



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-10641	1.2 Revision: 0				
1.3 Brief Descriptive Title: Lightning Protection Ground Ring Minimum Distance (ESM Ch. 7 D5090)					
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: Stromberg, Eric Roland Organization: ES-DO					
1.8 Revision History <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Revision Number</th> <th style="text-align: left; border-bottom: 1px solid black;">Changes and Comments</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">0</td> <td>Initial issue.</td> </tr> </tbody> </table>		Revision Number	Changes and Comments	0	Initial issue.
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): <p style="text-align: center;">N/A</p>	2.2 Subordinate or related document(s) [AP, master spec, LANL ESM chapter & section; or code, Order, standard, etc.]: Document Title/No.: ESM Chapter 7, Section D5090 Revision 6 Document Title/No.: Enter text.. Revision Enter text.. Document Title/No.: Enter text.. Revision Enter text..
2.3 Section/Paragraph: 7.3 Grounding System	
2.4 Specific Requirement(s) as Written in the Document(s): A. For new structures, design an LPS ground ring electrode, minimum 1/0 AWG¹²⁷ (4/0 AWG¹²⁸ for Class II systems) bare copper, five feet from the foundation and 3 feet below grade.¹²⁹ Locate at least 6 feet from any ground electrode on an electrical or communications system.¹³⁰⁻	
2.5 Contractual, preference, or other basis for requirement in 2.4: For horizontal distances, NFPA 780 requires that the ground ring be no less than 3 feet from structures that house explosives; for other structures, NFPA 780 has no distance requirement. As such, the ESM five-foot distance is a LANL preference, perhaps based on old NFPA or other guidance.	

For depth, the NFPA 780 requirement is for the ground ring to be buried at least 18 inches below grade. ESM footnote 129 notes that the "ground ring should be located below the frost line, generally accepted as 36 inches at LANL."

2.6 Type of VAR from ESM Chap 1, Z10 <i>[Applies only to standards variances]</i> <p style="text-align: center;">Type 2</p>	2.7 Discipline <p style="text-align: center;">Electrical</p>
--	---

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 ES - Electrical Systems System Number or Name EP	3.3 Highest ML Level <p style="text-align: center;">ML-1</p>
--	---

3.4 Proposal with Justification/Compensatory Measures:
Proposal
 Change the 7.3.A distance requirements to:
 A. For new structures, design an LPS ground ring electrode, minimum 1/0 AWG¹²⁷ (4/0 AWG¹²⁸ for Class II systems) bare copper, at least 3 feet from the foundation and at least 3 feet below grade (Chapter POC may grant written permission to do otherwise).¹²⁹ Locate at least 6 feet from any ground electrode on an electrical or communications system.¹³⁰

Justification for distance-from-foundation change and new bases
 For horizontal distances, NFPA 780 requires that the ground ring be no less than 3 feet from structures that house explosives; for other structures, NFPA 780 has no distance requirement. Using 3' for all installations will both meet NFPA and minimize the disturbance of the soil supporting the foundation but less for some situations may be allowable with proper compaction actions.
 The NFPA 780 depth requirement is that the ground ring be buried at least 18 inches below grade. LANL prefers 3' to avoid landscaping disturbance issues and potential frost heave (although less is likely adequate at a 3' distance from a heated structure or with cable slack).

This ESM change may be used by projects underway or complete using previous D5090 editions.

3.5 Attachments
 Document Title or Description **None**

3.6a Project ID <p style="text-align: center;">n/a</p>	3.6b: Project Name <p style="text-align: center;">n/a</p>	3.6c: Code of Record Date <p style="text-align: center;">n/a</p>
---	--	---

3.7 Duration: <p style="text-align: center;">Lifetime</p>	3.8a If Finite Period, Start Date: <p style="text-align: center;">Click to enter a date.</p>	3.8b End Date: <p style="text-align: center;">Click to enter a date</p>
--	---	--

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): Stromberg, Eric Roland	Organization ES-DO	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

<p>4.6 Additional Signer 1</p> <p>[AdditionalSigner1]</p> <p>Role: Enter text.</p>	<p>Organization</p> <p>Enter text.</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>
--	------------------