

Section PS-REQUIREMENTS

Rev. 2, 06/11/2025

Attachment REQ-4, Piping Code and Regulation Application
RECORD OF REVISIONS

Rev	Date	Description	POC	RM
0	9/17/14	Initial issue as Section ASME – New ASME System Requirements, Attachment ASME-1 – Code and Regulation Application	Ari Ben Swartz, <i>ES-EPD</i>	Larry Goen, <i>ES-DO</i>
1	9/22/23	Updated for 10CFR851 2018 Tech Amendment. Redesignated REQ-4.	Ari Ben Swartz, <i>ES-FE</i>	Dan Tepley, <i>ES-DO</i>
2	06/11/2025	Updated summary of B31.1 to include examples.	Ari Ben Swartz, <i>ES-OPS</i>	Michael Richardson, <i>ES-DO</i>

Contact the Standards point of contact (POC) for upkeep, interpretation, and variance issues.

Chapter 17	<u>Pressure Safety POC</u> (LANL internal)
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This document is online at <https://engstandards.lanl.gov>

This attachment contains paraphrased piping code and regulation scope summaries with discussion of how these mandates shall be applied at Los Alamos National Laboratory (LANL). It also reflects the latest revision of 10CFR851, which includes a [Technical Amendment](#) made effective on January 17, 2018.

The code editions in the table below reflect the latest edition at the time of issuance of this attachment. The edition of the piping codes required by 10CFR851 Appendix A Part 4, *Pressure Safety*, are older editions. LANL chooses to utilize the latest effective edition of the code for each project.

Section PS-REQUIREMENTS

Rev. 2, 06/11/2025

Attachment REQ-4, Piping Code and Regulation Application

<p>B31.1 Power Piping (2024)</p> <p>This Code prescribes minimum requirements for the design, materials, fabrication, erection, test, inspection, operation, and maintenance of piping systems typically found in electric power generating stations, industrial and institutional plants, geothermal heating systems, and central and district heating and cooling systems. It also covers boiler-external piping for power boilers and high temperature, high pressure water boilers in which steam or vapor is generated at a pressure of more than 15 psig; and high temperature water is generated at pressures exceeding 160 psig and/or temperatures exceeding 250 deg. F.</p> <p>American Society of Mechanical Engineers (ASME) B31.1 Paragraph 100.1.3 provides exclusions to the scope of the code.</p> <p>ASME B31.1 is most commonly applied at LANL for centralized steam distribution piping and for Boiler External Piping of ASME Boiler and Pressure Vessel Code (BPVC) Section I boilers.</p> <p>Examples of applying B31.1 at LANL include the TA03-0022 steam plant complex (including distribution system as defined UIDO-AGMT-001 Utilities, Traffic, and Open Space Interface Agreement.), and TA09, TA16, and TA55 ASME BPVC Section I boiler external piping.</p>	<p>ASME B31.3 Paragraph 300.1.3 provides exclusions to the scope of the code.</p> <p>At LANL, ASME B31.3 is most commonly applied for process fluids, laboratory fluids, flammable fluids, toxic fluids, and radioactive fluids. Generally, this Code is used for any pressure system in which the other ASME B31 or NFPA piping codes in this document do not apply.</p>
<p>B31.2 Fuel Gas Piping</p> <p><i>10CFR851 does not require this code. This code has been withdrawn and replaced by NFPA 54, National Fuel Gas Code.</i></p>	<p>B31.4 Pipeline Transportation Systems for Liquids and Slurries (2022)</p> <p><i>LANL does not apply this code because there are no known or expected systems within its scope.</i></p>
<p>B31.3 Process Piping (2024)</p> <p>This Code applies to piping for all fluids, including:</p> <ol style="list-style-type: none"> (1) Raw, intermediate, and finished chemicals (2) Petroleum products (3) Gas, steam, air, and water (4) Fluidized solids (5) Refrigerants (6) Cryogenic fluids <p>Applies to Design Pressure greater than 15 psig or, regardless of pressure, if the fluid is flammable, toxic, or damaging to human tissues as defined in ASME B31.3 paragraph 300.2 or the design temperature is outside the range of –29°C (–20°F) through 186°C (366°F). Toxic is defined as a Category M fluid.</p>	<p>B31.5 Refrigeration Piping and Heat Transfer Components (2019)</p> <p>This Code prescribes requirements for the materials, design, fabrication, assembly, erection, test, and inspection of refrigerant, heat transfer components, and secondary coolant piping for temperatures as low as –320°F (–196°C), whether erected on the premises or factory assembled, except as specifically excluded by ASME B31.5 Paragraph 500.1.1.</p> <p>ASME B31.5 is most commonly applied at LANL for field-installed refrigerant piping routed between refrigeration equipment for HVAC or other refrigeration processes.</p>
	<p>B31.8 Gas Transmission and Distribution Piping Systems (2022)</p> <p><i>Note: These systems are also required to meet 49 CFR Part 192 Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards.</i></p>
	<p>This Code covers the design, fabrication, installation, inspection, and testing of pipeline facilities used for the transportation of gas. This Code also covers safety aspects of the operation and maintenance of those facilities. (See B31.8 Mandatory Appendix Q for scope diagrams.)</p> <p>ASME B31.8 Paragraph 802.1(b) provides exclusions to the scope of this code.</p> <p>At LANL, ASME B31.8 is most commonly applied (in conjunction with 49CFR192, see below) to LANL’s Natural Gas Distribution utility system that provides natural gas service to LANL facilities.</p>

Section PS-REQUIREMENTS

Rev. 2, 06/11/2025

Attachment REQ-4, Piping Code and Regulation Application

<p>B31.8S Managing System Integrity of Gas Pipelines (2022)</p> <p>This Code applies to onshore pipeline systems constructed with ferrous materials and that transport gas. The principles and processes embodied in integrity management are applicable to all pipeline systems.</p> <p>This Code is specifically designed to provide the operator (as defined in B31.8S Section 13) with the information necessary to develop and implement an effective integrity management program utilizing proven industry practices and processes. The processes and approaches within this Code are applicable to the entire pipeline system.</p> <p>ASME B31.8S is considered a supplemental Code to ASME B31.8. It is not a piping design Code.</p>	<p>B31.12 Hydrogen Piping and Pipelines (2023)</p> <p>This code is not required by 10CFR851 Appendix A. At LANL, use of this code is considered optional.</p> <p>IP (industrial piping) Rules for this Part have been developed for hydrogen service included in petroleum refineries, refueling stations, chemical plants, power generation plants, semiconductor plants, cryogenic plants, hydrogen fuel appliances, and related facilities.</p> <p>B31G Manual for Determining Remaining Strength of Corroded Pipelines (2023)</p> <p>This document is intended solely for the purpose of providing guidance in the evaluation of metal loss in pressurized pipelines and piping systems. It is applicable to all pipelines and piping systems within the scope of the transportation pipeline codes that are part of ASME B31 Code for Pressure Piping, namely: ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids; ASME B31.8, Gas Transmission and Distribution Piping Systems; ASME B31.11, Slurry Transportation Piping Systems; and ASME B31.12, Hydrogen Piping and Pipelines, Part PL. Where the term <i>pipeline</i> is used, it may also be read to apply to piping or pipe conforming to the acceptable applications and within the technical limitations discussed below.</p> <p>ASME B31G is not a piping design Code.</p>
<p>B31.9 Building Services Piping (2020)</p> <p>This Code Section has rules for the piping in industrial, institutional, commercial, and public buildings, and multi-unit residences, which does not require the range of sizes, pressures, and temperatures covered in B31.1 or B31.3.</p> <p>ASME B31.9 Paragraph 900.1.2 provides a detailed description of fluid services, piping material and sizes, pressure limits, and temperature limits within the scope of the Code. Paragraph 300.1.3 provides exclusions to the scope of the code.</p> <p>At LANL, ASME B31.9 is most commonly applied for common building services such as:</p> <ol style="list-style-type: none"> (1) Facility steam and condensate piping less than 150 psig (2) Hydronic piping (e.g., heating water, chilled water, tower water) (3) Compressed air piping less than 150 psig 	
<p>B31.11 Slurry Transportation Piping Systems</p> <p><i>Withdrawn, superseded by B31.4.</i></p>	

Section PS-REQUIREMENTS

Rev. 2, 06/11/2025

Attachment REQ-4, Piping Code and Regulation Application

49 CFR Part 192 Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (check the eCFR website for the latest revision)

NOTE: These systems are also required to meet B31.8

This Part prescribes minimum safety requirements for pipeline facilities and the transportation of gas, including pipeline facilities and the transportation of gas within the limits of the outer continental shelf.

(b) This Part does not apply to offshore gathering of gas in State waters; pipelines on the Outer Continental Shelf (OCS); onshore gathering of gas through a pipeline that operates at less than 0 psig, through a pipeline that is not a regulated onshore gathering line, and within inlets of the Gulf of Mexico; any petroleum gas or petroleum gas/air mixtures only pipeline to fewer than 10 customers, if no portion of the system is located in a public place; or a single customer, if the system is located entirely on the customer's premises (no matter if a portion of the system is located in a public place).

NFPA 54 National Fuel Gas Code (2021)

NOTE: NFPA 54 systems are required to meet ESM Chapter 17 due to New Mexico Administrative Code requiring the use of this code.

NFPA 54 provides requirements for the design, fabrication, installation, testing, operation, and maintenance of piping systems from the point of delivery to the connections with each gas utilization device. NFPA 54 also covers requirements for the installation of gas utilization equipment, related accessories, and their ventilation and venting systems. NFPA 54 covers both gaseous and liquefied forms of fuel gas within specified pressure limitations.

Chapter 1 *Administration* of NFPA 54 details the scope/applicability (including what is *not* in the scope), required references to other standards, rules regarding retroactive application, and rules for the authority having jurisdiction applying code equivalency and enforcement.

NFPA 54 is applied at LANL exclusively to the design of natural gas systems from the exit of the service meter assembly (or, where no meter is provided, the outlet of the service regulator or

service shutoff valve). This is commonly referred to as "Facility Natural Gas" service.

Items before and including the low-pressure manifold are in the scope of ASME B31.8/49CFR192.

NFPA 58 Liquefied Petroleum Gas Code (2020)

NOTE: NFPA 58 systems are required to meet ESM Chapter 17 due to New Mexico Administrative Code requiring the use of this code.

NFPA 58 provides requirements for the design, construction, installation, and operation of liquefied petroleum gas (LP-Gas) systems. The scope of this code is broader than the LP-Gas scope of NFPA 54.

NFPA 58 has not historically been applied to piping system designs at LANL; existing LP-Gas systems are likely to have been designed to ASME B31.3. For some LP-Gas pressure systems, applying NFPA 58 (or NFPA 54, within its scope) may simplify the pressure system design. For example, commonly used fuel gas system components may not be constructed to listed standards in ASME B31.3 but are in the NFPA codes.