



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-10711	1.2 Revision: 1								
1.3 Brief Descriptive Title: SDC-1, SDC-2, and Non-nuclear SSCs Seismic Parameter Update; SDC-C Allowance									
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 <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: 2px 5px;">0</td> <td style="padding: 2px 5px;">Initial issue 12/12/2024 as "SDC-1, SDC-2, and Non-nuclear SSCs Seismic Parameter Increase; SDC-C Elimination," implementing ES-DO-Memo-24-022, Rev. 1, 12/11/2024, LANL Interim Seismic Design Parameters</td> </tr> <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> <tr> <td style="padding: 2px 5px;">1</td> <td style="padding: 2px 5px;">Revised to reduce parameters and restore SDC C, implementing the results of P-22-016-01-PR-01-AR-01 Rev. 0, July 2025, LANL Augmented SSHAC Level 2 Seismic Hazard Update: Ancillary Deliverables</td> </tr> </tbody> </table>		Revision Number	Changes and Comments	0	Initial issue 12/12/2024 as "SDC-1, SDC-2, and Non-nuclear SSCs Seismic Parameter Increase; SDC-C Elimination," implementing ES-DO-Memo-24-022, Rev. 1, 12/11/2024, LANL Interim Seismic Design Parameters	Revision Number	Changes and Comments	1	Revised to reduce parameters and restore SDC C, implementing the results of P-22-016-01-PR-01-AR-01 Rev. 0, July 2025, LANL Augmented SSHAC Level 2 Seismic Hazard Update: Ancillary Deliverables
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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.: TSM (i.e., Ch. 5) <div style="margin-left: 20px;">Revision 3</div> Document Title/No.: ESM Ch. 16, IBC-GEN, Att. B <div style="margin-left: 20px;">Revision 11</div> Document Title/No.: All other affected Standards documents containing statements similar to those in Field 2.4, including the Master Specifications, specification editing guides, and Standard Details <div style="margin-left: 20px;">Revision</div> Document Title/No.: <div style="margin-left: 20px;">Revision Enter text..</div>
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2.3 Section/Paragraph: *Varies by document*

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

All instances of seismic design parameters stated as $S_{DS} = 0.55g$ and $S_{D1} = 0.44g$.

All instances not allowing the use of SDC-C.

All instances of seismic design parameters stated as:

Description	Parameter	TA-16	TA-03	TA-55/50	Sitewide
Seismic Design Parameters	S_{DS}	0.68	0.66	0.60	0.68
	S_{D1}	0.59	0.64	0.68	0.68

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

Enter text.

Use of site-specific parameters is a DOE-STD-1020 mandate (required by DOE O 420.1C) and allowed by the IBC. Per DOE STD-1020-2016 Sections 2.2 and 3.1.4, seismic design parameters S_{DS} and S_{D1} are to be used for the design of SDC-1 and SDC-2 SSCs and non-nuclear SSCs at LANL.

Use of SDC C is the result of alternative seismic design category determination allowed by the IBC Section 1613.2.5.1.

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

Type 2

2.7 Discipline

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

OpSystem Acronym & Name **BLDG - Building**

System Number or Name **BLDG**

3.3 Highest ML Level

ML-2

3.4 Proposal with Justification/Compensatory Measures:

Proposal

1. Allow the use of Seismic Design Category (SDC) C in the following documents: TSM R3 Chapter 5; and ESM Chapter 16, IBC-GEN, Attachment B, R11, for structures that meet the requirements of 2021 IBC Section 1613.2.5.1.

2. In ESM Chapter 16, IBC-GEN, Attachment B, R11, allow the use of SDC C for structures that were originally designed using SDC C.

3. Allow the use of ASCE 7-16 Mapped Acceleration Parameters for LANL sites not included in Table 1 below.

4. Allow the use of the seismic design parameters in Table 1 for the design of SDC-1 and SDC-2 SSCs, as well as non-nuclear SSCs at the PF-4, CMRR, CMR and WETF, as applicable.

Table 1: Site-specific seismic design parameters developed per ASCE/SEI 7-16

Description	Parameter ¹	PF-4	CMRR	CMR	WETF
Seismic Design Parameters	S_{DS}	0.366	0.362	0.455	0.439
	S_{D1}	0.246	0.242	0.220	0.200
	PGA_M	0.277	0.277	0.277	0.265
	PGA_{DE}	0.185	0.185	0.191	0.182

¹ S_{DS} = design, 5% damped, spectral response acceleration parameter at short periods; S_{D1} = design, 5% damped, spectral response acceleration parameter at a period of 1 second; PGA_M : maximum considered earthquake geometric mean PGA; PGA_{DE} : design earthquake geometric mean PGA.

5. For PF-4, CMRR, CMR, and WETF: Allow the use of the site-specific vertical and horizontal design spectra and time histories for the design of SDC-1 and SDC-2 SSCs, as well as non-nuclear SSCs, with written (e.g., email) approval of both the LANL Structural POC and the Seismic Program Manager (listed internally [here](#)).

Implementation

The coefficients in Table 1, along with the allowance for using Seismic Design Category C (SDC-C), must be applied to new designs that establish their Code of Record on or after the issuance date of this variance.

For projects underway but not yet in construction phase (i.e., still in Title I or II), Project Management should evaluate and determine whether the adoption of the revised parameters per Rev. 1 of this variance is appropriate.

Justification

Implements the results of P-22-016-01-PR-01-AR-01 Rev. 0, July 2025, LANL Augmented SSHAC Level 2 Seismic Hazard Update: Ancillary Deliverables.

NOTES ON FIELD 3.7:

1. This variance will be web-posted to the major design criteria documents affected (ESM, TSM; see Field 2.2 above) and on the webpages of the Master Specifications and Standard Details (as it is not practical to post to each affected Standards document; projects are expected to update these lower-tier implementing documents as appropriate).
2. When an affected document is revised to align with Rev. 1 of this variance (allow SDC C use and/or reflect new seismic parameters) or subsequent direction, it supersedes this variance.

3.5 Attachments

Document Title or Description N/A

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)? 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): Coronado Restrepo, Carlos Arturo	Organization ES-SPD	Signature SIGNATURE ON FILE
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

<p>4.5 Safety or Security Management Program Owner's Approval for P341 and APs; P342, ESM and Contract Matters; and P343</p> <p>Richardson, Michael Joseph</p> <p>SMPO signature not required (Type 1 variance) <input type="checkbox"/></p>	<p>Organization</p> <p>ES-DO</p>	<p>Signature</p> <p>SIGNATURE ON FILE</p>
<p>4.6 Additional Signer 1</p> <p>Gidwani, Neha</p> <p>Role: Verifier</p>	<p>Organization</p> <p>ES-FE</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>Leyba, Matthew Anthony</p> <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.</p>	<p>Signature</p> <p>SIGNATURE ON FILE</p>	