

Conduct of Engineering Request for Variance or Alternate Method

To display the *VAR Request Metadata* pane for this document, click **File > Info > Properties > Show Document Panel.**

1.0 General

1.1 Document Number: VAR-10545		1.2 Revision: 0					
1.3 Brief Descriptive Title: Application of NFPA 54 and NFPA 58 to Fuel Gas (ESM Chapter 17)							
1.4 Affected Program: Engineering Standards		1.5 Request Type: Alternate Method					
1.6a Affected Tech Area 99		1.6b Affected Buildings Sitewide					
1.7 Requestor: Swartz, Ari Ben Organization: ES-EPD							
1.8 Revision History <table border="1"> <thead> <tr> <th>Revision Number</th> <th>Changes and Comments</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Initial issue.</td> </tr> </tbody> </table>				Revision Number	Changes and Comments	0	Initial issue.
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0	Initial issue.						

2.0 Affected Conduct of Engineering Program/Documents

2.1 Affected "P" Document: P342 Engineering Standards If against the P document itself, revision (or N/A): N/A		2.2 Subordinate or related document(s) [AP, master spec, LANL ESM chapter & section; or code, Order, standard, etc.]: Document Title/No.: LANL Engineering Standards Manual STD-342-100 Chapter 17, Pressure Safety, Section ASME - New ASME System Requirements, Attachment ASME - 1 – Code and Regulation Application Revision 0 Document Title/No.: LANL Engineering Standards Manual STD-342-100 Chapter 17, Pressure Safety, Section GEN – General Requirements, Attachment GEN-2 – Exclusions from Program Revision 0.1 Document Title/No.: Enter text.. Revision Enter text..	
2.3 Section/Paragraph: B31.2; B31.3			
2.4 Specific Requirement(s) as Written in the Document(s): B31.2 Fuel Gas Piping LANL does not follow this code. This code has been withdrawn and replaced by NFPA 54, National Fuel Gas Code. The authority having jurisdiction of NFPA 54 is the DOE/LANL Fire Marshal.			

B31.3 Process Piping

Pressure greater than 15 psig or if the fluid is flammable, toxic, or damaging to human tissues as defined in ASME B31.3 300.2 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. Category M fluids are identified in ESM Chapter 17 Att. II-4.

2.5 Contractual, preference, or other basis for requirement in 2.4:

LANL's approach to meeting 10 CFR 851 Attachment A, paragraph 4, Pressure Safety

2.6 Type of VAR from ESM Chap 1, Z10 [*Applies only to standards variances*)]

Type 2

2.7 Discipline

Pressure Safety

3.0 Request Information & Comments

3.1 NCR required (work has occurred)? No

If Yes, NCR Number: [Enter text.](#)

3.2 System/Component Affected

OpSystem Acronym & Name UFS - Utilities Fuel Supply

System Number or Name NG

3.3 Highest ML Level

ML-4

3.4 Proposal with Justification/Compensatory Measures:

[Enter text...](#)

Proposal

Require application of NFPA 54 for natural gas from the outlet of the secondary distribution system (ASME B31.8/49CFR192) to the appliance.

Require application of either ASME B31.3 or NFPA 58 as determined by the Designer for liquefied petroleum gas (LPG) pressure systems.

- NFPA 54/ANSI Z223.1, National Fuel Gas Code
- NFPA 58, Liquefied Petroleum Gas Code

ESM Chapter 17, Attachment ASME - 1 – Code and Regulation Application, is changed to read:

B31.2 Fuel Gas Piping LANL does not follow this code. This code has been withdrawn and replaced by NFPA 54 *National Fuel Gas Code*.

NFPA 54 pressure systems are required to meet ESM Chapter 17.

ESM Chapter 17, Attachment GEN-2, Exclusions from Program, is changed to read:

NFPA codes under the oversight of Fire Protection AHJ or the Electrical Safety AHJ are excluded from pressure safety program. Some examples are fire suppression systems covered by NFPA 13, *Standard for the Installation*

of Sprinkler Systems; NFPA 14, Standard for the Installation of Standpipe and Hose Systems; and NFPA 70E, Standard for Electrical Safety in the Workplace.

Code editions:

For new systems, the NFPA edition should correspond to the driving code (Uniform Mechanical or Plumbing Code; UMC or UPC), thus NFPA 54/ANSI 223.1-2012 and NFPA 58-2014 as a minimum. *Guidance: Newer editions should be used if doing so will not conflict with direction in (intent of) the UMC or UPC.*

For existing systems, refer to ESM Chapter 1, Z10 regarding code of record. (For example, Pressure System 4471, *Propane Burn System for Flash Pad*, where excess high explosives are burned, might have used NFPA 58-2014 or previous edition depending on year designed and may be maintained to same editions).

Background/Justification

The AHJ for Fire Protection agreed that application of NFPA 54 and NFPA 58 should reside in ESM Chapter 17, *Pressure Safety*.

The new scope for ESM Chapter 17, *Pressure Safety*, is the inclusion of NFPA 54 natural gas systems from the outlet of the secondary distribution system (ASME B31.8/49CFR192) to the appliance and the inclusion of NFPA 58 as an option for LPG pressure systems.

It is clear that 10CFR851 Attachment A, Paragraph 4, (b)(2)(ii) requires use of ASME B31.3 where applicable:

(b) Contractors must ensure that all pressure vessels, boilers, air receivers, and supporting piping systems conform to: ...

(2) The applicable ASME B31 code for pressure piping as indicated in this paragraph; and or as indicated in paragraph (b)(3) of this section: ...

(ii) B31.3-2014, *Process Piping* (incorporated by reference, see § 851.27).

It is also the case that ASME B31.3 includes petroleum products:

300.1.1 Content and Coverage

(b) This Code applies to piping for all fluids, including

(1) raw, intermediate, and finished chemicals

(2) petroleum products

(3) gas, steam, air, and water

(4) fluidized solids

(5) refrigerants

(6) cryogenic fluids

When ASME B31.2 was removed from 10 CFR 851 as a reference, the follow-on code NFPA 54 was not incorporated into ESM Chapter 17. It was left under ESM Chapter 6, *Mechanical*, and mistakenly thought to be monitored by the Fire Protection AHJ. This change corrects that omission by including building natural gas systems into ESM Chapter 17.

The application of NFPA 54 building-type codes instead, 10CFR851 Appendix A, Paragraph 4.b 3 must be followed:

(b) Contractors must ensure that all pressure vessels, boilers, air receivers, and supporting piping systems conform to:"

(3) The strictest applicable state and local codes.

The allowance to apply NFPA 58 also comes from the same 10CFR851 Appendix A, Paragraph 4.b 3. It is considered as an equivalent code to ASME B31.3 for the LP. However, the design is required to use either B31.3 or NFPA 58 for the LPG pressure system based the recommendation of the Designer.

This leads to meeting the New Mexico Administrative Code (Plumbing and Mechanical Codes), that are based on the IAPMO Uniform Plumbing and Mechanical Codes (UPC and UMC). These codes reference NFPA 54 and NFPA 58 as described in the **Proposal** paragraph above.

3.5 Attachments

Document Title or Description [Additional Code Citations and Excerpts \(Reference Material\)](#)

3.6a Project ID

N/A

3.6b: Project Name

N/A

3.6c: Code of Record Date

N/A

3.7 Duration:

Lifetime

3.8a If Finite Period, Start Date:

[Click to enter a date.](#)

3.8b End Date:

[Click to enter a date](#)

3.8c Provide the PFITS number for tracking removal/correction: [\[PFITSNum\]](#)

3.9 USQD/USID required (Nuclear, High/Mod Hazard)? **No**

If Yes, USQD/USID Number [Click here to enter text.](#)

3.10 QA Review for process change matters potentially affecting LANL's NQA-1 implementation

Is a QPA Determination required?: **No** If **Yes**, then: [Choose an item.](#)

QPA Comments: [Enter text..](#)

3.11 POC Determination: **Accept**

POC Comments: [Enter text..](#)

3.12 Management Program Owner's (SMPO) Approval for P341 and APs; P342, ESM, ML-1 and -2, and Contract Matters; and P343

SMPO Determination: **Accept**

Comments: [Enter text..](#)

4.0 Participant Signatures **NOTE:** DO NOT ADD NAMES FROM WITHIN WORD! [Save and close the form first](#), then do 1-4 below:

1. From the SharePoint library, select the document, then click the **ellipsis (...)** in the second column; a small dialog appears
2. In the small dialog click the **ellipsis** again
3. Click **Edit Properties** and check out the document if prompted to Enter names using the controls provided, then **Save**

4.1 POC (Management Program Owner's Representative):

Swartz, Ari Ben

Organization

ES-IPD

Signature

4.2 Facility Design Authority Representative [FDARName] FDAR signature not required <input checked="" type="checkbox"/>	Organization Enter text..	Signature
4.3 LANL Owning Manager (FOD or R&D/Program) [FODorPrgmMgrName] FOD or Program Manager signature not required <input checked="" type="checkbox"/>	Organization Enter text..	Signature
4.4 Quality Reviewer's Name: [QPAName] QPA review/signature not required <input checked="" type="checkbox"/>	Organization Enter text.	Signature
4.5 Safety or Security Management Program Owner's Approval for P341 and APs; P342, ESM and Contract Matters; and P343 Richardson, Michael Joseph SMPO signature not required (Type 1 variance) <input type="checkbox"/>	Organization ES-DO	Signature
4.6 Additional Signer 1 Apperson, Jason Wesley Pressure Safety Program Owner	Organization ES-DO	Signature
4.7 Additional Signer 2 [AdditionalSigner2] Role: Enter text.	Organization Enter text.	Signature
4.8 CoE Administrator Signature Leyba, Matthew <u>NOTE:</u> The CoE Admin is always the last signature placed on this document. The date of that signing is the date of this document.		