



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-10298		1.2 Revision: 0	
1.3 Brief Descriptive Title: ASME AG-1 and DOE-HDBK-1169 Applicability to Non-Credited Ventilation Systems			
1.4 Affected Program: Engineering Standards		1.5 Request Type: Variance	
1.6a Affected Tech Area 99		1.6b Affected Buildings Sitewide	
1.7 Requestor: Apperson, Jason Wesley Organization: ES-55OUT			
1.8 Revision History			
Revision Number	Changes and Comments		
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 ESM, Ch. 6 Mechanical, Section D30 HVAC, Heating, Cooling, HVAC Distribution and TAB Revision 5 Document Title/No.: <i>Enter text..</i> Revision <i>Enter text..</i> Document Title/No.: <i>Enter text..</i> Revision <i>Enter text..</i>
2.3 Section/Paragraph: Section 10.D and TABLE D30GEN-3	
2.4 Specific Requirement(s) as Written in the Document(s): "Follow applicable sections of the standards for HVAC and nuclear air treatment systems (NATS) in Table D30GEN-3 which follows. They represent the minimum acceptable methods. ML-1 & 2 requirements apply to new facilities and major modifications (see ESM Chapter 1 Section Z10 definition) – and shall be considered for other modifications." Per TABLE D30GEN-3, satisfying ASME AG-1 (for Adsorbers & HEPA Filtration) and DOE-HDBK-1169 in "Radiological, Beryllium, or Other Hazard Confinement (may be ML-3)" systems is identified as a minimum requirement.	

In addition, the Table is silent on Hazard Category (HC) 1, 2 or 3 Facilities where the ventilation system is not credited to support a Safety-Class (SC) or Safety-Significant (SS) function.

TABLE D30GEN-3

Required Standards for HVAC and Nuclear Air Treatment Systems (NATS)				
Function/Component	ML-4 (General Service)	Radiological, Beryllium, or Other Hazard Confinement (may be ML-3)	Safety Significant (SS/ML-2)	Safety Class (SC/ML-1)
General	N/A	Reference only: DOE-HDBK-1169; DOE-HDBK-1132	DOE G 420.1-1A. Ref only: DOE-HDBK-1132, DOE-HDBK-1169	DOE G 420.1-1A. Ref only: DOE-HDBK-1132, DOE-HDBK-1169
Air Handling Units (HVAC only)	AHRI Standards	AHRI Standards	ASME AG-1	ASME AG-1
Adsorbers (NATS only)	N/A	ASME AG-1	ASME AG-1	ASME AG-1
Breathing Air	See Section D20 and ESM Chapter 11 - Radiation Protection			
Coils	AHRI 410	ARHI 410	ASME AG-1	ASME AG-1
Controls	See ESM I&C Chapter 8			
Dampers	SMACNA; NFPA 90A; UL 555/555S; NFPA 801	SMACNA; NFPA 90A; UL 555/555S; NFPA 801	ASME AG-1	ASME AG-1
Ducts	SMACNA	SMACNA	ASME AG-1	ASME AG-1
Fans	Reference only: ASHRAE Handbooks	Reference only: ASHRAE Handbooks	ASME AG-1; Reference only: ASHRAE Handbooks	ASME AG-1; Reference only: ASHRAE Handbooks
Filtration	ASHRAE 52.2	ASHRAE 52.2	ASME AG-1	ASME AG-1
HEPA Filtration	N/A	ASME AG-1; DOE STD-3020	ASME AG-1; DOE STD-3020	ASME AG-1; DOE STD-3020
Lab Ventilation	AIHA Z9.5, NFPA 45 and 91. Reference only: ASHRAE Applications Handbook, 'Laboratories'	AIHA Z9.5, NFPA 45 and 91. Reference only: ASHRAE Applications Handbook, 'Laboratories'	ASME AG-1	ASME AG-1
Local Exhaust	AIHA Z9.2. Ref only: ASHRAE Applications Handbook, 'Industrial Local Exhaust System.'	AIHA Z9.2. Reference only: ASHRAE Applications Handbook, 'Industrial Local Exhaust Systems'	ASME AG-1	ASME AG-1
Off-gas treatment	Reference only: ASHRAE Handbooks	DOE-HDBK-1132. Ref only: ASHRAE Handbooks	ASME AG-1	ASME AG-1
Refrigeration units	AHRI Standards	AHRI Standards	ASME AG-1	ASME AG-1

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

(1) DOE O 420.1C, (2) DOE G 420.1-1A (2012 Version), and (3) DOE-HDBK-1169-2003. Details are discussed in Proposal field below.

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

Type 2

2.7 Discipline

Mechanical

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

1. For Radiological (Less than HC-3), Beryllium, or Other Hazard Confinement Facilities, ASME AG-1 and DOE-HDBK-1169 shall be considered as design guidance. The Facility Design Authority Representative (FDAR) shall approve the minimum applicable requirements of the Nuclear Air Treatment System (NATS).
2. For HC 1, 2, or 3 Facilities where the ventilation is not credited as SC or SS and only serves up to a Defense-In-Depth function, the minimum design requirements are the same minimum requirements for a Radiological (Less than HC-3) Facility.

The following criterion from DOE G 420.1-1A are considered as additional design guidance for non-credited ventilation system being used as an NATS. The Facility Design Authority Representative (FDAR) shall approve the minimum applicable requirements of the Nuclear Air Treatment System (NATS).

- Materials of construction should be appropriate for normal, abnormal and accident conditions.
- Ventilation system will have appropriate filtration to minimize release.
- Provide system status instrumentation and/or alarms.
- Interlock supply and exhaust fans to prevent positive pressure differential.
- Ventilation system should safely withstand earthquakes (only if credited in the Safety Basis).
- Design supports the periodic inspection & testing of filters and housings, and tests and inspections are conducted periodically.

Justification / Compensatory Measures

1. DOE O 420.1C: ASME AG-1 is only identified as a requirement for Safety-Significant (SS) and Safety-Class (SC) Systems in a new HC 1,2, or 3 Facility OR when associated with a Major Modification in a HC 1, 2, or 3 Facility. The Order has no specific requirements for ventilation systems not supporting a credited safety function (e.g. Other Hazard Controls (OHC), Defense-In-Depth (DID)).

Note: DOE O 420.1C Att 3 3.b(4) invokes Appendix A of DOE Guide (G) 420.1-1A for ventilation as follows: "Appendix A of DOE Guide (G) 420.1-1A, *Nonreactor Nuclear Safety Design Criteria for use with DOE O 420.1C, Facility Safety*, and DOE Handbook-1169-2003, *Nuclear Air Cleaning Handbook*, provide guidance for confinement ventilation systems design and performance criteria. Alternate methods must be approved by DOE field elements."

Invoking Appendix A of 420.1-1A and DOE Handbook-1169-2003 through the Order elevates them as requirements documents for SS and SC systems. However, 420.1-1A and DOE Handbook-1169-2003 are only considered as guidance documents for non-credited ventilation systems.

2. DOE G 420.1-1A: The Guide only applies to new HC 1, 2, or 3 Facilities OR when associated with a Major Modification in a HC 1, 2, or 3 Facility. For "Defense-In-Depth/Other" confinement ventilation systems, Appendix A of the Guide specifies the following criteria:
 - Materials of construction should be appropriate for normal, abnormal and accident conditions.
 - Ventilation system will have appropriate filtration to minimize release.
 - Provide system status instrumentation and/or alarms.
 - Interlock supply and exhaust fans to prevent positive pressure differential.
 - Ventilation system should safely withstand earthquakes (only if credited in the Safety Basis).
 - Design supports the periodic inspection & testing of filters and housings, and tests and inspections are conducted periodically.

Per DOE O 420.1C, Attachment 3, *Design Criteria For Safety Structures, Systems and Components*, any alternate methods to the above must be approved by the DOE field elements when associated with a SS or SC system. For Defense-in-depth (or less) ventilation systems, the requirements listed above are only considered as design guidance. Any deviation from this guidance should be technically justified and approved by the Facility Design Authority Representative (FDAR).

3. [DOE-HDBK-1169-2003](#): While the Handbook does reference ASME AG-1 throughout, DOE Standards and DOE Directives are the only two document types that may be invoked requirements. According to introductory statements within them, DOE Handbooks may not be invoked and may not include requirements language (such as “shall,” “must,” and “will” statements). The Handbook and referenced ASME AG-1 only serves as guidance for good engineering practice. Any deviation from the Handbook or ASME AG-1 (where applicable) should be technically justified and approved by the Facility Design Authority Representative (FDAR).

3.5 Attachments

Document Title or Description [None](#)

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:
[N/A](#)

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>Ladach, Michael J</p>	<p>Organization</p> <p>ES-EPD</p>	<p>Signature</p>
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<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>[FODorPrgmMgrName]</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>Goen, Lawrence Kenneth</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>Role: Enter text.</p>	<p>Organization</p> <p>NA</p>	<p>Signature</p>
<p>4.7 Additional Signer 2</p> <p>Role: Enter text.</p>	<p>Organization</p> <p>NA</p>	<p>Signature</p>
<p>4.8 CoE Administrator Signature</p> <p>Salazar-Barnes, Christina L</p>	<p>Signature</p>	

NOTE: The CoE Admin is always the last signature placed on this document. The date of that signing is the date of this document.

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