language limiting that prohibition to facilities "used directly" in processing activities. Nor does a reference within 49 U.S.C. § 60103(d)(2) to "fire prevention and containment equipment" among the factors PHMSA must consider when selecting operation and maintenance regulatory requirements transform design, installation, and testing requirements for those systems into O&M requirements avoiding the statutory retroactivity prohibition. Rather, that statutory language stands for the truism that O&M requirements should reflect the systems to which they pertain.[150]

PHMSA's updated classification of part 193 and NFPA 59A-2026 requirements as design, installation, and testing requirements governed by § 193.201 reflects this more accurate

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[148] MTB, *Liquefied Natural Gas Facilities; Federal Safety Standards*, 45 FR 70390, 70391 (Oct. 23, 1980).

[149] *See, e.g.*, NFPA 59A-2026 at sections 18.8 and 18.11.13 (commissioning testing and corrosion protection design requirements, respectively) and section 18.11.13.8 (requiring retroactive application of corrosion protection on some existing facilities).

[150] *See* MTB, *Liquefied Natural Gas Facilities; Federal Safety Standards*, 45 FR 70390, 70391 (Oct. 23, 1980). MTB's reading of 49 U.S.C. § 60103(d)(2) seems particularly artificial in that it avoids trying to make a similar argument based on broader language referencing any "equipment and structures" in the preceding subparagraph (1). Unsurprisingly, subsequent defenses of MTB's understanding de-emphasized the statutory authority argument in favor of appeals to continuity with historical practice and the safety value of maintaining MTB's strained reading of the statute. *See* RPSA, *Liquefied Natural Gas Facilities – Clarifying and Updating Safety Standards*, 69 FR 11330, 11331–33 (Mar. 10, 2004).

understanding of 49 U.S.C. § 60103(c). This corrected understanding is also the basis for PHMSA's proposal at § 193.201(c)(1) disclaiming the retroactive application of corrosion control requirements contemplated by NFPA 59A-2026 section 18.11.13.8. PHMSA acknowledges that its revised understanding of pertinent statutory language means that NFPA 59A-2026's updated design, installation, and initial testing requirements for fire protection, security, and cathodic protection systems will no longer automatically apply to existing facilities.

However, PHMSA does not expect this change in position to affect real-world safety adversely. Operators of existing facilities will remain incentivized for commercial reasons to align with their practices with the contents of NFPA 59A-2026, which memorializes industry consensus regarding the fire protection, security, and cathodic protection systems ensuring safety. In addition, operators of existing LNG facilities would remain subject to any obligations to comply with NFPA 59A-2026 fire protection, security, and cathodic protection system requirements that other Federal (*e.g.*, FERC) or State regulators have imposed or will impose in the future in connection with authorization for specific LNG facilities.

Lastly, PHMSA proposes in subparagraph (d) a special compliance provision for operators of FERC-jurisdictional LNG import and export facilities only. That provision would deem compliance with PHMSA subpart C security-related design, installation, and construction requirements based on provision of documentation verifying compliance with detailed USCG Facility Security Assessment (33 CFR part 105, subpart C) and FSP (33 CFR part 105, subpart D) requirements. With respect to those facilities, the 2004 Interagency Agreement recognizes USCG authority over physical security in the marine transfer area of waterfront LNG facilities. USCG regulations at 33 CFR part 105 contains detailed physical security plan development, operation, training, and recordkeeping requirements for facilities that are equivalent to or supplement many of the requirements in chapter 16 of NFPA 59A-2026. FSPs

adopted by operators in complying with those USCG requirements typically are not limited to the marine transfer area, but rather extend to the entirety of an LNG plant. PHMSA expects operators employing this regulatory flexibility will provide documentation from USCG confirming compliance with applicable USCG regulations as applied to the entirety of the LNG plant.[151]

D.2. Section 193.203—Plant design—Wind speed.

PHMSA proposes language at a new § 193.203 supplementing the wind force requirements in NFPA 59A-2026 for certain FERC-jurisdictional facilities. Current PHMSA regulations locate design wind resistance requirements governing LNG facilities at § 193.2067.[152] That provision begins with a generic requirement at § 193.2067(a) that all LNG facilities be designed "to withstand . . . the direct effect of wind forces." Paragraph (b) of that same provision supplements the generic wind forces requirement with facility-specific minimum requirements: low-capacity (70,000 gallons or less) shop-fabricated containers of LNG and other hazardous fluids must comply with the requirements of ASCE/SEI 7-2005, while all other LNG facilities must design for wind force resistance based on either a default sustained wind velocity of 150 mph[153] (with some flexibility to employ a lower value as approved by the PHMSA

[151] PHMSA has not proposed an analogous provision deeming compliance with physical-security related subpart C design, installation, and construction requirements based on documentation of compliance with TSA Pipeline Security Guidelines because that guidance has only limited requirements on those topics.

[152] Another provision at § 193.2101 broadly requires LNG facility designs comply with NFPA 59A-2001. However, NFPA 59A-2001 directly addresses design wind speed only in connection with select facilities and equipment (*e.g.*, dikes, impounding systems at section 2.2.2.4; LNG storage containers at sections 4.1.4 and 4.2.2.3(f); ASME container foundation supports at section 10.5.1); it does not prescribe design wind speed resistance parameters that are generically applicable to LNG facilities and equipment. NFPA 59A-2001's references to wind speed resistance design parameters are vague, consisting of references to "recognized structural engineering practices" or the 2005 edition of ASCE/SEI-7 (without mention of specific provisions therein).

[153] PHMSA notes, however, that the "sustained wind velocity" metric employed in § 193.2067 is not typically used by structural engineers, who instead determine wind force design resistance based on three second gust speeds. LNG FAQ D1 therefore elaborates that the 150 mph "sustained wind velocity" at § 193.2067(b)(2)(i) correlates to a three second gust speed of ca. 180 mph when "using a conservative method based on sound engineering principles" such as the Durst curve approach specified in ASCE/SEI 7-05.

Administrator), or the "most critical combination" of wind velocity and duration over the equivalent of a 10,000-year mean recurrence interval (MRI).

Part 193's current design wind force resistance requirements reflect more than two decades of effort to strike an appropriate balance between compliance costs and adequate protection from the public safety risks. When proposing the design wind resistance requirements in 1979, MTB struggled to identify an appropriate balance between those values. Concerned with the high compliance costs for measures addressing uncertain public safety risks, MTB initially proposed more demanding requirements than those found in current regulations for a more limited universe of buildings and structures: only "critical components" would be subject to a generic, broadly worded design wind velocity requirement referencing a then-leading industry standard. And within that limited universe, the most safety-consequential components (LNG storage tanks and dikes) would also be subject to a 250-mph default sustained wind velocity requirement, which MTB conceded may have been "too stringent."[154] In the 1980 final rule, however, MTB landed on a different balance between the competing values of cost and safety risk. While expanding the application of design wind resistance requirements to the entirety of LNG facilities, MTB lowered the default sustained wind velocity requirement to 200 mph in response to cost concerns magnified by available wind speed data suggesting even that lower value was overly conservative.[155] Two decades later, RSPA lowered the default sustained wind velocity again, citing historical hurricane data noting the infrequency of winds above 150 mph in concluding that a 200 mph sustained wind velocity requirement was "excessive."[156] This debate

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[154] MTB, *LNG Facilities; Federal Safety Standards*, 44 FR 8142, 8153 (proposed Feb. 8, 1979) (proposing a new § 193.117)

[155] RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9198–99 (adopting § 193.2067); MTB, *Liquefied Natural Gas Facilities; Reconsideration of Safety Standards for Siting, Design, and Construction*, 45 FR 57402, 57414–45 (Aug. 28, 1980).

[156] RSPA, *Pipeline Safety: Incorporation of Standard NFPA 59A in the Liquefied Natural Gas Regulations*, 63 FR 70735, 70738 (proposed Dec. 22, 1998); RSPA, *Pipeline Safety: Incorporation of Standard NFPA 59A in the Liquefied Natural Gas Regulations*, 65 FR 10950, 10954 (Mar. 1, 2000).

has continued in the years since. Operators have criticized PHMSA's design wind resistance requirements—particularly the default sustained wind velocity requirement at § 193.2067(b)(2)(i)—as needlessly expensive and overbroad, subjecting even structures (*e.g.*, storage sheds) functionally and physically removed from gas processing activities to the same wind velocity specifications as in-plant piping containing hazardous fluids.[157]

Recent editions of NFPA 59A attempt to address this concern. The 2013 edition of NFPA 59A introduced within a new section 5.4 generally applicable design requirements covering all buildings, structures, and systems at LNG facilities. That new approach sorted buildings, structures, and systems within LNG facilities among different classifications by function—and, by extension, the potential public safety risks arising in the event of a structural failure from forces (including wind forces) on those buildings, structures, and systems. In assigning design requirements to each classification within LNG facilities, the 2013 edition of NFPA 59A leveraged design parameters (including design wind resistance) set forth in the 2010 edition of ASCE/SEI-7 for different categories of buildings and structures based on the risk to public safety from a failure of structural integrity. The table below summarizes NFPA 59A-2026's classification scheme (found at sections 8.3.2.2 and 12.2.1) for different buildings, structures, and systems within an LNG facility, as updated through the 2026 edition of that standard referencing the 2022 edition of ASCE/SEI-7:

[157] *See, e.g.*, Eversource, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7602, at 18 (July 7, 2025).

NFPA 59A Classification	ASCE/SEI 7-2022 Category	Design Wind Force Resistance
Classification A: LNG tank systems, buildings, structures, and systems, including equipment and piping	NFPA 59A-2026 section 8.3.2.2	10,000 years
Classification B: Buildings; enclosures; and structures, including the main control room; supporting containers other than LNG tank systems; equipment; and piping that contain hazardous fluids, as well as containers other than LNG tanks systems, equipment, and piping that contain hazardous fluids that are not in a building	Risk Category III	1,700 years
Classification C: All other buildings, equipment, piping, and structures	Risk Category II	700 years

PHMSA has evaluated the above NFPA 59A-2026 classification scheme and preliminarily determined that, with respect to design wind force resistance, it strikes an appropriate balance between compliance costs and public safety risks for most buildings, structures, and systems within PHMSA-jurisdictional LNG facilities. Unlike the current one-size-fits-all approach in § 193.2067, NFPA 59A-2026's approach calibrates design wind force resistance for specific buildings, structures, and systems consistent with their function—which part 193 regulations have historically assumed correlates to public safety risk. The specific design parameters addressing wind and other forces, moreover, reflect the considered, consensus judgment of regulators and industry subject matter experts throughout the LNG industry—as well as among the structural engineers contributing to ASCE/SEI-7-2022.

Yet, PHMSA understands a slightly different approach is merited for the design wind force resistance of certain buildings, structures, and systems within LNG facilities whose structural failure would result in the highest potential public safety risks. Specifically, PHMSA proposes in a new § 193.203 that—rather than basing design wind force resistance on a 1,700-year MRI wind velocity as contemplated in NFPA 59A-2026—Classification B buildings, structures, and systems within FERC-jurisdictional import and export facilities must be designed

to withstand wind forces based on a 10,000-year MRI wind velocity. PHMSA notes this proposal is consistent with the 10,000-year MRI wind velocity prescribed in existing design wind force resistance requirements at § 193.2067(b). PHMSA's proposal also reflects that Classification B buildings, structures, and systems contain or control hazardous fluids; a loss of their integrity due to wind forces would itself be a potential hazard to public safety, and could (depending on the system, failure mechanism, and hazardous fluid) also pose a potential hazard to the integrity of Classification A buildings, structures, and systems.

PHMSA acknowledges that this proposal could entail non-trivial compliance costs for affected operators, and therefore proposes to limit its application to FERC-regulated LNG import and export facilities whose waterfront locations, complex system configurations, and large volumes of LNG and other hazardous fluids entail comparatively greater public safety risks than other PHMSA-jurisdictional facilities.[158] PHMSA notes that such capital-intensive facilities are also often better-positioned to absorb compliance costs associated with designing Classification B structures, buildings, and systems to withstand higher wind velocities.

D.3. Section 193.205—Vaporizers: Isolation valves.

PHMSA proposes in a new § 193.205 to require vaporizer equipment to have both inlet and outlet isolation valves. These valves are positioned at the entry and exit points of equipment piping and play a crucial role in ensuring the safe operation, maintenance, and inspection of that equipment. For example, during maintenance or inspection, operators close these isolation valves to allow the piping to empty its contents and purge hazardous fluids, ensuring operator safety during equipment removal.

[158] By way of example, the 1,700-year MRI in Cameron, LA, is 150 mph, whereas the 10,000 year-MRI is 172 mph—a nearly 15 percent difference.

NFPA 59A-2001 at section 5.3.1 specifies that a manifolded vaporizer needs to have both inlet and discharge block valves at each vaporizer.[159] This requirement is essential because it ensures that inlet and outlet vaporizers can be isolated during maintenance while remaining vaporizers within the same manifold assembly continue to operate. However, the corresponding provisions of NFPA 59A-2026 (sections 9.3.3 and 9.4.1) do not explicitly state that an operator must install both an inlet and outlet discharge valves on each vaporizer. Given the safety value, PHMSA proposes to retain the historical NFPA 59A-2001 requirement at § 193.205, which would continue to mandate that each manifolded vaporizer be equipped with both inlet and outlet isolation valves.

D.4. Section 193.207—Impoundment structural requirements.

PHMSA proposes to redesignate impoundment structural requirements at § 193.2155(a) in a new § 193.207 and to eliminate certain historical language that would be redundant with requirements in chapter 13 of NFPA 59A-2026. Under this proposal, PHMSA would maintain current § 193.2155 requirements that all impoundment systems must be designed and constructed to maintain their reliability and structural integrity while considering various factors. These factors include the effects of erosive impact of spilled LNG and potential impacts from the collapse of components or collisions by vehicles near LNG facilities.

D.5. Section 193.209—Water removal from impounding areas.

PHMSA proposes to redesignate the current impounding area water removal requirements in § 193.2173 within a new § 193.209, to revise current regulatory language to delete redundancies with NFPA 59A-2026 requirements (including those at section 13.13), and to retain other text supplementing NFPA 59A-2026 provisions where appropriate for safety.

[159] A manifolded vaporizer is part of a system of vaporizers designed with common inlet and outlet piping.

Impoundment systems must be free of water to provide sufficient volume to contain LNG or other hazardous fluids from a potential spill. Water removal is also required because the vaporization rate of LNG increases if water is present in an impoundment, creating a larger vapor cloud and the potential for a rapid phase transition explosion. Given the importance of water removal, PHMSA proposes to retain in paragraph (a) existing performance-based language within § 193.2173(a) requiring the construction of impounding areas to ensure water is "completely" drained, rather than the less demanding and qualified ("as dry as practicable") language in section 13.13.2 of NFPA 59A-2026. For the same reason, PHMSA also proposes retaining other language in § 193.2173(a) requiring operators to construct impoundment areas with proven, active water removal systems (including drainage pumps and piping), rather than relying exclusively on passive dewatering (*e.g.*, gravity drain) systems whose performance is hard to evaluate under real-world conditions and can be quickly degraded by clogging. Lastly, PHMSA proposes to revise the data source for determining rainfall amounts specified in § 193.2173(b) to reflect that the *Rainfall Frequency Atlas of the United States* published by the National Weather Service, which is now online and available through the Precipitation Frequency Data Server.

D.6. Section 193.211—Non-destructive examination (NDE) of hazardous fluid storage tanks.

PHMSA proposes to redesignate and to retain existing requirements at § 193.2321(a) for non-destructive testing of certain welds in the metal shells of storage tanks for LNG and other hazardous fluids within a new § 193.211. PHMSA in 1981 adopted the § 193.2321(a) requirements because the pertinent language in historical editions of NFPA 59A (and the language within other industry standards referenced by those editions of NFPA 59A) lacked specificity adequate to ensure the integrity of welds with difficult to perform geometries, which are subject to challenging operating parameters (*e.g.*, cryogenic conditions) and

whose integrity is critical to minimizing the release of LNG and other hazardous fluids.[160] PHMSA has reviewed pertinent provisions of NFPA 59A-2026 (as well as other industry standards referenced therein) and preliminarily determined that historical criticism still holds. PHMSA consequently proposes to retain the § 193.2321(a) language addressing that concern to supplement pertinent provisions of NFPA 59A-2026.

E. Subpart D—Permanent, Small-Scale LNG Facilities

Consistent with the mandate in the PIPES Act of 2016, PHMSA proposes to create a new subpart D prescribing calibrated, risk-based safety requirements for certain permanent (*i.e.*, stationary), small-scale LNG facilities appropriate. This new subpart will consist largely of the incorporation by reference of chapter 17 of NFPA 59A-2026 dedicated to those facilities.

When PHMSA last updated part 193 in 2001, a one-size-fits-all regulatory framework encompassing permanent, small-scale LNG facilities and larger facilities was appropriate. As discussed in section II.A. above, most LNG facilities at that time were peak shaving facilities with relatively small capacities and similar—and relatively simple—liquefaction and vaporization processes, often with fewer hazardous fluids and less extensive equipment. Many such facilities also operate intermittently or seasonally. But the LNG industry has evolved considerably in the past 25 years, and a consensus has emerged among interested stakeholders that the current part 193 requirements are no longer appropriate for most permanent, small-scale LNG facilities.[161]

The 2019 edition of NFPA 59A introduced a new chapter 17 with targeted provisions for permanent (or, as referred to in NFPA 59A, "stationary"), small-scale facilities. Earlier editions of NFPA 59A (including NFPA 59A-2001 at chapter 10) had included specific requirements for

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[160] *See* MTB, *LNG Facilities; Federal Safety Standards*, 44 FR 8142, 8165 (proposed Feb. 8, 1979) (explaining proposed § 193.1027(d)); RSPA, *Liquefied Natural Gas Facilities; New Federal Safety Standards*, 45 FR 9184, 9202 (Feb. 11, 1980) (endorsing the NPRM's reasoning, albeit with redesignation as § 193.2321).

[161] *See, e.g.*, BLUE, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7503, at 4, 10–11.

LNG facilities with certain components (ASME containers) that had relatively small capacity—but did not address other smaller-capacity facilities, which created confusion as to whether those requirements supplemented or replaced requirements throughout the rest of NFPA 59A.[162] In developing the 2019 edition of NFPA 59A, NFPA formed a task group of industry representatives and Federal regulators (including personnel from PHMSA, FERC, and USCG) to address these concerns. The task group's work ultimately led to the addition of chapter 17 within NFPA 59A-2019. Section 17.1 establishes certain eligibility criteria (including individual LNG tanks and aggregate LNG plant-wide storage capacity; aggregate mass of hazardous fluids and toxic fluids within an LNG plant; pipe diameter; and maximum allowable working pressure) based on hazard consequence magnitude, an approach that had historically informed requirements throughout NFPA 59A.[163] The balance of chapter 17 sets forth siting, design, construction, installation, maintenance, and operating requirements scaled to the distinguishable hazards of permanent, small-scale LNG facilities; requirements not listed in chapter 17 would not apply to eligible LNG facilities.

The eligibility and safety requirements in the 2019 edition of NFPA 59A are largely unchanged in NFPA 59A-2026. Applicable requirements—many of which apply the requirements governing large LNG facilities—are summarized in the table below:

NFPA 59A-2026 Chapter 17 Requirement	Summary
17.3.1 (Siting Evaluation)	• Requires a written plant and site evaluation of consequences from identified potential hazards to public safety

[162] Quest, *PHMSA Small-Scale LNG Risk-Based Criteria* at 3, A-4 (May 2017) (recording conclusions of workshop comprised of industry and Federal regulatory representatives chaired by PHMSA).

[163] Most of those eligibility criteria have also been adopted by at least one international standards development organization. *See* Canadian Standards Ass'n Grp., No. Z276-18, *Liquefied Natural Gas (LNG) - Production, Storage, and Handling*, section 3 (2018).

NFPA 59A-2026 Chapter 17 Requirement	Summary
17.3.2 (Impoundments and Setback Distances)	• Requires performance of an analysis to determine the practical limit of un-impounded spills and sets forth impoundment and containment requirements in the event a release would not remain on operator property • Establishes mechanisms for determining setback distances from LNG containers to property lines
17.4 (Plant Layout)	• References the entirety of chapter 6 (Plant Layout) requirements other than separation distances for particular components; setback distances are calculated either by formula (Table 17.3.2.2.2) or prescribed setback distances in Tables 17.3.2.2.3&4 consistent with setback distances for other facilities in Table 6.3.1
17.5 (Process Equipment)	• References the entirety of chapter 7 (Process Equipment) design, installation, construction, and initial testing requirements
17.6 (Stationary LNG Storage)	• References most chapter 8 (Stationary LNG Storage) design, installation, construction, and initial testing requirements, albeit supplemented with enhanced requirements for pipe penetration location (17.6.3), automatic fail-safe product retention valves on certain piping (17.6.3), and pressure gauge installation (17.6.4)
17.7 (Vaporization Facilities)	• References the entirety of chapter 9 (Vaporization Facilities) design, installation, construction, and initial testing requirements
17.8 (Piping System and Components)	• Requires all piping containing LNG to comply with the entirety of design, installation, construction, and initial testing requirements in chapter 8 (Stationary LNG Storage) • Requires all other piping in hazardous fluid service to comply with the entirety of chapter 10 (Piping Systems and Components) or ASME B31.3 (Process Piping)
17.9 (Instrumentation and Electrical Services)	• References the entirety of chapter 11 (Instrumentation and Electrical Services) design, installation, construction, and initial testing requirements
17.10 (Plant Facilities Design)	• References the entirety of chapter 12 (Plant Facilities Design) design, installation, construction, and initial testing requirements
17.11 (Impounding Area and Drainage System Design Capacity)	• References the entirety of chapter 13 (Impounding Area and Drainage System Design Capacity) design, installation, construction, and initial testing requirements when required by the section 17.3.2 siting evaluation
17.12 (Transfer Systems for Hazardous Fluids)	• References the entirety of chapter 15 (Transfer Systems for Hazardous Fluids) design, installation, construction, and initial testing requirements
17.13 (Fire Protection, Safety, and Security)	• References the entirety of chapter 16 (Fire Protection, Safety, and Security) requirements

NFPA 59A-2026 Chapter 17 Requirement	Summary
17.14 (Operations, Maintenance, and Personnel Training)	• References the entirety of chapter 18 (Operations, Maintenance, and Personnel Training) other than badging requirements at section 18.5.1(6) and certain requirements governing operations in the marine cargo transfer area operations

PHMSA subject matter experts have reviewed NFPA 59A-2026 chapter 17 and preliminarily determined that its incorporation would enhance the safety of eligible permanent, small-scale LNG facilities. As discussed in section II.A.3.c above, all LNG facilities—including permanent, small-scale LNG facilities—have a strong safety record under the current part 193 regulations, which are far less robust than the NFPA 59A-2026 requirements PHMSA now proposes to adopt. PHMSA expects incorporation of chapter 17 (which employs the great majority of those enhanced requirements) within the new subpart E will build on that strong safety record.

PHMSA recognizes that NFPA 59A-2026 chapter 17 provides operators with additional flexibility in implementing certain requirements for permanent, small-scale LNG facilities, which have characteristics (lower storage volumes, fewer—by type and volume—hazardous fluids, and intermittent operations) that are distinguishable from other LNG facilities. For example, chapter 17 does not require exclusion zones based on hazard modeling as is required under the current part 193 regulations.[164] However, permanent, small-scale LNG facilities would remain subject to most of the design, installation, construction, testing, maintenance, and operations requirements in NFPA 59A-2026, providing defense-in-depth against the hazards associated with releases from such facilities. Chapter 17 also includes robust requirements for site evaluation (section 17.3.1), impoundment analysis and installation (section 17.3.2.1), and setback restrictions (section 17.3.2.2). PHMSA has preliminarily determined that these

[164] *See* LNG FAQ, G1.

requirements address the siting-related risks to the public associated with releases from small-scale LNG facilities.[165]

For these reasons, PHMSA proposes a new § 193.401 incorporating by reference the entirety of NFPA 59A-2026 chapter 17 within a new subpart E. LNG facilities satisfying the eligibility criteria in chapter 17 would comply only with the requirements referenced in that chapter (in addition to the general requirements applicable to all LNG facilities at part 193, subpart A); other requirements in NFPA 59A-2026 would be inapplicable. PHMSA does not propose that operators be required to notify or to obtain permission from PHMSA to use chapter 17 (though, as discussed in sections III.B and III.D above, such designation should be memorialized in their part 191 OPID assignment and annual reports). PHMSA further notes that its proposed language at § 193.401 provides that, should chapter 17 reference a requirement in another chapter of NFPA 59A-2026 which this NPRM proposes to supplement, replace, or except by way of amendments to part 193, PHMSA's proposed part 193 language would apply as well in connection with chapter 17. Lastly, PHMSA expects operators will comply with the entirety of either chapter 17 or all other pertinent chapters of NFPA 59A-2026; operators will not be able to pick-and-choose requirements from chapter 17 and elsewhere in NFPA 59A-2026.

F. Subpart E—Operations and Maintenance

PHMSA proposes to create a new subpart E consolidating current subparts F (Operations), G (Maintenance), H (Personnel Qualifications and Training), I (Fire Protection), and J (Security). The new subpart D will consist largely of incorporated chapters and sections of NFPA 59A-2026.[166]

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[165] PHMSA understands neither the spill "analysis" requirement at section 17.3.2.1.1 nor the accompanying Appendix guidance require hazard modeling or detailed calculations similar to those operators must employ in "calculation of the "extent of hazards" pursuant to NFPA 59A-2026 chapter 5. Rather, qualitative reasoning (supported by brief calculations as appropriate) would be sufficient "analysis" under section 17.3.2.1.1.

[166] PHMSA in this section will collectively refer to these requirement as "operations and maintenance" requirements as distinguished from "design, construction, and installation" requirements discussed in section IV.D above.

Unlike existing part 193 regulations for design, construction, and installation requirements discussed in section IV.C. above, part 193 subparts governing O&M at LNG facilities do not broadly reference NFPA 59A-2001 standards. Only subpart I (Fire Protection) incorporates by reference certain corresponding NFPA 59A-2001 requirements (specifically, sections 9.1 through 9.7 and section 9.9). The O&M requirements in part 193 are derived from unique regulatory provisions. Successive editions of NFPA 59A have incorporated and elaborated on corresponding part 193 O&M requirements such that many of the O&M standards within NFPA 59A-2026 resemble the current language in part 193. Lastly, as discussed in section IV.D.1 above, more recent editions of NFPA 59A have also included a handful of O&M standards within chapters and sections nominally focused on design, construction, and installation requirements.

PHMSA now proposes in a new § 193.301 to consolidate within subpart D current subparts F (Operations), G (Maintenance), H (Personnel Qualifications and Training), I (Fire Protection), and J (Security). PHMSA also proposes the new subpart D will incorporate by reference the entirety of certain chapters of NFPA 59A-2026 focused on O&M requirements, as well as specific operating and maintenance requirements scattered throughout other chapters focused on design, testing, and installation requirements.[167] Those NFPA 59A-2026 chapters and sections proposed for incorporation by reference into the new subpart C are listed in the table below.[168] The table also summarizes PHMSA's assessment of how each of those chapters

[167] PHMSA has consolidated within a list (titled "Identification of NFPA 59A Operations and Maintenance Provisions") placed in the rulemaking docket all O&M requirements across NFPA 59A-2026 that it proposes for incorporation by reference in the new subpart D. Although the above table does not (for the sake of brevity) identify each of those NFPA 59A-2026 sections, PHMSA understands each enhances safety compared to current part 193 requirements. Should stakeholders identify additional standards meriting characterizing as O&M requirements, or object to PHMSA's classification of specific standards within the list placed in the docket, they may identify those concerns in their comments on the NPRM, or (after issuance of a final rule) submit a request for interpretation pursuant to § 190.11(b).

[168] PHMSA does not propose that § 193.301 would incorporate by reference design, construction, and installation provisions scattered throughout the chapters listed in this table. Rather, those provisions would be incorporated by reference pursuant to PHMSA's proposed § 193.201 governing those requirements.

contribute to safety enhancements compared to corresponding part 193 subparts and the historical edition of NFPA 59A referenced in part 193, subpart I:

NFPA 59A-2026 Chapter	Notable Safety-Enhancing Elements
Chapter 4, section 4.6: Management of Change	• Introduces detailed change management processes to ensure adequate understanding and control of risks associated with significant procedural and physical changes to an LNG facility
Chapter 16: Fire Protection, Safety, and Security	• Introduces a requirement for operators at each facility to perform a fire protection evaluation that would be reviewed every two years (section 16.2.1.3) • References leading consensus industry standards, specifically NFPA, that would govern operation and maintenance of enhanced fire protection systems (section 16.1.2.5) • Expands fire protection to include fire hazards associated with hazardous fluids generally—not just LNG • Includes more detailed leak detection and alarm requirements for LNG and other hazardous fluids (section 16.4)
Chapter 18: Operating, Maintenance, and Personnel Training	• Introduces an explicit requirement for operators to audit their operations and maintenance requirements periodically (section 18.2.2(8)) • Adds explicit requirements for operators to have procedures for managing contractor activities (section 18.2.4) • Introduces a requirement for operators to have incident investigation procedures (section 18.5) • Relocates within mandatory content provisions related to security (section 18.6) and training (section 18.12) that in NFPA 59A-2001 had been placed in non-mandatory appendices • Enhances and builds on the existing part 193 requirements governing maintenance, operations, and emergency response activities (section 18.3) • Introduces enhanced security assessment procedures (section 18.6) that may overlap with existing DHS/TSA security requirements • Adds provisions providing for maintenance on pipe-in-pipe systems (section 18.10). • Adds detailed requirements for fire protection control system inspection and testing (section 18.11.10) • Adds an annual update requirement for emergency procedures (section 18.4.8) • Adds periodicities for inspection of component foundations (section 18.11.3), tank foundations (section 18.11.11), insulation on impounding surfaces (section 18.11.5), relief valves (section 18.11.10.7), LNG tanks (section 18.11.11), and miscellaneous control systems (section 18.11.10) • Adds more detailed corrosion control inspection and maintenance requirements (section 18.11.13)

PHMSA understands that many of these NFPA 59A-2026 requirements are consistent with routinely imposed FERC conditions for LNG facilities. PHMSA's preliminary evaluation of

the above NFPA 59A-2026 materials has also identified a handful of requirements meriting additions or exceptions in the new subpart D. PHMSA discusses each of those proposals below.

F.1. Section 193.401—Scope.

PHMSA proposes a new § 193.401(a) requiring operators of LNG facilities to comply with the operation and maintenance standards in NFPA 59A-2026, subject to certain exceptions and additions as set forth in subpart E. This proposed requirement would replace existing provisions (§§ 193.2501, 193.2601, 193.2701, 193.2801, and 193.2901) describing the scope of application of current subparts F (Operations), G (Maintenance), H (Personnel Qualifications and Training), I (Fire Protection), and J (Security). PHMSA also proposes at § 193.401(a)(2) a savings clause that would incorporate by reference within the new subpart D certain O&M standards located throughout chapters of NFPA 59A-2026 that are properly characterized as design, construction, and installation requirements. As explained earlier, the current versions of subparts F, G, H, I, and J do not contain a regulatory conflict preemption provision, and PHMSA is not proposing to add such a provision in this proceeding.

PHMSA notes that, as proposed, § 193.401(a) would except from the scope of the O&M requirements certain miscellaneous provisions in chapter 16 of NFPA 59A-2026 chapters that are properly understood as design, installation, construction, or initial testing standards. Those include, but are not limited to, design, installation, construction, and initial testing standards within the following provisions:

NFPA 59A-2026 Provision	Description
16.2.1.4 and 16.2.1.5	Design, installation, and testing of new or modified fire protection systems in response to fire protection evaluations
16.3	Emergency shutdown systems design, installation, and testing
16.4.2	Gas detection systems continuous monitoring system design and installation
16.4.3	Fire detection systems continuous monitoring system design and installation
16.5	Fire protection water systems design and installation
16.8.3	Security enclosure installation requirements
16.8.7	Plant lighting requirements
18.11.13.2	Atmospheric corrosion control design and installation requirements
18.11.13.3	External corrosion control design and installation requirements for buried or submerged components
18.11.13.3	Internal corrosion control design and installation requirements
18.8	Commissioning requirements

As discussed in greater detail in section IV.D.1 above, the design, installation, and testing standards listed above would not apply retroactively to existing LNG facilities. Consistent with that understanding, PHMSA proposes in paragraph (b) to disclaim NFPA 59A-2026 design, installation, and testing standards in chapters 16 and 18. PHMSA also proposes to disclaim standards at section 18.9.7 governing operations in the marine cargo transfer area, which are subject to USCG regulations at 33 CFR part 127.

F.2. Section 193.403—Purging.

PHMSA proposes to supplement certain standards for purging in NFPA 59A-2026 at section 18.7.5. Section 18.7.5 lays out requirements for purging piping and equipment of

combustible fluids before initial placement into service, as well as in connection with subsequent entry and exit from service (*e.g.*, due to maintenance). Some of those requirements, however, are expressed in broad, performance-based language; more detailed requirements in the leading consensus industry standard on purging practices—AGA's *Purging Manual*—are only offered as non-binding guidance in the Appendix discussion of section 18.7.5. Section 18.7.5.4 also contemplates that operators would have the flexibility to depart from the typical practice of using inert media or mechanical means when conducting cleaning, drying, and tightness testing, either if they obtain approval pursuant to a § 190.341 special permit or if they determine that they have complied with NFPA 56.

PHMSA proposes to adopt a new § 193.403(a) requiring operators to comply with chapters 1, 2, and 6 of the AGA *Purging Manual* when implementing the purging protocols in NFPA 59A-2026 section 18.7.5. Chapter 1 of the AGA *Purging Manual* provides general requirements and considerations for purging, such as describing the duties of those assigned to purging operations and the guidelines for personnel and public safety during purging operations. Chapter 6 of the AGA *Purging Manual* provides instructions for purging specific components, including the documentation of purging plans or procedures—which may change depending on the system being purged and the purpose of the purging (*e.g.*, purging into LNG service, purging out of LNG service, emptying a piping system, or cooling down a system). Chapter 2 of the AGA *Purging Manual* provides detailed requirements for the identification of appropriate purging endpoints.

PHMSA also proposes a new § 193.403(b) that would exclude the process under section 18.7.5.4 to deviate from the default requirement for inert gas or mechanical means for cleaning, drying, and tightness testing without a special permit. Proper purging with inert gas (or via mechanical means) guarantees non-flammable or inert conditions that are crucial for operational safety in LNG facilities—a lesson learned from several incidents involving

inadequate purging practices that led to significant personal injuries and property damage.[169] The significant potential safety risks from departing from consensus industry best practices for purging merit case-by-case evaluation by PHMSA pursuant to a § 190.341 special permit application.

F.3. Section 193.405—Communication systems.

PHMSA proposes to adopt a new § 193.405 with requirements for communication systems. Section 193.405 would incorporate certain standards in NFPA 59A-2026 for communications systems and retain requirements in the current regulation for communication systems at § 193.2519.

NFPA 59A-2026 in several places prescribes minimum communication system standards for transfer operations (section 15.9 and various places in chapter 18) and security functions (section 16.8.4). However, these standards only apply to certain operations and functions and do not require access to verbal communications from every workstation in an LNG plant as currently required by § 193.2519. NFPA 59A-2026 also prescribes certain standards for emergency communications systems, but these standards lack the requirement in § 193.2519(b) that such systems be independent of other communications systems.

Therefore, PHMSA proposes to retain within a new § 193.405 the more detailed communication requirements within current § 193.2519(a)–(b). Communication throughout an LNG plant is critical during normal and emergency operations alike; delays in initiating or receiving communication at the beginning of an incident can make the difference in timely avoidance and mitigation of significant public safety consequences. Retaining the current § 193.2519(a)–(b) requirements will help to ensure that reliable means of communications are available to personnel throughout an LNG plant in those critical moments.

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[169] *See, e.g.*, PHMSA, *Failure Investigation Report–Liquefied Natural Gas (LNG) Peak Shaving Plant, Plymouth, Washington* (Apr. 28, 2016), available at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/FIR_and_APPENDICES_PHMSA_WUTC_Williams_Plymouth_2016_04_28_REDACTED.pdf.

F.4. Section 193.407—Maintenance procedures.

PHMSA proposes to adopt a new § 193.407 for maintenance procedures. Section 193.407 would supplement the standards in NFPA 59A-2026 for O&M procedures to ensure adequate safety-related condition reporting and adequate equipment isolation during maintenance activity. Section 18.10 of NFPA 59A-2026 contains detailed content standards for maintenance procedures. However, unlike the current regulations at § 193.2605(c), section 18.10 of NFPA 59A-2026 does not direct operator personnel to recognize and report safety-related conditions pursuant to § 191.23. PHMSA proposes to retain that longstanding requirement in a new § 193.407(a).

Similarly, although NFPA 59A-2026 acknowledges the safety value of robust system isolation practices to protect maintenance personnel in system design requirements and in non-binding guidance, the maintenance standards in section 18.10 do not articulate specific minimum requirements for mechanical and electrical isolation of systems during maintenance activity. PHMSA proposes to address that omission by adding a new requirement at § 193.407(c) that maintenance procedures provide for redundant methods of mechanical and electrical isolation. Mechanical isolation for hazardous fluid systems would require not only use of installed isolation valves, but also additional techniques (*e.g.*, removal of spool pieces or valves to "blank flange" piping; double block and bleed valving). Electrical isolation would be accomplished by "tag-out" procedures consisting of de-energizing and "locking out" electrical systems.

F.5. Section 193.409—Personnel qualification and training

Section 18.12 of NFPA 59A-2026 contains detailed standards for personnel qualification; training program design, content, and implementation; and recordkeeping of training activity. However, some of the standards in section 18.12 lack specificity necessary to support adequate implementation and oversight. PHMSA proposes a handful of additional requirements in a new § 193.409 to address these concerns.

First, PHMSA proposes to specify in paragraph (a) the minimum content (*e.g.*, name of personnel receiving training; the tasks for which they are being trained) of training records. The intent of this provision is to facilitate operator compliance with the training requirements and to ensure adequate regulatory oversight during investigations of contributing factors to incidents and safety-related conditions. Second, PHMSA proposes in paragraph (b) that all operator personnel must receive first-aid training to ensure that they can help other personnel in the event of an incident. Third, PHMSA proposes in paragraph (c) that all operator personnel involved in O&M activities—who are often best-positioned to identify safety-related conditions—receive training on recognition and reporting of the same as required by § 191.23. PHMSA also proposes that such training be held for immediate supervisors of such personnel (even if the immediate supervisors are only indirectly participating in the O&M activity) to help reinforce the training requirement for front-line O&M personnel. Fourth, PHMSA proposes in paragraph (d) to retain the requirement in the current version of § 193.2711 that operator training programs include protocols ensuring personnel do not have health conditions that would affect their performance of safety-critical responsibilities.

F.6. Sections 193.411 and 193.413—Fire Protection, Safety, and Security

PHMSA proposes to adopt fire protection, safety, and security requirements at sections 193.411 and 193.413. NFPA 59A-2026 contains extensive standards governing fire protection system performance (chapter 16), fire protection emergency procedures (section 18.4), fire protection system inspection and testing (section 18.11.10), and fire protection training (section 18.12.2.2). NFPA 59A-2026 also contains detailed standards for physical security system performance (section 16.8), security procedures (section 18.6), and personnel security training (section 18.12.2.3). PHMSA only proposes minimal additions to these standards. Specifically, PHMSA proposes in a new § 193.411 a semi-annual inspection and testing

requirement for fire protection control systems to maintain consistency with the current requirement at § 193.2619(c)(2).

PHMSA also proposes to qualify certain fire protection and security standards in NFPA 59A-2026. First, as noted in section IV.D.1, PHMSA is not proposing to incorporate the requirement in section 11.7.2 of NFPA 59A-2026 to conduct periodic cybersecurity vulnerability assessments. DHS has primary responsibility for the security of pipeline facilities, including LNG facilities, under the terms of a 2004 Memorandum of Understanding with DOT. As discussed in section II.A.3, TSA has issued a series of directives imposing cybersecurity program planning, response, and periodic assessment requirements on certain LNG facilities—to date, a handful of peak shaving facilities—designated as "critical" facilities.[170] TSA has also included high-level scaled (based on whether an LNG facility has been designated as a "critical" facility or not) cybersecurity program guidance within its Pipeline Security Guidelines.[171] DHS monitors compliance with the Pipeline Security Guidelines and Pipeline Security Directives through regulatory oversight of critical facilities and voluntary engagement with industry through CISA (under the auspices of its Pipeline Cybersecurity Initiative) and TSA (under the auspices of its Pipeline Corporate Security Review program). Recently-adopted USCG regulations at 33 CFR part 101, subpart F impose detailed cybersecurity planning and incident response program requirements on waterfront LNG facilities.[172] Although PHMSA plays an important role in ensuring the safety of LNG and other pipeline facilities in the event of a cybersecurity incident, PHMSA currently lacks the expertise and resources to oversee the performance of cybersecurity vulnerability assessments; performance of cybersecurity vulnerability assessments would also test the boundaries of PHMSA's statutory authority over LNG facility safety.

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[170] PHMSA notes that USCG regulations at 33 CFR 105.305(c)(1)(v) governing waterfront LNG facilities list cybersecurity measures among the required topics in operator Facility Security Assessments.

[171] TSA, *Pipeline Security Guidelines*, at 22–26 (Apr. 2021).

[172] USCG, *Cybersecurity in the Marine Transportation System*, 90 FR 6298 (Jan. 17, 2025).

PHMSA's proposed exclusion of NFPA 59A-2026 cybersecurity vulnerability assessment requirements also addresses concerns from multiple industry stakeholders about the significant compliance costs and minimal safety benefit that result from performing these assessments.[173] Nonetheless, PHMSA invites public comments on whether PHMSA should adopt specific cybersecurity requirements for LNG facilities, including whether those should include the relevant provisions within NFPA 59A-2026.

Second, PHMSA proposes a new deemed compliance requirement at § 193.413.[174] Specifically, paragraph (a) would—for operators of FERC-jurisdictional import and export facilities—deem compliance with PHMSA subpart D security requirements based on provision of documentation verifying compliance with detailed USCG Facility Security Assessment (33 CFR part 105, subpart C) and FSP (33 CFR part 105, subpart D) requirements. The USCG has regulatory authority over the physical security of waterfront LNG facilities, as well as authority to review and approve FSPs submitted by operators. USCG regulations at 33 CFR part 105 contains detailed physical security plan development, operation, training, and recordkeeping requirements for facilities similar to many of the requirements in chapter 16 of NFPA 59A-2026; FSPs adopted by operators in complying with those USCG requirements typically are not limited to the marine transfer area, but rather extend to the entirety of a facility. PHMSA expects operators employing this regulatory flexibility will maintain appropriate documentation confirming compliance with applicable USCG regulations as applied to the entirety of the LNG facility.

Similarly, § 193.413(b) would—for any LNG facility—deem compliance with part 193, subpart D's physical security-related program, procedural, maintenance, and training

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[173] *See, e.g.*, Williams Cos., *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7612.

[174] The regulatory flexibilities provided by § 193.315 would also be available for FERC-certificated import/export facilities choosing the section 110 alternative pursuant to proposed part 193, subpart F. The regulatory flexibilities in § 193.315 would not, however, apply to design, installation, construction, and initial testing of physical security systems and equipment in NFPA 59A-2026 given the safety importance of those systems.

requirements based on documented compliance with DHS (including TSA) regulations, directives, and guidance implementing its physical security-related statutory authority under the Aviation and Transportation Security Act.[175] This regulatory flexibility would be available to any LNG facility—even those not designated as "critical" under the TSA Pipeline Security Guidelines; PHMSA expects operators employing this regulatory flexibility will maintain appropriate DHS or TSA correspondence (*e.g.*, issued in connection with Pipeline Corporate Security Review program activities, or other regulatory oversight activity) documenting compliance with applicable Pipeline Security Guidelines and Security Directives. This proposal is consistent with the terms of the 2020 Annex to the 2004 Memorandum of Understanding between DHS and DOT, which recognizes TSA as the lead agency for physical security of pipeline facilities, including LNG facilities.[176]

G. Subpart F—Risk-based Operations and Maintenance

Congress's most recent reauthorization of PHMSA's pipeline safety program included several provisions directed toward improving Federal regulation of LNG facilities. Among the LNG facility-focused provisions of the PIPES Act of 2020 was a mandate at section 110 to provide "large-scale [LNG] facilities" a "risk-based regulatory approach" as an alternative to the traditional, prescriptive O&M requirements in part 193. Section 110 further directed that PHMSA's regulatory framework contain certain required content. Paragraph (c) lists a series of elements reflecting a PHA-based approach to addressing public safety risks of an LNG facility. Those elements track the comprehensive PHA requirements in OSHA's process safety management (PSM; 29 CFR 1910.119(e)) and Program 3 within U.S. Environmental Protection Agency's (EPA's) Risk Management Program (RMP; 40 CFR part 68, subpart B) regulations.

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[175] Pub. L. No. 107-71.

[176] 2020 Annex. PHMSA acknowledges that under proposed § 193.315 some operators of FERC-authorized LNG import/export facilities may have an option to demonstrate compliance with subpart D's physical security-related program, procedural, maintenance, and training requirements by presenting documentation of compliance with either USCG regulations or DHS regulations, directives, and guidance.

Eligible operators opting for this risk-based alternative would, pursuant to paragraph (d), submit implementation plans to PHMSA for approval. The implementation plans would include a schedule for complying with PHMSA regulations codifying the section 110(c) requirements and an overview of how the requirements would be implemented at LNG facilities. Paragraph (b) of section 110 further directs that the alternative, risk-based O&M regime adopted by PHMSA must "achieve a level of safety [at least] equivalent to the level of safety" provided by current part 193 regulations.

Multiple stakeholders have provided PHMSA with recommendations for implementing the section 110 requirements. Industry stakeholders have generally pointed to OSHA's PSM regime as a model for PHMSA to follow, praising the PSM regulations as a cost-effective, broadly-applicable, proven integration of PHA principles within the safety regulation of large industrial facilities.[177] In contrast, some pipeline safety advocates contend that any section 110 framework should supplement—rather than substitute for—prescriptive O&M requirements in part 193.[178] Those commenters also suggest that operator implementation plans should be comprehensive documents describing the specific alternative O&M measures operator will employ—and that PHMSA should review those plans rigorously and make them available for public comment before approval.

Consistent with the statutory mandate in section 110 of the PIPES Act of 2020, PHMSA proposes to adopt a new subpart F containing alternative, risk-based O&M requirements for FERC-authorized LNG facilities as a safety-equivalent alternative to most of the prescriptive requirements proposed for part 193, subpart E. The proposal—which complements safety-enhancing siting, design, installation, and construction requirements in existing part 193 or as

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[177] *See, e.g.*, API, CLNG & INGAA, *Pipeline Safety Amendments to Large-Scale LNG Facilities*, Docket ID PHMSA-2019-0091-7623.

[178] PST, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7613, at 10–12.

proposed in this NPRM[179]—would leverage decades of industry experience employing facility-specific, PHA-based risk management approaches. The proposal would allow operators to focus their limited resources on managing risks from the most safety-consequential processes and equipment, rather than on complying with one-size-fits-all, prescriptive O&M requirements. The proposal would align PHMSA's regulations for LNG facilities with more mature and sophisticated regulatory regimes administered by EPA and OSHA for industrial facilities. PHMSA discusses its specific proposals below for implementing the section 110 mandate below and invites stakeholder comment.

G.1 Proven Safety Value of PHA-Based Approaches

Consistent with section 110 of the 2020 PIPES Act, PHMSA proposes to adopt a risk-based alternative to the traditional O&M requirements in part 193 for FERC-authorized LNG facilities. The core of the proposed framework is a PHA involving the identification and evaluation of hazards from potential releases of hazardous fluids employed in LNG facility processing activities, as well as the design and implementation of controls for managing the risks associated with those hazards.

PHA-based strategies first arose in the 1960s as a response to the limitations of traditional risk management approaches for increasingly complex industrial facilities. Traditional risk management approaches were generally reactive, *i.e.*, they focused on avoiding historical accidents, rather than on proactive identification and management of risks arising from the specific equipment and processes within a particular facility. That backward-looking orientation discouraged innovation and continual process improvement by diverting finite operator resources away from designing and employing robust mechanisms for incident prevention and toward compliance "safe harbors" to minimize regulatory liability. Historical risk management

[179] As explained earlier in the NPRM, siting design, installation, and construction requirements proposed in the new subparts B and C would apply only to new and altered LNG facilities due to statutory prohibitions on retroactive application of new requirements.

approaches (often implemented in checklist form) also tended to focus on isolated equipment or process-specific actions and personnel, rather than on employing a more holistic approach to identifying, evaluating, and mitigating the risks arising from interrelated processes equipment and systems. Regulatory frameworks informed by traditional risk management approaches tended toward top-down, highly prescriptive, one-size-fits-all requirements that proved to be either overly protective or inadequate—and rarely-fit-for-purpose.

Industry took the initial steps in developing a more sophisticated, holistic, alternative—process hazard analysis—in reference materials issued by dedicated consensus standard development organizations (*e.g.*, CCPS), and OSHA and EPA adopted PHA-based regulatory frameworks in subsequent proceedings.[180] OSHA established its PSM regulations to manage risks of releases from industrial facilities employing highly hazardous chemicals in 1991, and EPA established its RMP regulations directed toward minimizing offsite consequences of releases from certain point sources under the 1990 amendments to the Clean Air Act (Pub. L. No. 101-549) in 1996. Those PHA-based regulatory frameworks rested on the common-sense proposition that each operator—rather than a distant regulator—is often best-positioned to identify, evaluate, and design mitigation strategies for addressing facility-specific risks. OSHA and EPA gave affected operators greater freedom in the PSM and RMP regulations to design and to implement compliance programs than had been enjoyed under traditional regulatory frameworks.

PHA methodologies and regulatory frameworks have matured and been applied more broadly in subsequent years. Leading consensus industry standards, such as the CCPS's *Guidelines for Hazard Evaluation Procedures*, have been updated and expanded multiple times

[180] A summary of historical industry and regulatory efforts in the development of process hazard analysis-based approaches may be found in the final rule adopting OSHA's PSM regime. *See* OSHA, *Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents*, 57 FR 6356–57 (Feb. 24, 1991). Responses to the limitations of traditional, prescriptive risk management approaches were not, however, limited to PHA-based approaches, as a diversity of other risk-informed approaches (*e.g.*, QRAs) arose in parallel.

(from approximately 200 pages to over 500 pages in length).[181] The oil and gas industry has been active in this area, with leading trade associations issuing multiple recommended practices implementing PHA principles.[182]

PHA methodologies have also been applied to LNG facilities. FERC requires LNG project applicants to submit the results of preliminary PHA within the front-end engineering information submitted during the pre-filing reviews, and to submit complete PHAs as it reviews final designs.[183] In addition, NFPA 59A has since 2019 required PHAs in connection with its traditional (section 5.2.1) and QRA-based (section 19.5.1.2) siting requirements. PHMSA also understands that many FERC-authorized LNG facilities conduct PHAs in response to commercial concerns (*e.g.*, as a material condition of financing or sales, or to obtain insurance coverage). PHMSA itself has commissioned studies evaluating how a PHA-based framework could be integrated within its part 193 regulations.[184]

Evidence indicates that PHA-based approaches have yielded significant safety benefits. For example, EPA data memorialized in a recent proposed rule revising its RMP regulations noted a long-term trend of decreasing releases from the nearly 12,400 RMP-jurisdictional facilities in the United States: a 45 percent drop in the annual number of reported accidents in each of 2014 (147 accidents) and 2023 (81 accidents). That positive safety trend also held for facilities most closely resembling LNG facilities, as the number of accidents for NAICS codes 324 (chemical facilities) and 325 (oil and gas facilities) decreased from 64 accidents in

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[181] CCPS, *Guidelines for Hazard Evaluation Procedures* (3rd ed. 2008). PHMSA notes that CCPS is currently working on an expanded, fourth edition of its *Guidelines* scheduled to issue in 2026.

[182] *See, e.g.*, API, *RP 750 - Recommended Practice on Management of Process Hazards* (1st ed. Jan. 1990) (API RP 750); API, *RP 1173 - Safety Management Systems* (1st ed. July 2015).

[183] *See* FERC, *Guidance Manual for Environmental Report Preparation, Vol. II: Liquefied Natural Gas Project Resource Reports 11 & 13 Supplemental Guidance*, at apps. 13.A.5, 13.G.1 (Feb. 2017).

[184] IoMosaic, Report No. 23215-C, *Final Technical Report: Methodologies for Managing Process Safety Risk Using Hazard and Operability (HAZOP) and Layers of Protection Analysis (LOPA) for Liquefied Natural Gas (LNG) Facilities* (June 2025).

2014 to only 37 accidents in 2023.[185] Similarly, accidents have been less severe, as EPA data between 2016–2020 and 2020–2023 evinces reduction in the severity of personal injuries and property damage.

Although less robust data is available for chemical facilities governed by OSHA's PSM regime, OSHA in 2016 noted that historical incident data from facilities subject to both RMP and PSM requirements demonstrated similar safety benefits: annual total incidents decreased by over 50 percent between 2000 (1,020) and 2010 (437); fatalities also decreased (from 14 to 10) in each of those years.[186] OSHA enforcement data evinces similar trends as industry has grown more familiar with the PSM framework, with potential violations having decreased over the lifetime of the PSM regime.[187]

PHMSA expects that adopting a PHA-based approach in part 193 will produce similar safety benefits. FERC-authorized LNG facilities are similar (*e.g.*, in size, hazardous fluids employed, and the number and complexity of equipment and processes) to many of the facilities governed by the PSM and RMP regimes. In addition, PHMSA expects a PHA-based approach to accommodate the rapid pace of technological and process innovation occurring at LNG facilities better. Integration of a PHA-based approach within part 193 would also reinforce existing initiatives promoting continuous safety improvement within the LNG industry. As noted above, many FERC-certificated LNG terminals already employ PHA-informed approaches in response to regulatory obligations or commercial incentives. Congress included within the statutory charter for PHMSA's National Center for Excellence in LNG Safety an expectation that the

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[185] EPA, *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Common Sense Approach to Chemical Accident Prevention*, 91 FR 8970, 8976 (proposed Feb. 24, 2026); EPA, *Regulatory Impact Analysis*, Docket ID EPA-HQ-OLEM-2025-0313-0058, at Exhibits 6-3 through 6-5 (Feb. 24, 2026).

[186] OSHA, *Process Safety Management SER Background Document*, Docket ID OSHA-2013-0020-0107, at 8 (2016).

[187] *See* OSHA Enforcement Data, available at: https://enforcedata.dol.gov/views/data_summary.php (last visited Jan. 26, 2026).

Center would function as a vehicle for continual safety improvement and innovation within the industry. In alignment with this mandate, PHMSA's proposed subpart F would integrate a PHA-based approach on a targeted basis. As discussed below, subpart F would be an alternative only to subpart E O&M requirements; other layers of defense in depth requirements for siting, design, installation, and construction would remain applicable.

PHMSA has extensive experience administering other risk-based programs. PHMSA has adopted integrity management (IM) regulations for gas transmission lines (part 192, subpart O), hazardous liquid pipelines (§ 195.452), and gas distribution lines (part 192, subpart P). These IM-based regulatory programs employ many of the same elements (risk identification and evaluation; deployment of mitigation measures; continuous process improvement) that appear in PHA-based regimes. Like PHA-based approaches, PHMSA's IM regulations give operators flexibility in identifying and evaluating hazards and in selecting appropriate mitigation measures. That flexibility, as discussed in section II.A.3 above, is subject to rigorous PHMSA oversight and enforcement.[188]

PHMSA's IM regulations have markedly improved pipeline safety. By way of example, a recent review of incident data on gas transmission lines since the 2003 introduction of PHMSA's part 192, subpart O IM requirements found significant reductions in per-mile frequency and severity of incidents on transmission lines subject to IM requirements.[189] For these reasons, PHMSA expects that the PHA-based alternative O&M requirements proposed for the new subpart F will improve public safety.

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[188] *See generally* PHMSA, *Enforcement Activity*, available at: https://primis.phmsa.dot.gov/enforcement-data/ (last visited Jan. 28, 2026). The two largest proposed penalties in PHMSA's history were both in connection with violations of PHMSA's part 195 integrity management requirements. *See* PHMSA, Press Release, *Trump's Transportation Secretary Sean P. Duffy Announces Record Fine Against Pipeline Operator for Violating Pipeline Safety Regulations* (Jan. 6, 2026) (Panther Operating Company); PHMSA, Press Release, *PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak* (May 26, 2022) (Denbury Gulf Coast Pipeline).

[189] Mark Hereth, Jason Skow & Martin Di Blasi, *Is Pipeline Safety Improving?*, *ASME's Proceedings of 2024 15th Intl. Pipeline Conference Volume 1*, at 2–3 (Sep. 2024).

G.2 Section 193.501—Scope

PHMSA proposes a new § 193.501 establishing the scope of the PHA-based O&M requirements for FERC-jurisdictional LNG facilities. PHMSA acknowledges that multiple stakeholders who commented on the May 2025 ANPRM recommended that the proposed framework be applied more broadly.[190] However, Congress limited the statutory mandate in section 110 to "large-scale" LNG facilities. PHMSA also expects that FERC-jurisdictional LNG facilities are currently in the best position to comply with the PHA-based framework. As noted above, PHA-based approaches are already employed at many LNG facilities pursuant to FERC requirements or in response to commercial incentives. Application of the PHA-based O&M requirements at the more complex, larger scale FERC-jurisdictional LNG facilities should yield greater cost savings as compared to their smaller (*e.g.*, peak shaving) counterparts. Further, many smaller-scale LNG facilities that could benefit from a PHA-based approach will have access to enhanced regulatory flexibilities from the proposed adoption of chapter 17 of NFPA 59A-2026 at subpart E. Small-scale LNG facility operators also retain the ability to apply for a waiver of the subpart E O&M requirements pursuant to a special permit issued under § 190.341. PHMSA will nevertheless evaluate any comments received on the cost savings and safety impact of extending subpart F to other LNG facilities.

PHMSA also proposes to except certain subpart E O&M requirements from subpart F.[191] Specifically, the NPRM in paragraphs (a)–(b) excepts subpart E requirements governing physical security and emergency procedures focused on coordination of emergency awareness and response actions by facility personnel and the public (as opposed to emergency response actions

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[190] *See, e.g.*, Joint Trade Associations, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7611, at 13, 32; API, CLNG, INGAA & NGA, *Supplemental Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7625, at 15 (Feb. 28, 2026). PHMSA will consider stakeholder comments calling for amendment of § 193.501 to extend subpart F to additional LNG facilities.

[191] PHMSA also solicits stakeholder suggestions as to other subpart E requirements (including incorporated NFPA 59A-2026 provisions) meriting exception from the scope of the substitution pursuant to subpart F.

in operating process equipment, which would be subject to subpart F). PHMSA notes that physical security requirements are beyond the scope of the section 110 mandate, while emergency awareness and response actions are addressed by other provisions of NFPA 59A-2026 proposed for incorporation by reference in subpart E and may be subject to additional requirements and FERC approval under the NGA.

G.3. Section 193.503—Program Contents

PHMSA proposes to establish the contents of the PHA-based risk management program at a new § 193.503.[192] Because the congressional mandate at section 110 of the PIPES Act of 2020 contains language resembling the programmatic requirements in OSHA's PSM regulations, the proposed text of § 193.503 borrows heavily from the 29 CFR 1910.119 regulatory text. PHMSA has, however, omitted certain PSM elements that are either addressed in other part 193 regulations (*e.g.*, failure investigation requirements at § 193.15; management of change requirements at quality assurance-related requirements in subpart C) or that should be left to operator discretion (specifically, trade secret protection). PHMSA has also throughout adapted the OSHA regulatory text (*e.g.*, substitution of OSHA's references to "employer" with references to "operator") for consistency with the text of the section 110 mandate and part 193 regulations.

PHMSA expects that adapting the familiar OSHA regulatory language will facilitate operator implementation. The PSM and part 193 regulatory framework share a common purpose and are directed toward minimizing the frequency and magnitude of consequences from process activities. PHMSA expects that pertinent guidance issued by OSHA and EPA in administering their PHA-based regimes may be informative—though not necessarily dispositive—of PHMSA's expectation's regarding acceptable subpart F compliance strategies.[193] PHMSA also

[192] PHMSA understands that subpart F compliance could be on a facility-specific basis should an operator have multiple facilities within the same LNG plant.

[193] PHMSA, however, is not bound by other agencies' interpretation of their distinguishable statutory authority and purposes. PHMSA consequently does not propose to adopt those other agencies' guidance (including, but not limited to, Appendices B–D to 29 CFR 1910.119) wholesale.

notes that it has commissioned research projects that can serve as resources for operators in developing and integrating PHA-based O&M programs.[194]

PHMSA clarifies below certain issues regarding implementation of the new subpart F. PHMSA solicits stakeholder feedback on these and other potential implementation concerns meriting addressing in a final rule.

Scope of Substitution for Subpart E's Prescriptive Operations and Maintenance Requirements

Operators electing the new subpart F must do so as an alternative to the entirety of the prescriptive subpart E O&M requirements, subject to the exceptions identified in § 193.501(a).[195] PHMSA understands this expectation will facilitate regulatory oversight by reducing confusion resulting from operators attempting to employ a hybrid approach asserting compliance with both subparts E and F simultaneously.[196] PHMSA notes, however, that operators may incorporate prescriptive requirements borrowed from subpart E into their subpart F compliance strategies.

Accidental Releases Targeted by PHAs

PHMSA expects that subpart F-compliant PHAs will be directed toward identifying, evaluating, and mitigating accidental releases that could result in incidents as that term is defined in part 191. Unlike the PSM and RMP regulations directed toward preventing risks from releases of "highly hazardous chemicals" (OSHA) or "extremely hazardous substances" (EPA) when present above certain quantities, the statutory language in section 110(c) couches PHA's identification, evaluation, and management of accidental releases in terms of "incidents." Congress has authorized PHMSA to define that term by regulation, and § 191.3 strikes a balance

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[194] IoMosaic, Report No. 23215-C, *Final Technical Report: Methodologies for Managing Process Safety Risk Using Hazard and Operability (HAZOP) and Layers of Protection Analysis (LOPA) for Liquefied Natural Gas (LNG) Facilities* (June 2025).

[195] Even as PHA-based approaches can suggest specific siting and design changes as risk mitigation measures, such measures are beyond the scope of the section 110 mandate and PHMSA's proposals herein.

[196] That said, PHMSA acknowledges that implementation of a PHA-based approach cannot happen overnight; PHMSA therefore proposes at section § 193.505 below that operators identify in their implementation plans process-specific timelines for transition from a subpart E to a subpart F framework.

between the compliance burdens and safety benefit associated with incident reporting by grounding minimum reporting thresholds in significant public safety (death or personal injury requiring hospitalization) and property damage consequences. PHMSA similarly expects that PHAs conducted pursuant to subpart F will be focused not on any accidental release of any hazardous fluid, but on those that could reasonably be expected to result in a reportable incident.

Mandatory Incorporation by Reference of CCPS Guidelines for Hazard Evaluation Procedures

PHMSA proposes at § 193.503(b) the incorporation by reference of the third edition of the CCPS *Guidelines* to require operators employ that consensus industry standard in designing and implementing their subpart F programs. Operators may supplement the PHA-based framework within the *Guidelines* with other pertinent PHA-based standards (*e.g.*, API RP 750) as appropriate for their facilities.

PHMSA acknowledges that OSHA's PSM regulations do not prescribe use of any particular consensus industry standards. Rather, OSHA identifies in Appendix D to 29 CFR 1910.119 several standards—including the CCPS *Guidelines* and API 750—that can inform the design and implementation of operator compliance strategies. PHMSA expects that mandatory reference to the CCPS *Guidelines* will improve regulatory oversight and operator compliance. The CCPS *Guidelines* are the authoritative industry reference on the performance of PHAs; the high-level conceptual framework therein sets forth proven guardrails for establishment of effective programs without sacrificing the flexibility characteristic of PHA-based approaches. PHMSA further notes that the CCPS *Guidelines* are frequently referenced in other consensus industry standards employing PHA-based frameworks and are often identified in operator descriptions of PHA-based approaches within their applications to FERC. That said, PHMSA solicits stakeholder feedback on whether the CCPS *Guidelines* (or the forthcoming fourth edition of that standard) should be incorporated within part 193 regulations in their entirety, or whether certain portions should be excluded from that incorporation by reference.

Recognized and Generally Accepted Good Engineering Principles (RAGAGEP)

PHMSA proposes at § 193.503(b)(3) and (h)(4) that operator programs reflect O&M practices consistent with recognized and generally accepted good engineering practices (RAGAGEP). The RAGAGEP standard—which is integrated within both OSHA's PSM and the EPA RMP regimes—is the benchmark for determining adequacy of operators' continual process improvement efforts: operators must ensure their practices keep pace with the evolution of technology, best practices, and lessons learned. Similar performance-based concepts appear in in the current part 193 regulations for maintenance practices ("generally accepted engineering practices" at § 193.2605(a)) as well as in FERC guidance ("generally accepted good engineering practices").[197]

PHMSA expects that operators will apply the RAGAGEP concept consistent with OSHA's elaboration of the term set forth in 2016 guidance.[198] Because RAGAGEP is fundamentally a performance-based standard, PHMSA proposes to define that term. PHMSA's proposal is consistent with recommendations that industry stakeholders submitted in response to PHMSA's May 2025 ANPRM and during the October 2025 public meeting. These industry stakeholders praised OSHA's approach as striking an appropriate balance between the burden on operators in evaluating potential bases of RAGAGEP within their continual process improvement efforts and the potential safety benefits from any updates.[199]

PHMSA's proposal preserves flexibility for operators to innovate in selecting operations and maintenance practices most suitable for the equipment and processes in their facilities. Although industry stakeholders identified in their ANPRM comments multiple industry

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[197] FERC, *Guidance Manual for Environmental Report Preparation, Vol. II: Liquefied Natural Gas Project Resource Reports 11 & 13 Supplemental Guidance*, at app. 13.D.

[198] OSHA, *RAGAGEP in Process Safety Management Enforcement* (May 11, 2016) (2016 OSHA Interpretation), available at: https://www.osha.gov/laws-regs/standardinterpretations/2016-05-11.

[199] *See, e.g.*, Joint Trade Associations, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7611, at 28, 35; Nielson (NextDecade), *Transcript of Oct. 2025 Public Meeting*, Docket ID PHMSA-2019-0091-7624, at 156:3–11 (Oct. 25, 2025).

standards (including NFPA 59A) that could be informative of RAGAGEP, PHMSA's proposed approach neither restricts RAGAGEP to those resources nor requires their use.[200] Similarly, PHMSA's understanding of RAGAGEP does not oblige operators to review and conform with each of the frequent updates to the broad universe of potentially pertinent consensus industry standards[201]—a task that often will not offer safety benefits commensurate with the resulting compliance burdens. Nor does it prohibit operator internal processes from informing RAGAGEP, as other bases of RAGAGEP (*e.g.*, consensus industry standards) typically consist of compilations of higher-level descriptions of facility-specific practices.

Lastly, PHMSA envisions that the Federal Government can play a valuable role in supporting operators' efforts in aligning their O&M practices with RAGAGEP. Specifically, PHMSA's National Center for Excellence in LNG Safety is intended to be a forum for collaboration and information-sharing between Federal, State, and industry representatives to ensure continual improvement in LNG facility safety.[202] PHMSA envisions the Center will serve as a repository of information on operational best practices for LNG facilities, as well as a vehicle for proactively identifying and directing safety research activities and distributing the results thereof to stakeholders.[203]

PHMSA Review of Operator Subpart F Compliance Programs

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[200] *See, e.g.*, Joint Trade Associations, *Comments on the ANPRM*, Docket ID PHMSA-2019-0091-7611, at 11, 31–33, 36, 43–44.

[201] *See* Andrew Kohout (FERC), *Transcript of Oct. 2025 Public Meeting*, Docket ID PHMSA-2019-0091-7624, at 153 (Oct. 25, 2025) (noting that FERC has compiled nearly 2600 unique industry standards—each of which are continually updated—listed in LNG facility applications). PHMSA similarly does not understand the PHA validation (§ 193.503(c)) or audit periodicities (§ 193.503(k)) proposed elsewhere in subpart F to dictate the frequency of operators' review, evaluation, and incorporation of updates to consensus industry standards within their operations and maintenance practices.

[202] Congress included within the statutory charter for PHMSA's National Center for Excellence in LNG Safety an expectation that it would function as a vehicle for continual safety improvement and innovation within the industry. *See* Pub. L. No. 112-60 (at section 111(d)).

[203] *See Best Practices Webinar Series Presented by the National Center of Excellence for Liquefied Natural Gas Safety*, 91 FR 3301 (Jan. 26, 2026).

PHMSA does not propose to require advance notification or review of subpart F-compliance O&M programs (or associated documentation, including any the results of any PHAs).[204] Section 110 does not require such a review. Nor is it required by OSHA in connection with the establishment of its PSM framework, or by PHMSA under the IM regulations for gas and hazardous liquid pipelines.

As with other regulatory programs, PHMSA will review operator compliance with the subpart F requirements in conducting inspection, investigation, and enforcement activities. This approach has proven track record of success and will ensure the appropriate use of PHMSA's limited resources. Should PHMSA determine in connection with its oversight activity that an operator's subpart F program raises a safety concern, PHMSA has (as discussed in section II.A.3.a above) broad statutory authority to intervene to protect public safety.

Audits of Operator Compliance Programs

PHMSA proposes at § 193.503(k) to adopt language in OSHA's PSM regulations requiring operators electing subpart F to audit their compliance programs once every three years. Although this requirement does not appear in the section 110 mandate, PHMSA notes that both OSHA and EPA have highlighted periodic auditing as a critical mechanism ensuring continual improvement of PSM and RMP compliance programs.[205] NFPA 59A-2026 at section 18.2.2(8) also requires periodic auditing of O&M procedures for similar reasons. Regularly scheduled audits also backstop operator performance of amended or new PHAs in connection with implementation of management of change requirements proposed within paragraph (§ 193.503(j)).

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[204] PHMSA takes no position, however, regarding the need for operators of previously authorized LNG facilities to obtain advance endorsement of their subpart F compliance programs from other FERC or other regulatory authorities.

[205] OSHA, *Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents*, 57 FR 6356, 6396 (Feb. 24, 1991); EPA, *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Common Sense Approach to Chemical Accident Prevention*, 91 FR 8970, 8987 (proposed Feb. 24, 2026).

PHMSA notes that such audits are not intended to require the re-performance of PHAs. Nor does PHMSA propose that such audits must be conducted by a third party as currently required by EPA's RMP regulations (at 40 CFR 68.87) and has been suggested by OSHA for incorporation within its PSM regulations.[206] PHMSA agrees (based on its review of the administrative record associated with EPA and OSHA's consideration of such requirements) with EPA's preliminary assessment and the position of many industry stakeholders that any potential, unique incremental safety benefits from third party audits are outweighed by the outsized compliance costs and implementation challenges.[207]

Relationship to PHAs Conducted in Complying with the Requirements of Subpart B or Other Regulatory Authorities, or for Other Reasons

PHMSA acknowledges that many operators may have or will conduct PHAs in connection with its own subpart B siting requirements, the requirements of other Federal agencies (*e.g.*, as part of a FERC application), or for commercial reasons. Provided those PHAs comply with the elements of § 193.503 and reflect a complete, accurate understanding of the hazardous fluids and processes of an LNG facility, they can be employed as the initial PHA required by paragraph § 193.503(c). PHMSA understands there would be little safety value from forcing operators to re-perform PHAs that are entirely compliant with proposed subpart F requirements.

G.4 Section 193.505—Implementation Plans

PHMSA proposes at § 193.505 requirements governing operator plans for implementing Subpart F programs, including: submission procedures (or mechanics); issues related to PHMSA review; and required minimum implementation plan content.

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[206] *See* OSHA, *Process Safety Management and Prevention of Major Chemical Accidents*, 78 FR 73756, 73762 (Dec. 9, 2013).

[207] *See* Docket No. OSHA–2013–0020; EPA, *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Common Sense Approach to Chemical Accident Prevention*, 91 FR 8970, 8987 (proposed Feb. 24, 2026).

Submission Mechanics

PHMSA in paragraph (a) proposes that operators electing to use subpart F must submit their implementation plans for review pursuant to 49 CFR 190.9. PHMSA does not propose to publish receipt of, or its decision on, those implementation plans; nor does PHMSA propose to make the content of those implementation plans available for public review or comment. Although PHMSA acknowledges that public safety advocates have called for such procedures, neither the section 110 statutory text nor legislative history support such procedural requirements. PHMSA also understands there would be little value to the public from public notification and disclosures. O&M procedures are typically confidential business information that is not disclosed to the public; PHMSA for this reason does not require operators to release their IM plans (or for that matter, their subpart F programs) for public review and comment. And, as discussed further below on PHMSA's proposed subparagraph (c), section 110 prescribes only minimal content for implementation plans—and that which it prescribes is focused more on implementation timelines than detailed descriptions of the content of operator compliance O&M procedures of the sort that public safety advocates envision would be within implementation plans.

Lastly, PHMSA proposes that operators must forward copies to each of the Federal regulatory authorities (specifically, FERC, USCG, and TSA) with oversight responsibilities regarding operator O&M efforts. Such filings should be made in accordance with any applicable filing requirements with those Federal agencies. Although PHMSA's review of operator implementation plans will not necessarily require endorsement of those other agencies, PHMSA reserves discretion to consult with them on elements of subpart F implementation plans on which there is shared regulatory authority.

PHMSA Review

PHMSA also proposes at paragraph (b) that its review of operator implementation plans will be time-limited; PHMSA shall issue an approval or denial no more than 30 days from receipt of an operator's initial submission to PHMSA—with no action by PHMSA automatically deemed denial. PHMSA also explicitly disclaims predicating the 30-day deadline on PHMSA's discretionary determination that an operator has made a "complete" submission. Stakeholders frequently complain that such discretion renders regulatory timelines elsewhere in PHMSA regulations meaningless and encourages arbitrary demands for information not explicitly required by regulation or authorized pursuant to the Paperwork Reduction Act (44 U.S.C. § 3501 *et seq.*).[208] PHMSA notes that should PHMSA determine an operator must submit additional information requiring additional time to review, the operator can resubmit its implementation plan with that additional information to "restart" the 30 day deadline—or PHMSA may deny the implementation plan (and the operator may resubmit thereafter). PHMSA expects this approach will also incent operators to engage PHMSA in advance of formal submission of implementation plans so that PHMSA can assist them in developing a submission plan with adequate information for timely and robust review.

Required Content of Implementation Plans

PHMSA proposes at paragraph (c) the prescribed minimum content for operator implementation plans. As discussed earlier, the statutory text section 110 mandate specifies only limited required content for those plans—and the statute focused that content on providing merely an "overview" and implementation timelines for transitioning from a prescriptive O&M-based framework to a risk-based, subpart F-compliant program. This understanding of the statutory text reflects the practical reality that conducting PHAs and designing and implementing the program procedures, management controls, and training within a subpart F program

[208] *See, e.g.*, INGAA, *Comments in Response to 'Rationalize Special Permit Conditions' Notice of Proposed Rulemaking*, Docket ID PHMSA-2025-0135-008, at 2–3 (Sep. 12, 2025).

necessarily will involve significant up-front work effort and time—indeed, implementation timelines were a topic of extensive negotiation with regulated entities in establishing EPA and OSHA's analogous risk-informed regulatory regimes.[209]

PHMSA therefore proposes that operator implementation plans identify—on a process, system, or organizational-specific basis—intermediate and final milestones specifying particular work streams and dates certain within an operator's transition to subpart F-compliant O&M programs. PHMSA believes this approach strikes an appropriate balance between administrative and documentation burdens on operators (*e.g.*, from designing the conceptual framework for implementation and selecting pertinent milestones and timelines) and adequate certainty for PHMSA and other regulators regarding whether particular processes, systems or organizations are subject to subpart E or subpart F requirements at any particular moment in time. Notably, PHMSA will not expect operators will have performed a PHA before or in connection with the development of their implementation plans; rather, the performance of a PHA could be a milestone identified in those plans consistent with other Federal agency requirements.

V. Regulatory Analyses and Notices

A. Statutory Authority

Pipeline Safety Laws

This proposed rule is published under the authority of the Federal Pipeline Safety Statutes (49 U.S.C. § 60101 *et seq.*). Section 60103 authorizes the Secretary of Transportation to issue regulations governing the location, design, installation, construction, inspection, testing, operation, and maintenance of LNG facilities.

PHMSA is proposing to revise the "Authority" entry for 49 CFR part 193 to include 30 U.S.C. § 185(w)(3), a provision of the Mineral Leasing Act (MLA). That statute provides that

[209] *See, e.g.*, EPA, *Accidental Release Prevention Requirements: Risk Management Programs Under Clean Air Act Section 112(r)(7)*, 61 FR 31668, 31672–73 (June 20, 1996) (discussing stakeholder concerns regarding implementation timelines for both the EPA RMP and OSHA PSM regimes).

"[p]eriodically, but at least once a year, the Secretary of the Department of Transportation shall cause the examination of all pipelines and associated facilities on Federal lands and shall cause the prompt reporting of any potential leaks or safety problems." PHMSA has traditionally complied with § 185(w)(3) through the issuance of the Pipeline Safety Regulations, which require annual examinations and prompt reporting for all or most of the pipelines they cover. Though there are currently no LNG facilities located on Federal land, the exclusion zones from certain existing and proposed LNG facilities may extend onto Federal land. In those cases, PHMSA requires the operator to take mitigation measures to show compliance with part 193. Moreover, PHMSA requires LNG operators to file annual, incident, and safety reports. PHMSA is making this change to clarify its long-standing position that the agency complies with the MLA through the issuance of the Pipeline Safety Regulations. The Secretary has delegated the above authorities to the PHMSA Administrator pursuant to 49 CFR 1.97(a).

Statutory Factors

The Pipeline Safety Laws specify certain mandatory considerations when adopting safety standards for gas pipeline facilities and LNG facilities. Section 60102(b) requires that safety standards for any gas pipeline facilities be "practicable" and "designed to meet the need for gas pipeline safety . . . and protecting the environment" based on consideration of its appropriateness for the type of transportation, reasonableness, and a risk assessment of the costs and benefits. Section 60103 supplies additional, LNG facility-specific considerations for requirements pertaining to each of siting (§ 60103(a)); design, installation, construction, inspection, and testing (§ 60103(b)); and operations and maintenance (§ 60103(d)). In addition, any proposed standard must, pursuant to 49 U.S.C. § 60115(c), be reviewed by the GPAC for technical feasibility, reasonableness, cost-effectiveness, and practicability.

PHMSA has preliminarily determined that, notwithstanding the uncertainties and data limitations discussed in the PRIA, each of the proposals in the NPRM would be justified by

either its corresponding compliance costs savings, enhanced regulatory flexibility, or improved public safety benefits. In reaching that preliminary determination, PHMSA has considered each of the pertinent statutory factors in proposing the requirements herein governing siting, design/installation/construction/inspection and testing, and operations and maintenance at LNG facilities. The core of the NPRM consists of incorporating by reference the (most recent) 2026 edition of NFPA 59A, an authoritative standard governing the safety of LNG facilities reflecting extensive technical deliberations among a broad consensus of Federal and State regulators and representatives across the spectrum of LNG industry stakeholders. Other NPRM proposals not derived from NFPA 59A either preserve current, longstanding part 193 requirements or enhance regulatory flexibility benefiting operators without adversely affecting safety. The origins of the NPRM's proposals consequently evince their appropriateness, technical feasibility, reasonableness, cost-effectiveness, and practicability as to the LNG facilities each such requirement would govern. And, as discussed at length in section IV above, PHMSA expects adoption of the proposals in the NPRM will improve public safety—and by extension, enhance protection of the environment.

B. Statutory Requirement and Executive Order 12866, and DOT Policies and Procedures for Rulemakings

The Pipeline Safety Act (49 U.S.C. § 60102(b)) requires that PHMSA prepare a risk assessment that "identifies the costs and benefits associated with a proposed regulatory change." E.O. 12866 (*Regulatory Planning and Review*, 58 FR 61735 (Oct. 4, 1993)) as implemented by DOT's rulemaking policies and regulations at 49 CFR part 5, subpart B, requires agencies to regulate in the "most cost-effective manner," to make a "reasoned determination that the benefits of the intended regulation justify its costs," and to develop regulations that "impose the least burden on society." In arriving at those conclusions, E.O. 12866 requires that agencies should consider "both quantifiable measures . . . and qualitative measures of costs and benefits that are

difficult to quantify" and "maximize net benefits . . . unless a statute requires another regulatory approach." Moreover, E.O. 12866 requires that "agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating." 49 CFR part 5, subpart B directs that PHMSA and other Operating Administrations must generally choose the "least costly regulatory alternative that achieves the relevant objectives" unless required by law or compelling safety need. Furthermore, 49 CFR part 5, subpart B specifies that regulations should generally "not be issued unless their benefits are expected to exceed their costs" except where required by law or compelling safety need.

E.O. 12866 and 49 CFR part 5, subpart B also require that PHMSA submit "significant regulatory actions" to the Office of Information and Regulatory Affairs (OIRA) within the Executive Office of the President's Office of Management and Budget (OMB) for review. OIRA has determined that this NPRM is a significant regulatory action pursuant to section 3(f) of E.O. 12866. Accordingly, this rule has been reviewed by OMB.

As explained in greater detail in the PRIA (available in the rulemaking docket), some elements of this NPRM may be considered deregulatory actions under E.O. 14192 and OMB guidance, including M-25-20.[210] PHMSA expects those elements will result in significant compliance cost savings by reducing regulatory burdens and regulatory uncertainty for operators of pertinent LNG facilities. PHMSA expects that some of those cost savings will also result in reduced costs for the public to whom certain LNG facility operators (*e.g.*, local gas distribution companies operating peak shaving facilities) may transfer a portion of their compliance costs. Those reduced costs to LNG facility operators and the public are consistent with E.O. 14192, which establishes a Federal policy of alleviating "unnecessary regulatory burdens" by reducing compliance costs and reducing the risks from non-compliance with burdensome regulations.

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[210] *See* OMB, M-25-20, *Guidance Implementing Section 3 of E.O. 14192* (Mar. 26, 2025), available at: https://www.whitehouse.gov/wp-content/uploads/2025/02/M-25-20-Guidance-Implementing-Section-3-of-Executive-Order-14192-Titled-Unleashing-Prosperity-Through-Deregulation.pdf.

PHMSA has provided in the PRIA quantifications of avoided compliance costs where possible. In addition, PHMSA expects the proposals within this NPRM will have non-quantified benefits to public safety and the environment arising from the enhanced safety requirements within the consensus industry standards PHMSA has proposed for incorporation into its part 193 regulations. Based on the detailed discussion of the costs and benefits of the NPRM within the PRIA, PHMSA has preliminarily determined that the benefits of each of the NPRM elements justify any associated costs notwithstanding the uncertainties identified. For a full breakdown of the regulatory and deregulatory aspects of the proposed rule, see the incremental impacts tables available in section 3 of the PRIA.

E.O. 12866 and DOT Order 2100.6B also require PHMSA to provide a meaningful opportunity for public participation, which reinforces requirements for notice and comment in the Administrative Procedure Act (APA, 5 U.S.C. § 551 *et seq.*). PHMSA seeks comment on its proposed revisions to the Pipeline Safety Regulations and the cost and benefit analyses in the PRIA, as well as any information that could assist in quantifying the costs and benefits of this rulemaking.

C. Energy-Related Executive Orders 13211, 14154, and 14156

The President has declared in E.O. 14156, a national emergency to address inadequate U.S. energy development production, transportation, refining, and generation capacity. Similarly, E.O. 14154, asserts a Federal policy to unleash American energy by ensuing access to abundant supplies of reliable, affordable energy from, *inter alia*, the removal of "undue burden[s]" on the identification, development, or use of domestic energy resources such as natural gas. PHMSA preliminarily finds the proposals in this NPRM are consistent with each of E.O. 14156 and E.O. 14154. PHMSA's proposed incorporation of updated consensus industry standards will enhance regulatory certainty for LNG facility operators who currently must navigate PHMSA regulations that are nearly two decades old. PHMSA's proposals would also increase flexibility

in connection with the siting of new and modified peak shavers and other LNG facilities that will in turn increase natural gas transportation capacity providing abundant, reliable, affordable natural gas for residential, commercial, industrial, and export demand.

However, PHMSA has preliminarily determined that this NPRM is not a "significant energy action" under E.O. 13211 (*Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*, 66 FR 28355 (May 22, 2001)), which requires Federal agencies to prepare a Statement of Energy Effects for any "significant energy action." Although this NPRM is a significant action under E.O. 12866, it will not have a significant adverse effect on supply, distribution, or energy use, as further discussed in the PRIA.

D. Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. § 601 *et seq*.) requires Federal agencies to consider the impact of their rules on small entities, to analyze alternatives that minimize those impacts, and to make their analyses available for public comment. Regulatory flexibility analysis is not required, however, where the agency head certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. DOT's implementing guidance—established consistent with E.O. 13272 (*Proper Consideration of Small Entities in Agency Rulemaking*, 67 FR 53461 (Aug. 16, 2002))—is available online.[211]

This NPRM was developed in accordance with E.O. 13272 and DOT implementing guidance. PHMSA has considered the anticipated impact the proposed rule would have and certifies that, if adopted, it will not have a significant economic impact on a substantial number of small entities. The PRIA estimates that fewer than a third of the entities affected by this rulemaking are "small entities" as defined by the Regulatory Flexibility Act. PHMSA expects, moreover, that the principal economic impact on those entities will be beneficial. As explained in

[211] https://www.transportation.gov/regulations/rulemaking-requirements-concerning-small-entities.

greater length in the PRIA, many of the NPRM's proposed regulatory amendments are expected to yield cost savings for PHMSA-jurisdictional LNG facilities—including those considered "small entities" under the Regulatory Flexibility Act. Further, many of the NPRM's proposed requirements imposing compliance costs on operators are limited to larger LNG facilities of the sort not typically operated by small entities; in fact, NFPA 59A-2026 excepts operators of mobile and temporary LNG facilities (chapter 14) and permanent, small-scale LNG facilities (chapter 17) satisfying certain eligibility criteria from many of new requirements that would otherwise apply to PHMSA-jurisdictional LNG facilities. The PRIA consequently predicts that all small entities will see cost savings; a minority of those entities will experience cost savings exceeding one percent of their annual revenues, and fewer than a quarter will experience cost savings exceeding three percent of their annual revenues.

PHMSA requests comments on its certification and the discussion of the Regulatory Flexibility Act in the PRIA.

E. Executive Order 13132 (Federalism)

PHMSA analyzed this NPRM in accordance with the principles and criteria contained in E.O. 13132 (*Federalism*, 64 FR 43255 (Aug. 10, 1999)) and the Presidential Memorandum (*Preemption*, 74 FR 24693 (May 22, 2009)). E.O. 13132 requires agencies to ensure meaningful and timely input by State and local officials in the development of regulatory policies that may have "substantial direct effects on the States, on the relationship between the National Government and the States, or on the distribution of power and responsibilities among the various levels of government."

Although the proposals in this NPRM may (if adopted) operate to preempt some State requirements, they would not impose any regulation that has substantial direct effects on the States, the relationship between the National Government and the States, or the distribution of power and responsibilities among the various levels of government. Section 60104(c) of the

Pipeline Safety Laws prohibits certain State safety regulation of interstate pipelines. Under the Pipeline Safety Laws, States that have submitted a current certification under section 60105(a) can augment Federal pipeline safety requirements for intrastate pipelines regulated by PHMSA but may not approve safety requirements less stringent than those required by Federal law. A State may also regulate an intrastate pipeline facility that PHMSA does not regulate. This NPRM pertains to LNG facilities and the preemptive effect of the regulatory amendments in this final rule is limited to the minimum level necessary to achieve the objectives of the Pipeline Safety Laws. Therefore, the consultation and funding requirements of E.O. 13132 do not apply.

F. Unfunded Mandates Reform Act of 1995

The Unfunded Mandates Reform Act (UMRA, 2 U.S.C. § 1501 *et seq.*) requires agencies to assess the effects of Federal regulatory actions on State, local, and Tribal governments, and the private sector. For any NPRM or final rule that includes a Federal mandate that may result in the expenditure by State, local, and Tribal governments, in the aggregate of $100 million or more in 1996 dollars ($203 million in 2024 dollars) in any given year, the agency must prepare, among other things, a written statement that qualitatively and quantitatively assesses the costs and benefits of the Federal mandate.

This NPRM does not impose unfunded mandates under UMRA. As shown in the PRIA located in the rulemaking docket, the proposed rule does not result in costs of $100 million or more in 1996 dollars per year for either State, local, or Tribal governments, or to the private sector.

G. National Environmental Policy Act (NEPA)

The National Environmental Policy Act of 1969 (42 U.S.C. § 4321 *et seq.*) requires Federal agencies to prepare a detailed statement on major Federal actions significantly affecting the quality of the human environment. DOT Order 5610.1D, *Procedures for Considering*

Environmental Impacts (July 1, 2025) establishes departmental procedures for evaluating environmental impacts under NEPA.

PHMSA has completed a draft environmental impact statement. A copy of the draft environmental impact statement is available in the docket. PHMSA invites comment on the potential environmental impacts of this proposed rule.

H. Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)

PHMSA analyzed this proposed rule in accordance with the principles and criteria contained in E.O. 13175 (*Consultation and Coordination with Indian Tribal Governments*, 65 FR 67249 (Nov. 9, 2000)) and DOT Order 5301.1A, *Department of Transportation Programs, Policies, and Procedures Affecting American Indians, Alaska Natives, and Tribes* (Aug. 10, 2023). E.O. 13175 requires agencies to ensure meaningful and timely input from Tribal government representatives when developing rules that significantly or uniquely affect Tribal communities by imposing "substantial direct compliance costs" or "substantial direct effects" on such communities or the relationship and distribution of power between the Federal Government and Tribes.

PHMSA assessed the impact of the proposed rule and does not expect that it will significantly or uniquely affect Tribal communities or Indian Tribal governments. The proposed rule's regulatory amendments are facially neutral and will have broad, national scope. PHMSA, therefore, does not expect this rule to affect Tribal communities significantly or uniquely, impose substantial compliance costs on Tribal governments, or mandate Tribal action. Further, since PHMSA expects the NPRM will improve safety and reduce environmental risks associated with LNG facilities and pipelines, PHMSA expects the NPRM will not entail disproportionately high adverse risks for Tribal communities. Therefore, the funding and consultation requirements of E.O. 13175 and DOT Order 5301.1A do not apply.

I. National Technology Transfer and Advancement Act of 1995 (NTTAA)

The National Technology Transfer and Advancement Act of 1995 (Pub. L. No. 104-113) directs Federal agencies to use voluntary consensus standards and design specifications instead of government-developed voluntary technical standards when appropriate. Voluntary consensus standards are technical standards developed or adopted by domestic and international standards development organizations (SDOs). OMB Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*, sets the policy for Federal use and development of voluntary consensus standards.

The legal effect of incorporation by reference (IBR) is that the material is treated as if it was published in full in the *Federal Register* and the CFR. Therefore, like any other rule issued in the *Federal Register*, the IBR standard has the force and effect of law. However, if an SDO publishes a new edition of a standard, the specific edition of the standard that was incorporated by reference remains as the standard carrying the force of law. Further, if a provision of a standard incorporated by reference conflicts with a regulation, the regulation takes precedence, unless expressly provided otherwise in a regulation. Congress authorized incorporation by reference to reduce the volume of material published in the *Federal Register* and the CFR (*see* 5 U.S.C. § 552(a) and 1 CFR part 51) and granted authority to the Director of the Federal Register to determine whether a proposed IBR serves the public interest. Unless expressly provided otherwise in a regulation, if a provision of a standard incorporated by reference conflicts with a regulation, the regulation takes precedence.

New or updated pipeline standards often consider new technologies, materials, management practices, and other innovations that improve the safety and operations of pipelines and pipeline facilities. Because the Pipeline Safety Regulations involve a great deal of technical subject matter, PHMSA has incorporated by reference over 80 standards and specifications into the regulations. PHMSA regularly reviews newer editions of currently referenced consensus

standards and issues regulations to incorporate by reference updated standards that are consistent with the intent of the Pipeline Safety Regulations. This ensures that the Pipeline Safety Regulations incorporate the latest safety innovations. The lists of publications that PHMSA has incorporated by reference are found in §§ 192.7, 193.2013, and 195.3. The proposed revisions that this NPRM would make to the list of publications referenced in part 193 are found in § 193.9.

PHMSA employees participate in 25 domestic U.S. SDOs, including the NFPA, that address the design, construction, maintenance, inspection, operation, and repair of pipeline facilities. These subject matter experts represent the agency and participate in discussions and technical debates, register opinions, and vote in accordance with the procedures of the standards body at each stage of the standards development process (unless prohibited from doing so by law). PHMSA participates in this process to ensure the agency's safety and environmental priorities are considered and to avoid the need to develop separate, government-unique standards. PHMSA's participation does not, however, imply that the agency agrees with or endorses all decisions reached by such organizations. PHMSA has the responsibility to ensure the safe operation of pipeline systems and adopts only those portions of consensus standards that adequately protect public safety and the environment.

Availability of Materials to Interested Parties

PHMSA currently incorporates by reference into the Pipeline Safety Regulations all or parts of more than 80 standards and specifications developed and published by SDOs. SDOs update and revise their published standards every two to five years to reflect modern technology and best technical practices. ASTM International (ASTM, formerly the American Society for Testing and Materials) often updates its more widely used standards every year. Sometimes multiple editions are published in a given year.

In accordance with the NTTAA, PHMSA has the responsibility to determine which standards should be added, updated, or removed. PHMSA revises materials incorporated by reference in the Pipeline Safety Regulations via the rulemaking process, which gives the public and regulated entities the opportunity to provide input. During the rulemaking process, PHMSA must also obtain approval from the Office of the Federal Register to make changes regarding materials incorporated by reference.

Pursuant to section 24 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (Pub. L. No. 112-90), "the Secretary may not issue guidance or a regulation pursuant to this chapter that incorporates by reference any documents or portions thereof unless the documents or portions thereof are made available to the public, free of charge." Pursuant to 1 CFR 51.5, Federal agencies must include a discussion in the preamble of the final rule "the ways that the materials it incorporates by reference are reasonably available to interested parties and how interested parties can obtain the materials."

To meet the requirements of section 24 of the NTTAA, PHMSA negotiated agreements with AGA, ASME, ASCE, and NFPA. These agreements required the SDOs to make copies of their standards viewable and available to the public at no cost. The mailing addresses and websites of the SDOs are listed in § 193.9.

In addition, PHMSA will provide temporary access to any standard incorporated by reference or proposed to be incorporated by reference. To gain temporary access to industry standards, including those from SDOs with no agreement with PHMSA, please email phmsastandards@dot.gov with your request. You must include the following information: (1) phone number; (2) physical address; and (3) email address where we should send a response. PHMSA will respond within five business days and provide access to the standard.

J. Paperwork Reduction Act

Pursuant to 5 CFR 1320.8(d), PHMSA is required to provide interested members of the public and affected agencies with an opportunity to comment on information collection and recordkeeping requests. If adopted, the proposals in this rulemaking would impose new recordkeeping, notification, and reporting requirements on operators of LNG facilities.

OPID Assignment Requests

PHMSA proposes to modify Form F1000.1, the OPID Assignment Request form, and the associated instructions, to allow operators of permanent small-scale LNG facilities to designate themselves as such if they choose to take advantage of the regulatory flexibilities in subpart D. Existing facilities opting for that designation would need to update their OPIDs consistent with the new requirements. PHMSA does not expect the burden for completing Form F1000.1 to change due to this modification.

LNG Annual Reports

PHMSA proposes to modify PHMSA form F7100.3-1, Annual Report for Liquefied Natural Gas Facilities, and its instructions to allow operators to elect to be designated as a "permanent, small-scale LNG facility" pursuant to proposed subpart D. PHMSA expects the burden on operators to complete the report to remain the same.

LNG Incident Reporting

PHMSA proposes to expand the scope of incident reporting by requiring operators to report incidents involving the release of any hazardous fluids as defined in the newly proposed § 193.5. PHMSA expects this expansion to result in an increased number of incident reports from operators of LNG facilities.

PHMSA also proposes to modify PHMSA F7100.3 and its instructions to eliminate questions on the value of lost commodity.

Safety-related Condition Reporting

PHMSA proposes to expand the scope of safety-related condition reporting by requiring operators to consider all releases of hazardous fluids (as defined in the newly proposed § 193.5) at LNG facilities as reportable safety-related conditions. Newly proposed revisions to § 191.23(c) clarify that each operator of an LNG facility must report any safety-related condition that occurs during the initial startup, but not during earlier commissioning activities, before operations commence.

Due to these provisions, PHMSA expects to receive an increased number of safety-related condition reports. The estimated impact on this information collection burden is detailed below.

LNG Notifications and Petitions

Section 193.103(a) requires operators to submit a Siting Package to PHMSA with engineering drawings, piping and instrument drawings, reports from hazard analyses (including exclusion zones), and similar items. Operators must also submit a written assessment showing how these measures affect their hazard calculations and modeling.

In addition, § 193.505 proposes to require operators electing to use subpart F to submit an implementation plan under 49 CFR 190.9 and send copies to FERC, DHS, and each cognizant Coast Guard Captain of the Port (COTP). The implementation plan must detail the operator's pathway to subpart F compliance and include specific work streams, departmental milestones, and deadlines for implementation.

New Recordkeeping Requirements for LNG Operators

PHMSA proposes to expand the recordkeeping requirements for LNG operators. LNG operations must retain records for: general plans and procedures; corrosion control; operations and maintenance; material verification; control center management plans; pressure tests; personnel training; and applications for the use of an alternative risk-based approach to operations and maintenance. These records must be maintained for the life of the facility.

PHMSA proposes a new § 193.11(a) to specify that operators must maintain written plans and procedures in accordance with part 193 and NFPA 59A-2026. Operators must amend these plans as necessary to ensure safety.

In a new § 193.11(c), PHMSA proposes to require operators to record and maintain a change log detailing changes to plans and procedures, highlighting any revisions from the previous version. PHMSA proposes that operators keep a record of the change log for the lifetime of the facility governed by the procedures, unless a different timeframe for is required by another provision of part 193 and NFPA 59A-2026.

The newly proposed § 193.15(c) requires operators to maintain failure investigation records, including investigations of hazardous fluid releases, for a minimum of five years from the conclusion of the investigation.

When an operator chooses the QRA-based approach for siting rather than the traditional, prescriptive siting approach, they must document and maintain records generated in connection with that decision. A new § 193.107 would require operators to submit the records required by NFPA 59A-2026 section 19.2.1, including documentation of the risk assessment methodology, records of environmental and meteorological data used for the assessment, documentation of failure rates and frequencies, records of exclusion zones for flammable vapors and thermal radiation, the final calculated risk levels, and documentation of any specific risk mitigation techniques used to reduce the calculated risk. These records must be maintained for the life of the facility and updated whenever a significant change occurs that would alter the risk profile.

Section 193.401 requires operators to keep and maintain all records required by NFPA 59A-2026 sections 4.6, chapter 16, and chapter 18. NFPA 59A-2026, section 18.3.12, requires that changes to written procedures be documented and reviewed after considering operability, safety, and security.

A new § 193.407 would require each operator of an LNG facility to develop and keep an operations manual that includes procedures for corrosion control; clear guidance to help personnel recognize potential safety-related conditions; methods to ensure a work area is free of hazardous fluids; and repair procedures that provide for the safety of personnel and property.

In a new § 193.409, PHMSA proposes to supplement the requirements of NFPA 59A-2026 section 18.12 to require that operators document, at minimum, the trainee's name, tasks for which they are trained, and other record elements needed for PHMSA verification.

The proposed regulations § 193.503 establish an alternative, risk-based O&M framework for FERC-certificated LNG facilities. Operators must establish and implement written procedures to maintain the on-going integrity of process equipment. The operator shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test. Each operator shall issue a hot work permit for hot work operations conducted on or near a covered process. The permit shall document that the fire prevention and protection requirements in this part have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work, and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations. Operators would also need to establish and to implement written procedures to manage changes (except for "in-kind" replacements) to process chemicals, technology, equipment, and procedures, and changes to facilities that affect a covered process. And operators will need to certify that they have evaluated compliance with the provisions of this section at least every three years to verify that the procedures and practices under their risk-based O&M programs are adequate and are being

followed. A report of the audit findings shall be developed, and operators shall retain the two (2) most recent compliance audit reports.

LNG recordkeeping requirements are covered under OMB Control Number 2137-0048. PHMSA will request a revision to the currently approved LNG recordkeeping information collection to include the recordkeeping requirements detailed above. The estimated impact on this information collection is detailed below.

PHMSA will submit an information collection request to OMB for approval based on the requirements in this rule. These information collection requirements are contained in the Pipeline Safety Regulations. The following information is provided for each information collection: (1) title of the information collection; (2) OMB control number; (3) current expiration date; (4) type of request; (5) abstract of the information collection activity; (6) description of affected public; (7) estimate of total annual reporting and recordkeeping burden; and (8) frequency of collection. Requests for a copy of these information collection requests should be directed to Angela Hill by e-mail at angela.hill@dot.gov.

The information collection burden is estimated to be revised as follows:

1. Title: National Registry of Pipeline and Liquefied Natural Gas (LNG) Operators.

OMB Control Number: 2137-0627.

Current Expiration Date: 06/30/2028.

Type of Request: Revision.

Abstract: The National Registry of Pipeline and LNG Operators serves as the storehouse for the reporting requirements for an operator regulated or subject to reporting requirements under 49 CFR part 192, 193, or 195. This registry incorporates the use of two forms: OPID Assignment Request (PHMSA F1000.1) and National Registry Notification (PHMSA F1000.2).

PHMSA proposes to modify the OPID Assignment Request form, Form F1000.1, and the associated instructions, to require operators of permanent, small-scale LNG facilities to confirm

that designation. PHMSA does not expect operators to incur any additional burden due to this change.

Affected Public: Operators of Pipeline Facilities.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 744.

Total Annual Burden Hours: 744.

Frequency of Collection: On occasion.

2. Title: Annual and Incident Reports for Gas Pipeline Operators.

OMB Control Number: 2137-0522.

Current Expiration Date: 10/31/2026.

Abstract: This information collection covers the collection of annual report data from natural gas pipeline operators. PHMSA proposes to modify PHMSA form F7100.3-1, Annual Report for Liquefied Natural Gas Facilities, to allow operators to elect to be designated as a "permanent, small-scale LNG facility." PHMSA does not expect operators to incur any additional burden due to this change.

Affected Public: Natural Gas Pipeline Operators.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 2,445.

Total Annual Burden Hours: 104,596.

Frequency of Collection: Annual and on occasion.

3. Title: Incident Reports for Gas Pipeline Operators.

OMB Control Number: 2137-0635.

Current Expiration Date: 1/31/2029.

Abstract: This information collection covers the collection of incident data from natural gas pipeline operators. PHMSA proposes to expand the scope of incident report to include the

release of hazardous fluids. This expansion is expected to result in four additional increased reported incidents from operators of LNG facilities. PHMSA is also revising the LNG Incident Report (form PHMSA F7100.3-X) to remove the requirement for operators to submit data on the value of lost commodities.

Affected Public: Natural Gas Pipeline Operators.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 1,003.

Total Annual Burden Hours: 4,504.

Frequency of Collection: On occasion.

4. Title: Reporting Safety-Related Conditions on Gas, Hazardous Liquid, and Carbon Dioxide Pipelines and Liquefied Natural Gas Facilities.

OMB Control Number: 2137-0578.

Current Expiration Date: 3/31/2029.

Abstract: This information requires operators of LNG facilities to notify PHMSA of safety-related conditions during commissioning, construction, replacement, relocation, significant alteration, operation or maintenance activities, and for any release of LNG or hazardous fluid. Due to the expanded scope of safety-related condition reporting to include the release of hazardous fluids, PHMSA expects to receive two additional reports over three years.

Affected Public: Owners and operators of Liquefied Natural Gas (LNG) facilities.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 176.

Total Annual Burden Hours: 1,056.

Frequency of Collection: On occasion.

5. Title: Notification and Petition Requirements for LNG Operators

OMB Control Number: Will request from OMB.

Current Expiration Date: To be determined by OMB.

Abstract: A person owning or operating a liquefied natural gas (LNG) facility is required to provide information to the Secretary of Transportation at the Secretary's request according to 49 U.S.C. § 60117. Part 193 requires LNG operators to make various notifications upon the occurrence of certain events.

These requirements are necessary to ensure safe operation of LNG facilities, ascertain compliance with the Pipeline Safety Regulations, and provide a background for incident investigations. These mandatory notifications help PHMSA stay abreast of issues related to the health and safety of the Nation's pipeline infrastructure.

Affected Public: Owners and operators of LNG facilities.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 5.

Total Annual Burden Hours: 5.

Frequency of Collection: On occasion.

6. Title: Recordkeeping Requirements for Liquefied Natural Gas (LNG) Facilities

OMB Control Number: 2137-0048.

Current Expiration Date: 06/30/2027.

Abstract: 49 CFR part 193 requires operators of liquefied natural gas (LNG) facilities to maintain records, as needed, pertaining to facility design, operations, maintenance, and personnel training. The purpose of this mandatory information collection request is to ensure compliance with the recordkeeping requirements prescribed in the Pipeline Safety Regulations. LNG operators must make and maintain records as described and have those records available for compliance inspection by PHMSA staff upon request. Examples of such records include the results of personnel training activities; records of materials used for components, buildings, foundations, and LNG support systems; maps; and various facility maintenance activities. Most

of the required records are to be kept for as long as the facility is in service. Personnel records must be maintained for one year after personnel are no longer assigned duties at the LNG plant. This information collection revision covers the new recordkeeping requirements contained in the Pipeline Safety: Amendments to Liquefied Natural Gas Facilities NPRM. PHMSA estimates that the operators will spend approximately 40 hours, annually, complying with the various recordkeeping requirements. The burden estimate below has been updated accordingly.

Affected Public: Owners and operators of Liquefied Natural Gas (LNG) facilities.

Annual Reporting and Recordkeeping Burden:

Total Annual Responses: 42,284

Total Annual Burden Hours: 17,521

Frequency of Collection: On occasion.

Comments on these information collections are invited on:

(a) The need for the proposed collection of information for the proper performance of the functions of the agency, including whether the information will have practical utility;

(b) The accuracy of the agency's estimate of the burden of the revised collection of information, including the validity of the methodology and assumptions used;

(c) Ways to enhance the quality, utility, and clarity of the information to be collected; and

(d) Ways to minimize the burden of the collection of information on those who are to respond, including the use of appropriate automated, electronic, mechanical, or other technological collection techniques.

Please submit any comments, identified by the docket number in the heading of this document, to OMB, Office of Information and Regulatory Affairs, Attn: Desk Officer for the Department of Transportation, 725 17th Street N.W., Washington, D.C. 20503, and to PHMSA by the methods described in the ADDRESSES section. Comments should be submitted on or

before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

K. Severability

This NPRM represents a reasoned determination by PHMSA, based on its technical expertise and review of the administrative record, that the anticipated safety and avoided (compliance and opportunity) cost saving benefits of each of the amendments proposed herein preliminarily justify any associated compliance and other costs. As discussed throughout the NPRM, PHMSA's part 193 regulations governing LNG facilities consist of mutually-reinforcing elements of a conservative, defense-in-depth strategy to reducing public safety risks associated with siting, design, construction, installation, and operation of LNG facilities; NFPA 59A-2026 provisions which the NPRM proposes to incorporate by reference as the core of its part 193 regulations were selected by a consensus decision of a diverse group of technical experts from industry and State and Federal regulators consistent with that approach. Although the PRIA notes that the difficulty in identifying with precision the incremental safety contributions from particular proposed regulatory amendments in this NPRM (and by extension, provisions of NFPA 59A-2026), PHMSA generally understands that most of its proposed amendments could be severed from the rest of the proposals herein without adversely affecting the balance of cost and benefits justifying other proposed amendments—whether considered individually or in aggregate. This preliminary assessment holds in particular for those elements of the NPRM that function as alternatives to other, default requirements (*e.g.*, the QRA-based siting alternative at § 193.107; the risk-based operations and maintenance alternative at subpart F), as well as the application of various proposals throughout to any particular category of PHMSA-jurisdictional LNG facility (*e.g.*, application of subpart B siting requirements to peak shavers as well as FERC-jurisdictional LNG terminals).

PHMSA solicits stakeholder comment on which of the NPRM's proposals are severable from other elements of the rulemaking, or as applied to any particular category of PHMSA-jurisdictional LNG facility.

List of Subjects

49 CFR Part 191

Liquefied natural gas, Pipeline reporting requirements.

49 CFR Part 193

Incorporation by reference, Liquefied natural gas, Pipeline safety.

In consideration of the foregoing, PHMSA proposes to amend 49 CFR parts 191 and 193 as follows:

PART 191—TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE; ANNUAL REPORTS, INCIDENT REPORTS, AND SAFETY-RELATED CONDITION REPORTS

1. The authority citation for part 191 continues to read as follows:

Authority: 30 U.S.C. 185(w)(3), 49 U.S.C. 5121, 60101 *et. seq.*, and 49 CFR 1.97.

2. In § 191.3, revise the definitions of "Incident" and "LNG facility" and add the definition of "LNG plant" in alphabetical order to read as follows:

§ 191.3 Definitions.

* * * * *

Incident means any of the following events:

(1) An event that involves a release of gas from a pipeline, gas from an underground natural gas storage facility (UNGSF), liquefied natural gas, liquefied petroleum gas, refrigerants, or other hazardous fluid (as defined in § 193.5 of this chapter) from an LNG facility, and that results in one or more of the following consequences:

(i) A death, or personal injury necessitating in-patient hospitalization;

(ii) Estimated property damage of $122,000 or more, including loss to the operator and others, or both, but excluding the cost of gas or hazardous fluids (as defined in § 193.5 of this chapter) lost. For adjustments for inflation observed in calendar year 2021 onwards, changes to the reporting threshold will be posted on PHMSA's website. These changes will be determined in accordance with the procedures in appendix A to this part; or

(iii) Unintentional estimated gas loss of three million cubic feet or more.

(2) An event that results in an emergency shutdown of an LNG facility or a UNGSF. Activation of an emergency shutdown system for reasons other than an actual emergency within the facility does not constitute an incident.

(3) An event that is significant in the judgment of the operator, even though it did not meet the criteria of paragraph (1) or (2) of this definition.

LNG facility means a liquefied natural gas facility as defined in § 193.5 of this chapter.

LNG plant means an LNG facility or collection of LNG facilities functioning as a unit.

* * * * *

3. In § 191.22:

a. Remove the word "or" at the end of paragraph (c)(2)(iv);

b. Remove the period at the end of paragraph (c)(2)(v) and add "; or" in its place; and

c. Add paragraph (c)(2)(vi).

The addition reads as follows:

§ 191.22 National Registry of Operators.

* * * * *

(c) * * *

(2) * * *

(vi) Election of the requirements of subpart D of part 193 of this chapter.

* * * * *

4. In § 191.23, revise the introductory text of paragraph (a) and paragraphs (a)(3), (4), (6), (7), and (9) and add paragraph (c) to read as follows:

§ 191.23 Reporting safety-related conditions.

(a) Except as provided in paragraphs (b) and (c) of this section, each operator shall report in accordance with § 191.25 the existence of any of the following safety-related conditions involving facilities in service:

* * * * *

(3) Unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability of a pipeline or the structural integrity or reliability of a UNGSF or LNG facility that contains, controls, or processes hazardous fluids (as defined in § 193.5 of this chapter).

(4) Any crack or other material defect that impairs the structural integrity or reliability of a UNGSF or an LNG facility that contains, controls, or processes hazardous fluids (as defined in § 193.5 of this chapter).

* * * * *

(6) Any malfunction or operating error that causes the pressure—plus the margin (build-up) allowed for operation of pressure limiting or control devices—to exceed either the maximum allowable operating pressure of a distribution or gathering line, the maximum well allowable operating pressure of a UNGSF, or the maximum allowable working pressure of an LNG facility that contains or processes hazardous fluids (as defined in § 193.5 of this chapter).

(7) A leak in a pipeline, UNGSF, or LNG facility that contains or processes hazardous fluids (as defined in § 193.5 of this chapter) that constitutes an emergency.

* * * * *

(9) Any safety-related condition that could lead to an imminent hazard and causes (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent or more reduction in operating pressure or shutdown of operation of a pipeline, UNGSF, or an LNG facility that contains or processes hazardous fluids (as defined in § 193.5 of this chapter).

* * * * *

(c) Each operator of an LNG facility must report any safety-related condition specified in paragraph (a) of this section that occurs during initial startup before operations.

5. In § 191.25, revise paragraph (a) and the introductory text of paragraph (c) to read as follows:

§ 191.25 Filing safety-related condition reports.

(a) Each report of a safety-related condition under § 191.23(a)(1) through (9) and (11) and (c) must be filed (received by the Associate Administrator) in writing within 5 working days (not including Saturday, Sunday, or Federal holidays) after the day a representative of the operator first determines that the condition exists, but not later than 10 working days after the day a representative of the operator discovers the condition. Separate conditions may be described in a single report if they are closely related. Reporting methods and report requirements are described in paragraph (c) of this section.

* * * * *

(c) Reports must be filed by email to *InformationResourcesManager@*dot.gov or by facsimile to (202) 366-7128. For a report made pursuant to § 191.23(a)(1) through (9) and (11) and (c), the report must be headed "Safety-Related Condition Report." For a report made pursuant to § 191.23(a)(10), the report must be headed "Maximum Allowable Operating Pressure Exceedances." All reports must provide the following information:

* * * * *

6. Revise and republish part 193 to read as follows:

PART 193—LIQUEFIED NATURAL GAS FACILITIES: MINIMUM FEDERAL SAFETY STANDARDS

Subpart A—General

Sec.

193.1 Scope of part.

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193.301 Small-scale LNG facilities.

Subpart E—Operations and Maintenance

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193.403 Purging.

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Subpart F—Risk-based Operations and Maintenance

193.501 Scope.

193.503 Program content requirements.

193.505 Implementation plans.

Authority: 30 U.S.C. 185(w)(3), 49 U.S.C. 5103, 60101 *et seq.*; and 49 CFR 1.97.

Subpart A—General

§ 193.1 Scope of part.

(a) This part prescribes safety standards for LNG facilities used in the transportation of gas by pipeline that is subject to the pipeline safety laws (49 U.S.C. 60101 *et seq*.) and part 192 of this subchapter.

(b) This part does not apply to:

(1) LNG facilities used by ultimate consumers of LNG or natural gas.

(2) LNG facilities used in the course of natural gas treatment or hydrocarbon extraction that do not store LNG.

(3) In the case of a marine transfer area for LNG as defined in 33 CFR 127.005, any matter other than siting.

(4) Any LNG facility located in navigable waters (as defined in section 3(8) of the Federal Power Act (16 U.S.C. 796(8)).

§ 193.3 Applicability.

(a) The requirements in this part governing siting, design, installation, or construction (including material incorporated by reference) do not apply retroactively to existing LNG facilities or to proposed LNG facilities that an appropriate authority approved before the requirements went into effect.

(b) If an LNG facility covered by paragraph (a) of this section is replaced, relocated, or significantly altered on or after [EFFECTIVE DATE OF THE FINAL RULE], then the LNG facility must comply with the applicable requirements of this part governing siting, design, installation, and construction, except that:

(1) The siting requirements apply only to LNG storage tanks that are significantly altered by increasing the storage capacity or relocated; and

(2) To the extent the operator determines compliance with design, installation, and construction requirements make any replaced, relocated, or altered LNG facility incompatible with other LNG facilities, or would otherwise be impracticable, the replaced, relocated, or significantly altered LNG facility may be designed, installed, or constructed in accordance with the original specifications for the LNG facility.

§ 193.5 Definitions.

The definitions in chapter 3 of NFPA 59A (incorporated by reference, *see* § 193.9) are incorporated by reference for use in this part except as substituted, modified, or supplemented in this section:

Administrator means the Administrator, Pipeline and Hazardous Materials Safety Administration or a delegate.

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

Design pressure means the pressure used in the design of components for the purpose of determining the minimum permissible thickness or physical characteristics of its various parts. When applicable, the static head must be included in the design pressure to determine the thickness of any specific part.

Design spill means a potential spill or release from LNG and hazardous fluid containers, piping, and equipment at liquefaction, storage, transfer, or other process areas in an LNG facility.

Determine means to make a decision based on an appropriate investigation using scientific methods and sound engineering judgment, including documentation that demonstrates the basis of the decision.

Emergency means a deviation from normal operation, a structural failure, or severe environmental conditions that would probably cause harm to people or property.

Exclusion zone means an area within or surrounding an LNG facility in which an operator or government agency legally controls all activities in accordance with subpart B of this part for as long as the facility is in operation.

Gas except when designated as inert, means natural gas, other flammable gas, or gas which is toxic or corrosive.

Hazardous fluid means a hazardous liquid or gas that is flammable, toxic, or corrosive.

Hazardous liquid means LNG or a liquid that is flammable, corrosive, or toxic.

Impounding system includes an impounding area and dikes and floors for conducting the flow of spilled hazardous liquids to an impounding area.

Liquefied natural gas or *LNG* means natural gas or synthetic gas having methane (CH_4) as its major constituent that has been changed to a liquid.

LNG facility means a pipeline facility that is used for liquefying natural gas or synthetic gas or transferring, storing, vaporizing liquefied natural gas, including on-site power generation facilities.

Maximum allowable working pressure (MAWP) means the maximum gauge pressure permissible at the top of the equipment, containers, or pressure vessels while operating at design temperature.

Normal operation means functioning within allowable ranges of pressure, temperature, flow, and other operating criteria consistent with the requirements of this part.

Operator means a person who owns or operates a pipeline facility.

Person means any individual, firm, joint venture, partnership, corporation, association, State, municipality, cooperative association, or joint stock association, including any trustee, receiver, assignee, or personal representative thereof.

Pipeline facility means new and existing piping, rights of way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation, including an LNG facility.

Piping means line pipe, tubing, hoses, fittings, valves, pumps, connections, safety devices, or related components for containing the flow of hazardous fluids.

Transfer piping means a system of permanent or temporary piping, or both, used for transferring hazardous fluids between any of the following: liquefaction process facilities, storage tanks, vaporizers, compressors, cargo transfer systems, and facilities other than pipeline facilities.

Transfer system includes transfer piping and cargo transfer systems.

Vaporization means the addition of thermal energy that changes a liquid to a vapor or gaseous state.

§ 193.7 Rules of regulatory construction.

(a) As used in this part:

(1) *Includes* means including but not limited to;

(2) *May* means is permitted to or authorized to;

(3) *May not* means is not permitted to or not authorized to; and

(4) *Must* is used in the mandatory and imperative sense.

(5) *Shall* is used in the mandatory and imperative sense.

(b) In this part:

(1) Words importing the singular include the plural; and

(2) Words importing the plural include the singular.

§ 193.9 What documents are incorporated by reference partly or wholly in this part?

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, PHMSA must publish a notice of change in the *Federal Register* and the material must be available to the public. All approved incorporation by reference (IBR) material is available for inspection at the Pipeline and Hazardous Materials Safety Administration (PHMSA) and at the National Archives and Records Administration (NARA). Contact PHMSA at: The Office of Pipeline Safety, Pipeline and Hazardous Materials

Safety Administration, 1200 New Jersey Avenue S.E., Washington, D.C. 20590; phone: (202) 366–4046; website: www.phmsa.dot.gov/pipeline/regs. For information on the availability of this material at NARA, visit *www.archives.gov/federal-register/cfr/ibr-locations* or email *fr.inspection@nara.gov*. The material may be obtained from the sources in the following paragraphs of this section.

(b) American Concrete Institute (ACI), 38800 Country Club Drive, Farmington Hills, MI 48331; phone: (248) 848-3800; website: *www.concrete.org/*.

(1) ACI 304R-00, Guide for Measuring, Mixing, Transportation and Placing of Concrete, reapproved 2009, (ACI 304R); IBR approved for § 193.201.

(2) ACI 318-25, Building Code Requirements for Structural Concrete and Commentary, published January 15, 2025, (ACI 318); IBR approved for § 193.201.

(3) ACI 376, Refrigerated Liquefied Gas Containment for Concrete Structures–Code Requirements and Commentary, published July 1, 2023, (ACI 376); IBR approved for § 193.201.

(c) American Gas Association (AGA), 400 North Capitol Street, N.W., Washington, D.C. 20001; phone: (202) 824–7000; website: *www.aga.org*.

(1) American Gas Association (AGA), "Purging Manual," 4th edition, September 2018, (Purging Manual), IBR approved for § 193.403.

(2) [Reserved]

(d) American Petroleum Institute (API), 200 Massachusetts Avenue N.W., Suite 1100, Washington, D.C. 20001-5571; phone: (202) 682-8000; website: *www.api.org/*.

(1) API 510, Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration, 11th edition, published March 2, 2023, (API 510); IBR approved for § 193.401.

(2) API RP 576, Inspection of Pressure-Relieving Devices, 5th edition, September 27, 2024, (API RP 576); IBR approved for § 193.401.

(3) API Specification 6D, Specification for Valves, 25th edition, November 1, 2021, including Errata (December 2021), Errata 2 (April 2022), Errata 3 (October 2023), Addendum 1 (April 2023), Addendum 2 (September 2024), and Addendum 3 (March 2025), (API Spec 6D); IBR approved for § 193.201.

(4) API Standard 620, Design and Construction of Large, Welded, Low-pressure Storage Tanks, 12th edition, effective October 2013, including Addendum 1 (November 2014), Addendum 2 (April 2018), Addendum 3 (March 2021), Addendum 4 (February 2025), Errata 1 (March 2025), (API Std 620); IBR approved for § 193.201.

(5) API STD 625, Tank Systems for Refrigerated Liquefied Gas Storage, 1st edition, August 1, 2010, including Addendum 1 (July 2013), Addendum 2 (November 2014), Addendum 3 (June 2018), Addendum 4 (August 2021), Addendum 5 (February 2025), (API STD 625); IBR approved for § 193.201.

(6) API Standard 650, Welded Tanks for Oil Storage, 13th edition, March 2020, including Errata 1 (January 2021), (API Std 650); IBR approved for § 193.201.

(7) API Standard 2510, Design and Construction of LPG Installations, 9th Edition, August 2020, (API Std 2510); IBR approved for § 193.201.

(e) American Society of Civil Engineers (ASCE), 1801 Alexander Bell Drive, Reston, VA 20191; phone: (800) 548-2723, 703 295-6300 (international); website: *www.asce.org/*.

(1) ASCE/SEI 7-22, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, January 1, 2022, includes Supplement 2 (2023), (ASCE/SEI 7); IBR approved for §§ 193.201 and 193.203.

(2) [Reserved]

(f) American Society of Mechanical Engineers (ASME), Two Park Avenue, Suite 1600, New York, NY 10016-5990; phone: (800) 843-2763; email: CustomerCare@asme.org; website: *www.asme.org*.

(1) ASME B31.1, Power Piping, 2024 edition, issued October 15, 2024, (ASME B31.1); IBR approved for § 193.201.

(2) ASME B31.3, Process Piping, 2024 edition, issued December 27, 2024, (ASME B31.3); IBR approved for §§ 193.201 and 193.401.

(3) ASME B31.4, Pipeline Transportation Systems for Liquids and Slurries, 2022 edition, issued December 8, 2022, (ASME B31.4); IBR approved for § 193.201.

(4) ASME B31.5, Refrigeration Piping and Heat Transfer Components, 2022 edition, approved November 28, 2022, (ASME B31.5); IBR approved for § 193.201.

(5) ASME B31.8, Gas Transmission and Distribution Piping Systems, 2022 edition, issued December 22, 2022, (ASME B31.8); IBR approved for § 193.201.

(6) ASME Boiler & Pressure Vessel Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, 2023 edition, July 1, 2023, (ASME BPVC); IBR approved for §§ 193.201 and 193.211.

(g) American Society for Nondestructive Testing (ASNT), 1201 Dublin Road, Suite #G04, Columbus, OH 43215; phone: (800) 222-2768; website: *www.asnt.org/*.

(1) ASNT SNT-TC-1A 2020, Personnel Qualification and Certification in Nondestructive Testing, approved January 1, 2020, (ASNT SNT-TC-1A); IBR approved for §§ 193.201 and 193.401.

(2) [Reserved]

(h) ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; phone: (877) 909-2786; website: *www.astm.org/* or *www.astm.org/help/contact*.

(1) ASTM E84-24, Standard Test Method for Surface Burning Characteristics of Building Materials, approved August 1, 2024, (ASTM E84); IBR approved for § 193.201.

(2) ASTM E136, Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C, approved January 2, 2024, (ASTM E136); IBR approved for § 193.201.

(3) ASTM E2652, Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C approved November 1, 2022, (ASTM E2652); IBR approved for § 193.201.

(i) Brazed Aluminum Plate-fin Heat Exchanger Manufacturers' Association (ALPEMA), P.O Box 1390, Navasota, TX 77868; phone: +41 (021)-693-5981; website: *www.alpema.org/.*

(1) Standards of the Brazed Aluminum Plate-Fin Heat Exchanger Manufacturers Association, 4th edition, published January 1, 2024; IBR approved for § 193.201.

(2) [Reserved]

(j) Center for Chemical Process Safety (CCPS), 120 Wall Street, FL 23 New York, NY 10005; phone: (800) 242-4363; website: www.aiche.org/.

(1) Guidelines for Hazard Evaluation Procedures, 3rd edition, April 2008; IBR approved for § 193.503.

(2) [Reserved]

(k) Compressed Gas Association (CGA), 8484 Westpark Drive, Suite 220 McLean, VA 22102; phone: (703) 788-2700; website: *www.cganet.com/.*

(1) CGA 341, Specification for Insulated Cargo Tank Specification for Nonflammable Cryogenic Liquids, published August 2023, (CGA 341); IBR approved for § 193.201.

(2) CGA S-1.3, Pressure Relief Device Standards—part 3—Stationary Storage Containers for Compressed Gases, published September 2024, (CGA S-1.3); IBR approved for § 193.201.

(l) CSA Group (CSA), 55 Broadway 14th Floor, New York, NY 10006-3729; phone: (787) 641-6800; website: *www.csagroup.org/.*

(1) CSA B51-24, Boiler, Pressure Vessel and Pressure Piping Code, published April 2024, (CSA B51); IBR approved for § 193.201.

(2) CSA C22.1-24, Canadian Electrical Code, 26th edition, published March 4, 2024, (CSA C22.1); IBR approved for § 193.201.

(m) International Society of Automation (ISA), PO Box 12277 Research Triangle Park, NC 27709; phone: (919) 549-8411; website: *www.isa.org/*.

(1) ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids, 2016, (ISA 12.27.01); IBR approved for § 193.201.

(2) [Reserved]

(n) National Board of Boiler and Pressure Vessel Inspectors (NBBI), 1055 Crupper Avenue Columbus, OH 43229; phone: (614) 888-8320; website: *www.nationalboard.org/*.

(1) NBBI, NB 23, National Board Inspection Code, part 2, Inspection, July 1, 2023, (NB 23); IBR approved for § 193.401.

(2) [Reserved]

(o) National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471; phone: (800) 344-3555; website: *www.nfpa.org/*.

(1) NFPA 13, Standard for the Installation of Sprinkler Systems, 2025 edition, issued August 29, 2024, (NFPA 13); IBR approved for §§ 193.201 and 193.401.

(2) NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2024 edition, issued August 25, 2023, (NFPA 14); IBR approved for §§ 193.201 and 193.401.

(3) NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection, 2022 edition, issued November 26, 2020, (NFPA 15); IBR approved for §§ 193.201 and 193.401.

(4) NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, 2025 edition, issued August 29, 2024, (NFPA 20); IBR approved for §§ 193.201 and 193.401.

(5) NFPA 22, Standard for Water Tanks for Private Fire Protection, 2023 edition, issued April 14, 2022, (NFPA 22); IBR approved for §§ 193.201 and 193.401.

(6) NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 2025 edition, issued April 22, 2024, (NFPA 24); IBR approved for §§ 193.201 and 193.401.

(7) NFPA 30, Flammable and Combustible Liquids Code, 2024 edition, issued January 1, 2024, (NFPA 30); IBR approved for § 193.201.

(8) NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2024 edition, issued December 1, 2023, (NFPA 37); IBR approved for § 193.201.

(9) NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work, 2024 edition, issued December 1, 2023, (NFPA 51B); IBR approved for §§ 193.201 and 193.401.

(10) NFPA 54/ANSI Z22.3.1, National Fuel Gas Code, 2024 edition, issued August 25, 2023, (NFPA 54); IBR approved for § 193.201.

(11) NFPA 56, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems, 2023 edition, issued November 29, 2022, (NFPA 56); IBR approved for §193.401.

(12) NFPA 58, Liquefied Petroleum Gas Code, 2024 edition, issued August 25, 2023, (NFPA 58); IBR approved for § 193.201.

(13) NFPA 59, Utility LP-Gas Plant Code, 2024 edition, issued August 25, 2023, (NFPA 59); IBR approved for § 193.201.

(14) NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG), 2026 edition, issued November 19, 2025, (NFPA 59A). IBR approved for §§ 193.5;

193.13; 193.101; 193.103; 193.105; 193.107; 193.201; 193.203; 193.207; 193.301; 193.401; 193.403; 193.405; 193.407; 193.409; 193.411; and 193.501.

(15) NFPA 68, Standard on Explosion Protection by Deflagration Venting, 2023 edition, issued November 29, 2022, (NFPA 68); IBR approved for §§ 193.201 and 193.401.

(16) NFPA 70, National Electrical Code, 2026 edition, issued August 20, 2025, (NFPA 70); IBR approved for § 193.201.

(17) NFPA 72, National Fire Alarm and Signaling Code, 2025 edition, issued August 29, 2024, (NFPA 72); IBR approved for §§ 193.201 and 193.401.

(18) NFPA 85, Boiler and Combustion Systems Hazards Code, 2023 edition, issued November 29, 2022, (NFPA 85); IBR approved for § 193.201.

(19) NFPA 86, Standard for Ovens and Furnaces, 2023 edition, issued August 12, 2022, (NFPA 86); IBR approved for § 193.201.

(20) NFPA 101, Life Safety Code, 2024 edition, issued August 25, 2023, (NFPA 101); IBR approved for §§ 193.201 and 193.401.

(21) NFPA 110, Standard for Emergency and Standby Power Systems, 2025 edition, issued April 22, 2024, (NFPA 110); IBR approved for § 193.201.

(22) NFPA 274, Standard Test Method to Evaluate Fire Performance Characteristics of Pipe Insulation, 2023 edition, issued November 29, 2022, (NFPA 274); IBR approved for § 193.201.

(23) NFPA 496, Standard for Purged and Pressurized Enclosures for Electrical Equipment, 2024 edition, issued April 23, 2023, (NFPA 496); IBR approved for § 193.201.

(24) NFPA 600, Standard on Fire Brigades, 2025 edition, issued November 16, 2024, (NFPA 600); IBR approved for § 193.401.

(25) NFPA 750, Standard on Water Mist Fire Protection Systems, 2023 edition, issued March 20, 2022, (NFPA 750); IBR approved for §§ 193.201 and 193.401.

(26) NFPA 1225, Standard for Emergency Communications Services, 2022 edition, issued August 26, 2021, (NFPA 1225); IBR approved for §§ 193.201 and 193.401.

(27) NFPA 5000, Building Construction and Safety Code, 2024 edition, issued August 25, 2023, (NFPA 5000); IBR approved for § 193.201.

(p) UL Solutions, 1250 Connecticut Avenue Northwest, Suite 520 Washington, D.C. 20036; phone: (202) 296-7840; website: *www.ul.com/.*

(1) UL 723, Test for Surface Burning Characteristics of Building Materials, 11th edition, 2018, revised April 27, 2023 (UL 723); IBR approved for § 193.201.

(2) [Reserved]

§ 193.11 Plans and procedures.

(a) *General.* Each operator must develop and follow written plans and procedures required by this part. All plans or procedures must be available for review and inspection.

(b) *Review and update*. Each operator must review and update the plans and procedures required by this part—

(1) When a component is installed, replaced, relocated, or otherwise changed; or

(2) At least once every two calendar years, with intervals not exceeding 27 months.

(c) *Changes.* Changes to plans and procedures must be recorded in a log that is maintained for the life of the LNG facility.

§ 193.13 Mobile and temporary LNG facilities.

(a) Operators of mobile and temporary LNG facilities used for peak-shaving, service maintenance during gas pipeline systems repair, alteration, or other short-term applications that are in compliance with chapter 14 of NFPA 59A (incorporated by reference, *see* § 193.9) need not comply with the requirements of this part other than those in this subpart.

(b) Operators of mobile and temporary LNG facilities must provide to PHMSA or the applicable State agency a location description of each facility at least two weeks in advance of

the installation, including the details of location, leakage containment or control, firefighting equipment, and methods employed to restrict public access, except that in the case of emergency where such notice is not possible, as much advance notice as possible must be provided.

(c) Operators of mobile and temporary LNG facilities shall be subject to the reporting requirements in part 191 of this subchapter.

§ 193.15 Investigations of failures.

(a) Operators must investigate and determine the cause of any event involving a failure of the integrity or function of systems containing hazardous fluids occurring during commissioning, initial start-up, or operation, as well as any explosion, fire, or hazardous fluid release that results in:

(1) Death or injury requiring hospitalization; or

(2) Estimated property damage of $122,000 or more, including loss to the operator and others, or both, but excluding the cost of gas lost. For adjustments for inflation observed in calendar year 2021 onwards, changes to the reporting threshold will be posted on PHMSA's website. These changes will be determined in accordance with the procedures in appendix A to part 191 of this subchapter.

(b) If the Administrator or relevant State agency under the pipeline safety laws (49 U.S.C. 60101 *et seq*.) investigates a failure, 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 authorizes. Where components must be moved for operational or safety reasons, they must not be removed from the LNG facility and must be maintained intact to the extent practicable until the investigation is complete, or the investigating agency otherwise authorizes.

(c) Operators must maintain investigation records for a minimum of 5 years from conclusion of the investigation.

Subpart B—Siting

§ 193.101 Scope.

(a) This subpart prescribes requirements for LNG facility siting.

(b) Except as specified in § 193.3 or as provided otherwise by this subpart, each LNG facility that is designed, constructed, replaced, relocated, or significantly altered on or after [5 YEARS AFTER DATE OF PUBLICATION OF THE FINAL RULE], must comply with the requirements of this subpart and sections 5.2.1 and 5.3.1 of NFPA 59A (incorporated by reference, *see* § 193.9). In the event of a conflict between NFPA 59A and the provisions of this subpart, the provisions of this subpart shall prevail.

§ 193.103 Hazard analysis.

Each operator shall perform an evaluation of hazards and calculation of the extent of hazards for each container, piping, and other equipment containing LNG or other hazardous fluids in accordance with this section and section 5.3.2 of NFPA 59A (incorporated by reference, see § 193.9) and:

(a) Each operator shall submit a siting package consisting of the following material documentation:

(1) Project description, background, purpose and details describing the proposed LNG facility;

(2) Hazard reports, including any attachments and referenced reports;

(3) Facility location map(s), topography map(s), and site aerial photography;

(4) Engineering drawings including an overall plot plan showing the LNG facility's property boundary and unit plot plans for each process area or system showing the location and elevation of major equipment;

(5) Piping and instrument drawings;

(6) Process Flow Diagrams;

(7) Heat and Material Balance Sheets;

(8) Piping Inventory Table;

(9) Pump and compressor curves for pumps and compressors used for hazardous fluid service;

(10) Sketch on plot plan showing expected locations and elevations of major potential single accidental leakage sources;

(11) Dimensions, capacities, and thermal properties for any impoundments associated with the project;

(12) Design details for mitigation measures (including vapor barriers and pipe-in-pipe systems) and assessment of the effect of such measures on evaluation of and calculation of the extent of hazards; and

(13) The summary report of all input and output parameters for hazard modeling.

(b) The design spill criteria for “Piping and Other Equipment” shall include, in lieu of design spill criteria in Table 5.3.2.3 of NFPA 59A, the following:

(1) For piping within process systems or transfer areas involving hazardous fluids greater than or equal to six inches in diameter, a hole two inches in diameter applied at any location along the piping segment;

(2) For piping within process systems or transfer areas involving hazardous fluids less than six inches in diameter, a hole size equivalent to a full-bore rupture applied at any location along the piping segment;

(3) For pipe-in-pipe systems serving as secondary containment, an unobstructed release from a hole one inch in diameter applied at the operating conditions of the inner pipe;

(4) For single-ply construction expansion bellows, a hole size equivalent to a full-bore rupture of the expansion joint applied at any location along the piping segment applied at the expansion joint; and

(5) For transfer hoses, a hole size equivalent to a full-bore rupture of the transfer hose applied at any location along the transfer hose.

(c) Evaluation and calculation of the extent of hazards shall employ source terms and hazard models reviewed against PHMSA-approved Model Evaluation Protocols and Model Validation Databases maintained on PHMSA's website: https://www.phmsa.dot.gov.

(d) Evaluation and calculation of the extent of flammable and toxic vapor-gas dispersion hazards shall employ an elevation parameter of 0.5 meters.

(e) Calculation of the extent of flammable vapor-gas and toxic vapor dispersion hazards shall continue until the greater of the time for the dispersion hazards to reach their maximum extent and the design spill duration pursuant to section 5.3.2.4 of NFPA 59A.

(f) Calculation of the extent of hazards shall employ any uncertainty factor generated under PHMSA-approved model evaluation protocols pursuant to paragraph (c) of this section.

(g) Evaluation and calculation of the extent of hazards shall consider any supporting documentation for active mitigation measures identified in the siting package.

§ 193.105 Exclusion zones.

Each operator (or applicant, as applicable) evaluating and calculating the extent of hazards pursuant to § 193.103 must establish exclusion zones, occupancy restrictions, and develop any public notification protocols in consultation with applicable State and local emergency management and response organizations with respect to each LNG and hazardous fluid container, piping, and other equipment in accordance with this section and section 5.3.2 of NFPA 59A (incorporated by reference, *see* § 193.9) provided that:

(a) Operators shall, for a design spill resulting in a toxic cloud with concentration levels corresponding to AEGL-2 and AEGL-3 levels and an exposure duration of one hour or less, establish exclusion zones and occupancy restrictions for toxic vapor dispersion hazards pursuant to Table 5.3.2.9 of NFPA 59A; for other areas with toxic vapor concentration levels and exposure durations at or above AEGL-1, development of any public notification procedures in consultation with applicable State and local emergency management and response organizations will be required in accordance with the facility's emergency response plan; and

(b) An operator need not demonstrate legal control of activities in, or be subject to occupancy restrictions with respect to, any public road, any public right-of-way, and navigable waters.

§ 193.107 Quantitative risk assessment.

As an alternative to the requirements of §§ 193.103 and 193.105, an operator may perform an evaluation of hazards, including calculation of risks to individuals and society with respect to each of fatality and irreversible harm from those hazards, for each container, piping, and other equipment containing LNG or other hazardous fluids in accordance with this section and chapter 19 of NFPA 59A (incorporated by reference, see § 193.9), provided that:

(a) Each operator shall submit material documentation required by NFPA 59A section 19.2.1;

(b) NFPA 59A section 19.1.3 shall not apply;

(c) Evaluation of hazards and risks shall employ hazard models reviewed against PHMSA-approved Model Evaluation Protocols and Model Validation Databases maintained on PHMSA's website: https://www.phmsa.dot.gov;

(d) Operators need not evaluate hazards from releases on feed gas or send-out gas lines;

(e) The land use restrictions and risk mitigation requirements of NFPA 59A sections 19.10 and 19.11 shall not apply to public roads, public rights-of-way, and navigable waters; and

(f) Each operator shall comply with risk tolerability criteria (including land use restrictions) in NFPA 59A section 19.10 and risk mitigation requirements in NFPA 59A section 19.11.

§ 193.109 Proximity to airport or runway.

An LNG storage tank system must not be located within a horizontal distance of 1 mile (1.6 km) from where an airport runway ends or 1⁄4 mile (0.4 km) from the nearest point of a runway, whichever is longer. The height of LNG structures in the vicinity of an airport must also comply with applicable Federal Aviation Administration requirements.

Subpart C—Design, Construction, and Installation

§ 193.201 Scope.

(a) This subpart prescribes requirements for the design, construction, and installation of LNG facilities.

(b) LNG facilities designed—and new, replaced, relocated, or significantly altered equipment installed—after [EFFECTIVE DATE OF THE FINAL RULE] must, except as otherwise provided in this subpart, comply with design, construction, and installation requirements within each of the following:

(1) Chapter 4 (General Requirements); sections 5.2.3 (All-Weather Accessibility), and 5.2.4 (Surface Water Drainage); chapter 6 (Plant Layout); chapter 7 (Process Equipment); chapter 8 (Stationary LNG Storage); chapter 9 (Vaporization Facilities); chapter 10 (Piping System and Components); chapter 11 (Instrumentation and Electrical Services); chapter 12 (Plant Facilities Design); chapter 13 (Impounding Area and Drainage System Design and Capacity); chapter 15 (Transfer Systems for LNG and Other Hazardous Materials); chapter 16 (Fire Protection, Safety, and Security); and sections 18.8 (Commissioning) and 18.11.13 (Corrosion Protection) of NFPA-59A (incorporated by reference, *see* § 193.9);

(2) ACI 304R, ACI 318, ACI 376; API Spec 6D, API Std 620, API Std 625, API Std 650, API Std 2510; ASCE/SEI 7; ASME B31.1, ASME B31.3, ASME B31.4, ASME B31.5, ASME B31.8, ASME BPVC; ASNT SNT-TC-1A; ASTM E84, ASTM E136, ASTM E2652; Standards of the Brazed Aluminum Plate-Fin Heat Exchanger Manufacturers Association; CGA 341, CGA S-1.3; CSA B51, CSA C22.1; ISA 12.27.01; NFPA 13, NFPA 14, NFPA 15, NFPA 20, NFPA 22, NFPA 24, NFPA 30, NFPA 37, NFPA 51B, NFPA 54, NFPA 58, NFPA 59, NFPA 68, NFPA 70, NFPA 72, NFPA 85, NFPA 86, NFPA 101, NFPA 110, NFPA 274, NFPA 496, NFPA 750, NFPA 1225, NFPA 5000; and UL 723, as described by NFPA 59A (all incorporated by reference, *see* § 193.9); and

(3) Any other chapter or section of NFPA 59A (incorporated by reference, *see* § 193.9) required in this part.

(c) The use of NFPA 59A pursuant to paragraph (b) of this section shall be subject to the following exclusions:

(1) NFPA 59A sections 8.2.1.1.1; 8.4.7.2.6; 13.13.3; 15.5 (design, construction, and installation requirements therein only); 15.8.7; and 18.11.13.3.3.1.

(2) NFPA 59A section 16.8.8 and any other operations and maintenance requirements located in chapters and sections of NFPA 59A.

(3) References to “approvals” in NFPA 59A sections 8.2.1.1.1 and 8.4.7.2.6(3).

(d) PHMSA shall consider operators to be in full compliance with physical security requirements in this subpart on provision of documentation generated by the U.S. Coast Guard verifying compliance of Federal Energy Regulatory Commission (FERC)-certificated LNG import and export facilities only with the requirements of 33 CFR part 105, subparts C and D.

§ 193.203 Plant design – Wind speed.

Buildings, structures, and systems must have a basic design wind speed in compliance with NFPA 59A (incorporated by reference, *see* § 193.9) and the following:

(a) Buildings, structures, and systems that are either Classification A or B at FERC-certificated LNG import and export facilities must be designed to a wind speed based on a 10,000-year mean occurrence interval.

(b) All other buildings, structures, and systems must be designed to a wind speed based on NFPA 59A and ASCE/SEI 7 (incorporated by reference, *see* § 193.9) as described by NFPA 59A.

§ 193.205 Vaporizers: Isolation valves.

Each manifolded vaporizer must have both inlet and outlet isolation valves.

§ 193.207 Impoundment structural requirements.

Each impoundment, in addition to pertinent requirements in NFPA 59A (incorporated by reference, *see* § 193.9), must be designed and constructed to prevent impairment of the reliability and structural integrity of the system after considering:

(a) The imposed loading from the impingement of the trajectory of an LNG jet discharged at any predictable angle.

(b) The erosive action from a spill, including jetting of spilling LNG, and any other anticipated erosive action including surface water runoff, ice formation, dislodgement of ice formation, and snow removal.

(c) If applicable, the potential impact and loading on the dike due to:

(1) The collapse of the component or item served or adjacent components; and

(2) If the LNG facility adjoins the right-of-way of any highway or railroad, collision by or explosion of a train, tank car, or tank truck that could reasonably be expected to cause the most severe loading.

§ 193.209 Water removal from impounding areas.

(a) Impoundment areas must be constructed and maintained such that all areas drain completely to prevent water collection. Drainage pumps and piping must be provided to remove water from collecting in the impoundment area.

(b) For rainfall amounts used in determining the adequacy of water removal system capacity, operators must use the Precipitation Frequency Data Server, accessible at https://hdsc.nws.noaa.gov/pfds/.

§ 193.211 Non-destructive examinations (NDE) for components with hazardous fluids.

The butt welds in metal shells of storage tanks with internal design pressure above 15 psig must be nondestructively examined in accordance with the ASME BPVC (incorporated by reference, *see* § 193.9), except that 100 percent of welds that are both longitudinal (or meridional) and circumferential (or latitudinal) of hydraulic load bearing shells with curved surfaces that are subject to cryogenic temperatures must be nondestructively examined in accordance with the ASME BPVC.

Subpart D—Permanent, Small-scale LNG Facilities

§ 193.301 Small-scale LNG facilities.

Operators satisfying the eligibility criteria in chapter 17 of NFPA 59A (incorporated by reference, *see* § 193.9) may, instead of the requirements of subpart B of this part and §§ 193.201 and 193.401, comply with the entirety of the requirements in chapter 17.

Subpart E—Operations and Maintenance

§ 193.401 Scope.

(a) Operators must, in addition to the requirements of this subpart, comply with the operation and maintenance requirements within each of the following:

(1) NFPA 59A (incorporated by reference *see* § 193.9) section 4.6 (management of change), chapter 16 (Fire Protection, Safety, and Security); and chapter 18 (Operating, Maintenance, and Personnel Training);

(2) API 510, API RP 576; ASME B31.3; ASNT SNT-TC-1A; NB 23; NFPA 13, NFPA 14, NFPA 15, NFPA 20, NFPA 22, NFPA 24, NFPA 51B, NFPA 56, NFPA 68, NFPA 72, NFPA 101, NFPA 600, NFPA 750, and NFPA 1225, as described by NFPA 59A (all incorporated by reference, *see* § 193.9); and

(3) Any other chapter or section of NFPA 59A (incorporated by reference, *see* § 193.9) required by this part.

(b) The use of NFPA 59A pursuant to paragraph (a) of this section shall exclude NFPA 59A section 18.9.7 (Marine Shipping and Receiving) and any design, construction, installation, and initial testing requirements within NFPA 59A chapters 16 (Fire Protection, Safety, and Security) and 18 (Operating, Maintenance, and Personnel Training).

§ 193.403 Purging.

Each operator must, in addition to the requirements of NFPA 59A chapter 18 (incorporated by reference, *see* § 193.9), purge components that could accumulate significant amounts of combustible mixtures in accordance with the following requirements:

(a) Chapters 1, 2, and 6 in the American Gas Association Purging Manual, (incorporated by reference, *see* § 193.9); and

(b) Cleaning, drying, purging, and tightness testing must be conducted using an inert or nonflammable nontoxic medium or mechanical means unless another medium has been authorized only by special permit pursuant to § 190.341 of this subchapter.

§ 193.405 Communication systems.

Each operator of an LNG plant must, in addition to pertinent requirements in NFPA 59A (incorporated by reference, *see* § 193.9):

(a) Have a primary communication system that provides for oral communications between all operating personnel in the LNG plant.

(b) Have, for each LNG plant in excess of 264,000 gallons (1,000 liters) storage capacity, an emergency communication system that provides for oral 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 section 16.8.4 of NFPA 59A (incorporated by reference, *see* § 193.9).

§ 193.407 Maintenance procedures.

Each operator of an LNG facility must, in addition to pertinent requirements in NFPA 59A (incorporated by reference, *see* § 193.9):

(a) Include in the manual required by this subpart instructions enabling personnel who perform operation and maintenance activities to recognize conditions that potentially may be safety-related conditions that are subject to the reporting requirements of § 191.23 of this subchapter.

(b) Prepare and follow written repair procedures that provide safety of personnel and property during alteration or repair activity in accordance with this part and NFPA 59A chapter 18 (incorporated by reference, *see* § 193.9), which include procedures for the following:

(1) A technique, in addition to isolation valves, to ensure that the work area does not contain hazardous fluids, such as removing spool pieces or valves and blank flanging the piping, or double block and bleed valving; and

(2) De-energizing and locking out connected machinery and electrical equipment while repairs are being made.

§ 193.409 Personnel qualifications and training.

Each operator must, in addition to pertinent requirements in NFPA 59A (incorporated by reference, *see* § 193.9), ensure:

(a) Training records include, for each of their personnel, their name, job title, and job responsibilities of each person, identification of tasks each person is trained to perform, the date(s) of current training for each of those tasks, and the training methods employed;

(b) All LNG facility personnel involved in operations and maintenance activity receive training to provide first-aid; and

(c) All LNG facility personnel involved in operations and maintenance activities, including immediate supervisors and contractors, must be trained to recognize and report safety related conditions that are subject to part 191 of this subchapter.

§ 193.411 Control systems for fire protection systems.

Each operator must, in addition to pertinent requirements in NFPA 59A (incorporated by reference, *see* § 193.9), inspect and test fire protection control systems at intervals not to exceed every six months.

§ 193.413 Physical security.

PHMSA shall consider operators to be in full compliance with physical security requirements in this subpart on provision of documentation:

(a) Generated by the U.S. Coast Guard verifying compliance of FERC-jurisdictional LNG import and export facilities only with the requirements of 33 CFR part 105, subparts C and D; or

(b) Generated by, or by agencies within, the Department of Homeland Security verifying compliance of any other facility with applicable content in regulations, security directives, or guidance related to the physical security of pipeline facilities issued pursuant to authority under the Aviation and Transportation Security Act, Pub. L. 107-71.

Subpart F—Risk-based Operations and Maintenance

§ 193.501 Scope.

LNG facilities subject to the jurisdiction of the Federal Energy Regulatory Commission may establish a risk-based program pursuant to the requirements of this subpart as an alternative to operations and maintenance requirements of subpart E of this part other than those pertaining to the following:

(a) Physical security; and

(b) Emergency procedures governing coordination of emergency awareness and response actions by facility personnel and the public in sections 18.4.4, 18.4.5, 18.4.7, and 18.4.8 of NFPA 59A (incorporated by reference, see § 193.9).

§ 193.503 Program content requirements.

An operator electing this subpart must develop and follow a written program pursuant to the Center for Chemical Process Safety's Guidelines for Hazard Evaluation Procedures (incorporated by reference, *see* § 193.9) and containing the elements described in paragraphs (a) through (k) of this section:

(a) *Employee participation*. Operators shall provide for participation by their personnel and their representatives as required by this paragraph (a):

(1) Operators shall consult with their personnel and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this section.

(2) Operators shall provide to their personnel and their representatives access to process hazard analyses and to all other information required to be developed by this section.

(b) *Process safety information*. Operators shall compile written process safety information before conducting any process hazard analysis required by the section, including information pertaining to:

(1) Hazards of the hazardous fluids used or produced (*e.g.*, toxicity information; permissible exposure limits; physical data; reactivity data; corrosivity data; thermal and chemical stability data; and hazardous effects of inadvertent, reasonably foreseeable mixing);

(2) Technology of the process (*e.g.*, block flow diagrams; process chemistry; inventory limits; and evaluation of consequences from deviations); and

(3) Equipment in the process (*e.g.*, materials of construction; piping and instrumentation drawings; electrical classification; safety systems and their bases; ventilation system design; design codes and standards; material energy balances) along with documentation that equipment either:

(i) Complies with recognized and generally accepted good practices; or

(ii) In the case of existing equipment, was designed and constructed in accordance with codes, standards, or practices that are no longer in general use, but which the operator has determined and documented is designed, maintained, inspected, tested, and operating in a safe manner.

(c) *Process hazard analysis.* (1) The operator shall perform an initial process hazard analysis (PHA) on processes covered by this section. The PHA shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the event of an accidental release of hazardous fluids that could result in an incident. PHAs conducted in connection with FERC review of a certificate application for an LNG facility that meet the requirements of this paragraph (c) are acceptable as initial PHAs.

(2) Operators shall use one or more of the following PHA methods: What-If; checklist; HAZOP, FMEA; Fault Tree Analysis; or an appropriate equivalent.

(3) The PHA shall address the following: hazards of the processes employed; facility siting; identification of pertinent previous incidents; human factors; applicable design and

administrative controls, along with the potential consequences of failure of those controls; and a qualitative evaluation of possible safety and health effects of failure of controls.

(4) The process hazard analysis shall be performed by a team with expertise in engineering and process operations, and the team shall include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be knowledgeable in the specific process hazard analysis methodology being used.

(5) The operator shall establish a system to address the team's findings and recommendations promptly; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

(6) At least every 5 years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated by a team meeting the requirements in paragraph (c)(4) of this section, to assure that the process hazard analysis is consistent with the current process.

(7) Operators shall retain process hazards analyses and updates or revalidations for each process covered by this section, as well as the documented resolution of recommendations described in paragraph (c)(5) of this section for the life of the process.

(d) *Operating procedures.* (1) The operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements:

(i) Steps for each operating phase including initial startup; normal operations; abnormal operations; emergency shutdown including the conditions under which emergency shutdown is

required, and the assignment of shutdown responsibility to qualified personnel to ensure that emergency shutdown is executed in a safe and timely manner; emergency operations; cooldown; normal shutdown; and, startup following a planned shutdown, or after an emergency shutdown.

(ii) Operating limits, including consequences of deviation, and steps required to correct or avoid deviation.

(iii) Safety and health considerations including properties of, and hazards presented by, the hazardous fluids used in the process; precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment; control measures to be taken if physical contact or airborne exposure occurs; quality control for raw materials and control of hazardous fluid inventory levels; and any special or unique hazards.

(iv) Safety systems and their functions.

(2) Operating procedures shall be readily accessible to personnel who work in or maintain a process.

(3) The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to facilities. The operator shall certify annually that these operating procedures are current and accurate.

(4) The operator shall develop and implement safe work practices to provide for the control of hazards during operations such as lockout/tagout; confined space entry; opening process equipment or piping; and control over entrance into a facility by maintenance, contractor, laboratory, or other support personnel. These safe work practices shall apply to operator and contractor personnel.

(e) *Training*—(1) *Initial training.* Operator personnel presently involved in operating a process, and personnel before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in paragraph

(d) of this section. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks. In lieu of initial training for those personnel already involved in operating a process as of [EFFECTIVE DATE OF THE FINAL RULE], an operator may certify in writing that each of its personnel has the required knowledge, skills, and abilities to carry out safely the duties and responsibilities as specified in the operating procedures.

(2) *Refresher training*. Refresher training shall be provided at least every three years, and more often if necessary, to personnel involved in operating a process to assure that each understands and adheres to the current operating procedures of the process. The operator, in consultation with the personnel involved in operating the process, shall determine the appropriate frequency of refresher training.

(3) *Training documentation.* The operator shall ascertain that each of its personnel involved in operating a process has received and understood the training required by this paragraph (e). The operator shall prepare a record which contains the identity of each of its personnel, the date of training, and the means used to verify that the personnel understood the training.

(f) *Contractors*—(1) *Application*. This paragraph (f) applies to operations or maintenance activity performed by contractors on or adjacent to a covered process. It does not apply to contractors' provision of incidental services which do not influence process safety, such as janitorial, food and drink, laundry, delivery or other supply services.

(2) *Operator responsibilities*. (i) The operator, when selecting a contractor, shall obtain and evaluate information regarding the contractor's safety performance and programs.

(ii) The operator shall inform contract operators of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process.

(iii) The operator shall explain to contractor the applicable provisions of the emergency procedures required under subpart E of this part.

(iv) The operator shall develop and implement safe work practices consistent with this section, to control the entrance, presence and exit of contractors and contractor personnel in covered process areas.

(v) The operator shall ensure contractor personnel are trained in the work practices necessary to perform their jobs safely.

(vi) The operator shall ensure contractor personnel are instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.

(vii) The operator shall ensure the contractor has documented that each of its personnel has received and understood the training required by this paragraph (f), and has prepared a record which contains the identity of its personnel, the date of training, and the means used to verify that each of its personnel understood the training.

(viii) The operator shall assure that all contractor personnel follow the safety rules of the facility including the safe work practices required under this section.

(ix) The operator shall ensure that the contractor advises it of any unique hazards presented by the contractor personnel's work, or of any hazards found by the contractor personnel's work.

(g) *Pre-startup safety review*. (1) The operator shall perform a pre-startup safety review for new facilities and for modified facilities when the modification requires a change in the process safety information.

(2) The pre-startup safety review shall confirm that prior to the introduction of hazardous fluids to a process:

(i) Construction and equipment is in accordance with design specifications;

(ii) Safety, operating, maintenance, and emergency procedures are in place and are adequate;

(iii) For new facilities, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; and modified facilities meet the management of change requirements contained in paragraph (k) of this section.

(iv) Training of personnel involved in operating a process has been completed.

(h) *Mechanical integrity*—(1) *Application*. Paragraphs (h)(2) through (5) of this section apply to the following process equipment:

(i) Pressure vessels and storage tanks;

(ii) Piping systems (including piping components such as valves);

(iii) Relief and vent systems and devices;

(iv) Emergency shutdown systems;

(v) Controls (including monitoring devices and sensors, alarms, and interlocks); and

(vi) Pumps.

(2) *Written procedures*. The operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.

(3) *Training for process maintenance activities*. The operator shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the personnel's job tasks to assure that personnel can perform the job tasks in a safe manner.

(4) *Inspection and testing*. (i) Inspections and tests shall be performed on process equipment.

(ii) Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.

(iii) The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience.

(iv) The operator shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.

(5) *Equipment deficiencies*. The operator shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in paragraph (b) of this section) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

(i) *Hot work permit*. (1) The operator shall issue a hot work permit for hot work operations conducted on or near a covered process.

(2) The permit shall document that the fire prevention and protection requirements in this part have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations.

(j) *Management of change*. (1) The operator shall establish and implement written procedures to manage changes (except for "in-kind" replacements) to process chemicals, technology, equipment, and procedures; and, changes to facilities that affect a covered process.

(2) The procedures shall assure that the following considerations are addressed prior to any change:

(i) The technical basis for the proposed change;

(ii) Impact of change on safety and health;

(iii) Modifications to operating procedures;

(iv) Necessary time period for the change; and,

(v) Authorization requirements for the proposed change.

(3) Operator personnel involved in operating a process and maintenance and contractor personnel whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process.

(4) If a change covered by this paragraph (j) results in a change in the process safety information required by paragraph (b) of this section, such information shall be updated accordingly.

(5) If a change covered by this paragraph (j) results in a change in the operating procedures or practices required by paragraph (d) of this section, such procedures or practices shall be updated accordingly.

(k) *Compliance audits*. (1) Operators shall certify that they have evaluated compliance with the provisions of this section at least every three years to verify that the procedures and practices developed under this section are adequate and are being followed.

(2) The compliance audit shall be conducted by at least one person knowledgeable in the process.

(3) A report of the findings of the audit shall be developed.

(4) The operator shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected

(5) Operators shall retain the two (2) most recent compliance audit reports.

§ 193.505 Implementation plans.

(a) Operators electing this subpart shall submit for PHMSA review and approval pursuant to implementation plans under § 190.9 of this subchapter, copying the Federal Energy Regulatory Commission, the Department of Homeland Security, and each cognizant Coast Guard

Captain of the Port (COTP). PHMSA shall review, and either deny or approve, each plan within 30 calendar days from receipt; plans not approved within 30 days shall be deemed denied.

(b) Implementation plans shall set forth, on a process-by-process, system-by-system, or an organization-by-organization basis, intermediate and final milestones specifying work streams and dates for an operator's transition to compliant operations and maintenance programs under this subpart.

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Paul Roberti,

Administrator.

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