Conduct of Engineering
Request for Variance or Alternate Method

1.0 General

1.1 Document Number: VAR-10183	1.2 Revision: 0

1.3 Brief Descriptive Title: Allowance for multi-wire branch circuits

1.4 Affected Program: Engineering Standards	1.5 Request Type: Variance
1.6a Affected Tech Area 99 *Site Wide*	1.6b Affected Buildings Sitewide

1.7 Requestor: Stromberg, Eric R   Organization: ES-EPD

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.: ESM Chapter 7 Section D5020, Lighting & Branch Circuit Wiring
	
	  Revision Rev. 5
	
	Document Title/No.: Enter text..
	
	  Revision Enter text..
	
	Document Title/No.: Enter text..
	
	  Revision Enter text..

2.3 Section/Paragraph: 2.2 F

2.4 Specific Requirement(s) as Written in the Document(s):

Do not use "multi-wire" branch circuits. Require a dedicated grounded (neutral) conductor for each branch circuit that requires a neutral.[17]

[17] IEEE Std 1100, *IEEE Recommended Practice for Powering and Grounding Electronic Equipment* (Emerald Book); Chapter 8 recommends a dedicated grounded conductor (neutral) for each branch circuit.

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

This requirement has multiple underlying drivers. One, as referenced in the footnote, is for supplying sensitive laboratory equipment. The other main reason is that multi-wire branch circuits have been the source of many shocks to electricians; however, the National Electric Code has been modified over the last several cycles to address the reasons that gave rise to shocks from multi-wire branch circuits. Requirements that have been added to the Code include the grouping of circuit conductors and the use of identified handle

ties to disconnect all parts of the circuit before service. With these requirements added, there is no longer a shock hazard to electricians who are working on new circuits.

2.6 Type of VAR from ESM Chap 1, Z10 [*Applies only to standards variances*) Type 2	2.7 Discipline Electrical

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 EP_Electrical Power System Number or Name [Select SystemNumberOrName]	3.3 Highest ML Level ML-1

3.4 Proposal with Justification/Compensatory Measures:
Proposal Modify 2.2 F to read: "Do not use multi-wire branch circuits for laboratories where sensitive electronic equipment will be used. Multi-wire branch circuits are permitted for all other areas." Justification See field 2.5 above.

3.5 Attachments
Document Title or Description Enter text...

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)? Choose an item.
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 toEnter names using the controls provided, then* **Save**

4.1 POC (Management Program Owner's Representative): Stromberg, Eric R	Organization ES-EPD	Signature
4.2 Facility Design Authority Representative [FDARName] FDAR signature not required ☒	Organization Enter text..	Signature
4.3 LANL Owning Manager (FOD or R&D/Program) [FODorPrgmMgrName] FOD or Program Manager signature not required ☒	Organization Enter text..	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

4.6 Additional Signer 1 [AdditionalSigner1] Role: Enter text.	Organization Enter text.	Signature
4.7 Additional Signer 2 [AdditionalSigner2] Role: Enter text.	Organization Enter text.	Signature

4.8 CoE Administrator 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.	Signature