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-10163	1.2 Revision: 0
1.3 Brief Descriptive Title: In-process Examination of Tie-in to Existing Contaminated Piping	
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: Snider, Phil Organization: ES-EPD	
1.8 Revision History Revision Number Changes and Comments R0 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.: ESM Chapter 17, Section EXIST – Legacy System Requirements Enter text.. Revision 2 Document Title/No.: Enter text.. Revision Enter text.. Document Title/No.: Enter text.. Revision Enter text..
2.3 Section/Paragraph: Paragraph 3.0 Modification or Maintenance of an Existing System, B, 1., a, 3) i.	
2.4 Specific Requirement(s) as Written in the Document(s): a. For welded connections where elevated pressure leak test is not possible: 3) Perform Initial Service Leak Test as follows: i. Gradually increase pressure in steps until the operating pressure (pressure during normal system operating conditions) is reached, holding the pressure at each step long enough to equalize piping strains except for systems under 25 psig and with a volume of 2 cubic foot or less, pressure can be brought up in one step.	
2.5 Contractual, preference, or other basis for requirement in 2.4: ESM Chapter 17 is the required implementation of 10CFR851.	

2.6 Type of VAR from ESM Chap 1, Z10 [*Applies only to standards variances*)	2.7 Discipline
Type 2	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	3.3 Highest ML Level
OpSystem Acronym & Name DRYVAC_Dry Vacuum System Number or Name DRYVAC_Dry Vacuum	ML-4

3.4 Proposal with Justification/Compensatory Measures:

Background

PEI 1 RCD-TA55-15-001 Rev 2, Table 8.1, Dry Vacuum (House and Process) requires compliance with ASME B31.3-2012, Category Normal for the design of Gloveboxes and equipment fluid services and utilities. However, per Section 8.20 System Interface, "For systems where the code of record is ASME B31.3, and the pressure is reduced below 15 psig, they are excluded from the ASME B31.3 requirements and ESM Chapter 17 for design and testing requirements".

B31.3-2012 states:
300.1.3 Exclusions. This Code excludes the following:
(a) piping systems designed for internal gage pressures at or above zero but less than 105 kPa (15 psi), provided the fluid handled is nonflammable, nontoxic, and not damaging to human tissues as defined in 300.2, and its design temperature is from −29°C (−20°F) through 186°C (366°F).

Therefore new vacuum systems meeting the above conditions are not excluded from B31.3. Existing systems (the subject of this request) are not within the code's scope (see below).

300 (c) *(2)* This Code is not intended to apply to the operation, examination, inspection, testing, maintenance, or repair of piping that has been placed in service. The provisions of this Code may optionally be applied for those purposes, although other considerations may also be necessary.

At LANL, ESM Chapter 17, EXIST 3.0 *Modification or Maintenance of an Existing System*, provides the requirements for the interface connections. See Field 2.4 for EXIST's wording. The EXIST wording does not address tie-in to vacuum system. Looking at both EXIST wording and B31.3 345.7 (below), it is not possible to comply precisely as written because, for a hot tie-in to vacuum system, internal pressure would not gradually increase in steps (it would change/decrease).

345.7 Initial Service Leak Test
This test is applicable only to piping in Category D Fluid Service, at the owner's option. See para. 345.1(a).
345.7.1 Test Fluid. The test fluid is the service fluid.
345.7.2 Procedure. During or prior to initial operation, the pressure shall be gradually increased in steps

until the **operating pressure** is reached, holding the pressure at each step long enough to equalize piping strains. A preliminary check shall be made as described in para. 345.5.5 if the service fluid is a gas or vapor.

Furthermore, the EXIST wording is written as such because, in modified system tie-ins that cannot be isolated and pressurized, it is not possible to perform testing per 345.2.4 (see below) on the connection.

345.2.4 Externally Pressured Piping. Piping subject to external pressure shall be tested at an internal gage pressure 1.5 times the external differential pressure, but not less than 105 kPa (15 psi).

Proposal

Allow fabrication of the connecting joint in accordance with the ESM Chapter 17, Exist, 3. B. 1. A, modified by including the words "or brazed" along with "welded" in 3. B. 1. a., and substituting the word "change" for "increase" in Exist, 3. B. 1. a. 3) i. **NOTE: This is not substituting the words in ASME B31.3 345.2.4 or 345.7, but only ESM Chapter 17. This Alternate Method is valid for any tie-in to an existing vacuum system that cannot fulfil the requirements of 345.2.4 or 345.7 as written.**

Thus, the initial service leak test will be performed by a return to service and subsequent check for gross leaks which might be indicated by contamination release. The assembly and testing is performed inside a bag and evaluated in accordance with proven radiation monitoring/sampling prior to removal of the bagging.

Justification

This method of performing the hot tie-in of a vacuum line while allowing the pump to run has been historically used for all Dry Vacuum tie-in joints at TA-55-0004, but not necessarily documented. It is the only practical approach that can be followed under the circumstances.

Compensatory Measures

The bagging method described under "Proposal" above minimizes the possibility of a leaking joint and contamination release.

3.5 Attachments

Document Title or Description DCF-15-55-0004-941-FCR-00016-ATTACHMENT 1

Document Title or Description Enter text...

3.6a Project ID	3.6b: Project Name	3.6c: Code of Record Date
103150	Plutonium Implementation (CMRR Continuation) PEI1	2012 issued Jan 10, 2013

3.7 Duration:	3.8a If Finite Period, Start Date:	3.8b End Date:
Lifetime	Click to enter a 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)? Yes

If Yes, USQD/USID Number TBD

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:*

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2. *In the small dialog click the **ellipsis** again*
3. *Click **Edit Properties** and check out the document if prompted toEnter names using the controls provided, then **Save***

4.1 POC (Management Program Owner's Representative): Swartz, Ari (Ben)	Organization ES-EPD	Signature Ari B Swartz Digitally signed by Ari B Swartz DN: c=US, o=U.S. Government, ou=Department of Energy, ou=Los Alamos National Laboratory, ou=People, serialNumber=235211, cn=Ari B Swartz Date: 2017.08.03 14:24:31 -06'00'
4.2 Facility Design Authority Representative FDAR signature not required ☒	Organization	Signature
4.3 LANL Owning Manager (FOD or R&D/Program) FOD or Program Manager signature not required ☒	Organization	Signature
4.4 Quality Reviewer's Name: [QPAName] QPA review/signature not required ☒	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 Goen, Lawrence Kenneth SMPO signature not required (Type 1 variance) ☐	Organization ES-DO	Signature LAWRENCE GOEN (Affiliate) Digitally signed by LAWRENCE GOEN (Affiliate) DN: c=US, o=U.S. Government, ou=Department of Energy, 0.9.2342.19200300.100.1.1=89001000275435, cn=LAWRENCE GOEN (Affiliate) Date: 2017.08.04 09:23:10 -06'00'

4.6 Additional Signer 1	Organization	Signature
~~Pennington, Daniel H~~ Role: Enter text.	~~ES-55~~	
4.7 Additional Signer 2	**Organization**	**Signature**
[AdditionalSigner2] Role: Enter text.	Enter text.	

4.8 CoE Administrator Signature	Signature
Salazar-Barnes, Christina L NOTE: The CoE Admin is always the last signature placed on this document. The date of that signing is the date of this document.	Christina L Salazar-Barnes Digitally signed by Christina L Salazar-Barnes DN: c=US, o=U.S. Government, ou=Department of Energy, ou=Los Alamos National Laboratory, ou=People, serialNumber=121714, cn=Christina L Salazar-Barnes Reason: Finalize document Date: 2017.08.04 09:28:54 -06'00'