

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-10281, R1	1.2 Revision: 1						
1.3 Brief Descriptive Title: Certification of Pressure Systems							
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> <tr> <td>1</td> <td>Revised proposal's definition and justification</td> </tr> </tbody> </table>		Revision Number	Changes and Comments	0	Initial issue.	1	Revised proposal's definition and justification
Revision Number	Changes and Comments						
0	Initial issue.						
1	Revised proposal's definition and justification						

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.: Engineering Standards Manual Chapter 17, Pressure Safety, Section GEN-1 – Definitions and Acronyms Revision 1 Document Title/No.: Section ADMIN-1, Administrative, Requirements Revision 1 Document Title/No.: Enter text.. Revision Enter text..
2.3 Section/Paragraph: GEN-1 – Definitions and Acronyms, Certification; ADMIN-1 C. Pressure System Certification Process	
2.4 Specific Requirement(s) as Written in the Document(s): GEN-1: Certification: All requirements of this document have been met and CPSO or delegate has approved pressure system for use. Is not to be understood as an ASME or NBIC certification, it is only a permit to operate the pressure system, granted by the CPSO. ADMIN-1, Paragraph C: Pressure System Certification Process: Multiple chapter requirements.	
2.5 Contractual, preference, or other basis for requirement in 2.4:	

Certification is a self-imposed LANL method whereby a Pressure Safety Officer (PSO) and Chief Pressure Safety Officer review pressure system design, fabrication, testing and maintenance and determines whether it is satisfactory. .

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 N/A

System Number or Name N/A

3.3 Highest ML Level

ML-3

3.4 Proposal with Justification/Compensatory Measures:

Proposal

This Alternative Method reduces the complexity of ESM Chapter 17 certification on a risk basis.

This Alternate Method is not applicable to pressure vessels, boilers, air receivers, and supporting piping systems.

Safety Class and Safety Significant (ML1/ML2) piping systems are required to meet ASME B31.3 in accordance with DOE O 420.1C, and are not included as part of this Alternative Method.

Justification

As stated in 2.5 above, certification is a self-imposed LANL requirement. Implementing this Alternate Method for ML-3 and ML-4 systems will allow for a reasonable level of review and documentation.

This Alternate Method is in consonance with ensuring that pressure systems are designed, fabricated, tested and inspected in accordance with 10 CFR 851.

Alternative Method

LANL is responsible for ensuring that all pressure vessels, boilers, air receivers, and supporting piping systems conform to the applicable ASME requirements. As stated previously, the purpose of 10 CFR 851 is to ensure the contractor is meeting the requirements for reducing/preventing occupational injuries, illnesses and accidental losses. As such, a contractor is required to conform to the applicable ASME requirements that mitigate occupational injuries, illnesses, and accidental loss. If the ASME Codes are not applicable to the pressure systems then the contractor is required to apply a system that provides an equal level of protection to the worker. The minimum documents necessary under this Alternate Method are attached in Attachment A for Research and Development (R&D) systems and Attachment B for all others (facility and other non-R&D)

A graded approach to the required documentation and approvals a pressure system requires has been created. The amount of documentation and approvals required depends on the risk. Managers, project managers, project engineers, or researchers may request additional required documentation and/or approvals by a PSO or CPSO. An overview of the process detailed in the attachments is below.

General

- Systems are in the Exempt subset of low risk if they are less than 1000 pound-foot of energy, nontoxic, nonflammable, not oxidizing, not corrosive, not steam, not cryogenic, not high temperature, not high pressure

as defined in ASME B31.3 Process Piping, and do not contain a piping component fabricated by LANL. Use Attachment C, System Energy Determination, to calculate energy based on component volume and pressure.

Facility and other Non-R&D Pressure Systems

- Facility and non-R&D pressure system work will continue to be performed as required by PD 340, *Conduct of Engineering and Configuration Management for Facility Work*. Specifically, the design is to meet the requirements of the Code of Record and the Owner's Inspector is required to ensure that the work is performed in accordance with the design. A PSO shall review the design to verify it meets the Code of Record. Changes to the design must be reviewed by the PSO.
- Low risk pressure systems are not required to be certified, but require Owner's Inspector approval.
- Medium risk pressure systems require only PSO review and certification (and Owner's Inspector approval). Attachment B tables show the risk levels as follows:
 - 1) Red Text – high risk
 - 2) Orange highlight – medium risk
 - 3) Yellow highlight – low risk
 - 4) Blue highlight – new low energy Exempt
- Only the highest risk facility systems require CSPO/DCPSO certification (and Owner's Inspector approval).

R&D Pressure Systems

Research and Development (R&D), per SD601/LANL Definition of Terms:

"Any creative systematic activity undertaken in order to increase the stock of knowledge, and the use of this knowledge to devise new applications" (after a definition used by the Organization for Economic Cooperation and Development and the United Nations Educational, Scientific and Cultural Organization [UNESCO]. See also SD601, Conduct of Research and Development, Section 9).

- R&D pressure system work including low risk R&D work will continue to be performed as required by PD 370 Conduct of Engineering for Research and Development (R&D); however, to ensure an equal level of protection, specific reviews are required to ensure safety.
- ASME codes are not applicable to true R&D pressure systems. An equivalent protection level, equal to or greater than the protection afforded by ASME Code, must include the following items:
 - 1) Design Drawings, sketches, and calculations must be reviewed and approved by a qualified independent design professional.
 - 2) Qualified personnel must be used to perform examinations and inspections of materials, in-process fabrications, nondestructive tests, and acceptance test.
 - 3) Documentation, traceability, and accountability must be maintained for each unique pressure vessel or system, including descriptions of design, pressure conditions, testing, inspection, operation, repair, and maintenance.
- For low risk pressure systems, the Researcher is required to have their pressure system reviewed by a PSO or the RLM will appoint a qualified Peer reviewer that has no conflict of interest.
- Moderate and high risk requires a PSO permit to operate; the Attachment A Form FM-R&D-REVIEW acts as the permit once signed. The PSO cannot be replaced by a Peer review. Att A Form FM-R&D-DOCS is a checklist for the documentation required for the PSO review. Forms will be webposted and users should use those, not the ones attached, as they will be revised for administrative improvements independently of VAR.
- R&D workers may perform the role of examiner and inspector. The examiner is the person that does the work, and the inspector is the person that verifies the work is adequate, for example the examiner would use the correct parts, and fabricate and test the system to be leak free, and the Inspector would verify as much of the work as necessary to ensure the work was done correctly. R&D workers are qualified on the basis of having a relevant technical degree from an accredited institution or equivalent experience (reference PD370 6.0 Training). The examination and inspection is recorded on Form FM-R&D-REVIEW.
- Low risk systems may be leak tested at operating pressure. Any other leak test must be approved by a PSO to ensure the leak testing is performed safely.
- Only the highest risk systems require CSPO/DCPSO certification.

Note: The existing exemptions and exclusion of the ESM Chapter 17 are still applicable.

Corrosive: For the text preceding Table ADMIN-1-3-1ALT (and elsewhere in Ch 17 where it is defined such as GEN-1), define "corrosive" as follows: API 581 general corrosion loss levels are defined in terms of mills/year (mpy, see table below). At LANL, a corrosive fluid is defined by one of three criteria.

1. Exceeds the "Moderately Corrosive" criterion of API 581 of 5 to 10 mills per year
2. Exhibits other corrosive conditions as shown in NB-23 Part 2, for example erosion, stress-induced, crevice, pitting
3. A single exposure to the internal fluid can produce serious irreversible harm to persons on breathing or bodily contact, even when prompt restorative measures are taken

General Corrosion	Corrosion rate (mills per year)
None/Inert	< 1
Mildly Corrosive	1 to 5
Moderately Corrosive	5 to 10
Severely Corrosive	10 to 20
Unpredictable or Localized	> 20

3.5 Attachments

Document Title or Description

Attachment A: R&D Pressure System Certification Process (with forms FM-R&D-REVIEW and FM-R&D-DOCS)

Attachment B: Facility and Non-R&D Pressure System Certification Process (with required documentation by ASME B31 codes)

Attachment C: System Energy Determination

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**

<p>4.1 POC (Management Program Owner's Representative):</p> <p>Swartz, Ari (Ben)</p>	<p>Organization</p> <p>ES-EPD</p>	<p>Signature</p>
<p>4.2 Facility Design Authority Representative</p> <p>[FDARName]</p> <p>FDAR signature not required <input checked="" type="checkbox"/></p>	<p>Organization</p> <p>Enter text..</p>	<p>Signature</p>
<p>4.3 LANL Owning Manager (FOD or R&D/Program)</p> <p>[FODorPrgrMmgrName]</p> <p>FOD or Program Manager signature not required <input checked="" type="checkbox"/></p>	<p>Organization</p> <p>Enter text..</p>	<p>Signature</p>
<p>4.4 Quality Reviewer's Name:</p> <p>[QPAName]</p> <p>QPA review/signature not required <input checked="" type="checkbox"/></p>	<p>Organization</p> <p>Enter text.</p>	<p>Signature</p>
<p>4.5 Safety or Security Management Program Owner's Approval for P341 and APs; P342, ESM and Contract Matters; and P343</p> <p>Streit, James (Jim)</p> <p>SMPO signature not required (Type 1 variance) <input type="checkbox"/></p>	<p>Organization</p> <p>ES-DO</p>	<p>Signature</p>
<p>4.6 Additional Signer 1</p> <p>Apperson, Jason</p> <p>Role: Pressure Safety Committee Chairman</p>	<p>Organization</p> <p>ES-DO</p>	<p>Signature</p>

<p>4.7 Additional Signer 2</p> <p>[AdditionalSigner2]</p> <p>Role: Enter text.</p>	<p>Organization</p> <p>Enter text.</p>	<p>Signature</p>
--	--	------------------

<p>4.8 CoE Administrator Signature</p> <p>Salazar-Barnes, Christina L</p> <p><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.</p>	<p>Signature</p>
--	------------------