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-10706	1.2 Revision: 0

1.3 Brief Descriptive Title: High Confidence of Low Probability of Failure (HCLPF) Definition Deletion (Structural Evaluation of Existing Nuclear SSCs)

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: Coronado Restrepo, Carlos Arturo   Organization: ES-SPD

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 Ch. 5 Section I Revision 9 Document Title/No.: Enter text.. Revision Enter text.. Document Title/No.: Enter text.. Revision Enter text..

2.3 Section/Paragraph: 3.0 Definitions

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

High confidence of low probability of failure (HCLPF) – Usually a 90% confidence of a less than 10% probability of failure which results in about a 1% to 2% probability of failure.

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

The definition relates to the evaluation of existing nuclear facilities and SSCs within them, and specifically a fragility analysis or seismic margin study. Such an evaluation might be triggered by a facility condition assessment, e.g., one performed because of an updated NPH assessment required by DOE-STD-1020, a DOE O 420.1C-invoked standard. DOE-STD-1020-2016 Section 9.3.6 provides no direction on fragility analysis or seismic margin study methodology, only noting that "If the evaluation of existing SSCs identifies an Unreviewed Safety Question (USQ) or Potential Inadequate Safety Analysis (PISA), refer to DOE Guide 424.1-1B, Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements, for additional information. For SSCs that are found deficient, a fragility analysis or seismic margin study may be performed to assist in the PISA and USQ Determination, and to justify continued operation of the facility."

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

3.0 Request Information & Comments

3.1 NCR required (work has occurred)? No	
If Yes, NCR Number: Enter text.	
3.2 System/Component Affected N/A	3.3 Highest ML Level
OpSystem Acronym & Name BLDG - Building	
System Number or Name BLDG	ML-1

3.4 Proposal with Justification/Compensatory Measures:

Proposal

Delete the definition "High confidence of low probability of failure (HCLPF)."

Justification

This deletion is a clarification/correction and not changing expectations or practice. The ESM definition of HCLPF in ESM Ch 5, Section I is inconsistent with current LANL and industry practice, which is to follow latest EPRI document(s). Currently, the 2018 report EPRI 3002012994, *Seismic Fragility and Seismic Margin Guidance for Seismic Probabilistic Risk Assessments,* is used, along with its HCLPF definition.

Background/History

The ESM definition has existed unchanged since it first appeared in ESM Chapter 5, Section I, Rev. 1 (dated 2/9/2004).

An earlier reference to the HCLPF calculation (but no definition) appears in ESM Ch. 5 Section 200 Rev. 0 (dated 6/28/99); specifically, its Section 202.9.d stated the following:

> A High Confidence of Low Probability of Failure (HCLPF) capacity for the SSC may be calculated. No further action will be taken when the HCLPF capacity is greater than the demand load determined with respect to the facilities Performance Category (peak ground acceleration of 0.15g for PC-1, 0.22g for PC-2, 0.31g for PC-3 and 0.58g for PC-4). Performance of the SSC HCLPF calculations will be in accordance with the recommendations and guidance provided in EPRI Report NP-6041-SL [11], "A Methodology for Assessment of Nuclear Power Plant Seismic Margin". As an alternative to the Conservative Deterministic Failure Margin, CDFM, approach used in EPRI-NP-6041-SL [11], a fragility analysis approach may be used for the calculation. This approach is discussed in EPRI Report TR-103959 [12].

Additional history – The procedure to calculate fragilities was originally provided in the following EPRI reports:
1. NP-6041-SLR1 A Methodology for Assessment of Nuclear Power Plant Seismic Margin Revision 1 (EPRI 1991) and
2. EPRI TR-103959 Methodology for Developing Seismic Fragilities (Kennedy EPRI 1994)

and later updated in Seismic Fragility and Seismic Margin Guidance for Seismic Probabilistic Risk Assessments (EPRI 2018 3002012994).

This 2018 report supersedes the EPRI reports Methodology for Developing Seismic Fragilities (TR-103959), Seismic Fragility Applications Guide (1002988), and Seismic Fragility Application Guide Update (1019200). Other EPRI reports on the topic have been incorporated in part including: A Methodology for Assessment of Nuclear Power Plant Seismic Margin (NP-6041-SLR1).

3.5 Attachments

Document Title or Description N/A

3.6a Project ID	3.6b: Project Name	3.6c: Code of Record Date
N/A	N/A	N/A

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)? 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?: Choose an item.   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): Coronado Restrepo, Carlos Arturo	Organization ES-SPD	Signature
4.2 Facility Design Authority Representative [FDARName] FDAR signature not required ⊠	Organization Enter text..	Signature

	Organization	Signature
4.3 LANL Owning Manager (FOD or R&D/Program) [FODorPrgmMgrName] FOD or Program Manager signature not required ☒	Enter text..	
4.4 Quality Reviewer's Name: [QPAName] QPA review/signature not required ☒	Enter text.	
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) ☐	ES-DO	
4.6 Additional Signer 1 [AdditionalSigner1] Role: Enter text.	Enter text.	
4.7 Additional Signer 2 [AdditionalSigner2] Role: Enter text.	Enter text.	

	Signature
4.8 CoE Administrator Signature Leyba, Matthew Anthony <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.	