ATTACHMENT B LANL EXISTING BUILDING/SYSTEM CODE (LEBC)

1. Purpose/Scope: This mandatory Attachment contains LANL amendments to the International Existing Building Code (IEBC), which addresses repairs, alterations, changes of occupancy, additions, historic Buildings, and relocated buildings. It also contains other requirements for non-building system repairs and alterations.

2. When altering systems outside the LANL IBC Program defined by IBC-GEN tables (*GEN-1 and -2),* (e.g., certain process or programmatic equipment unlike traditional building systems), see ESM Chapter 1 Z10 regarding Code or Record for direction on possible need to upgrade to current expectations.

3. Adoption: Comply with the 2015 IEBC and its Appendices A and B.[1] New Mexico amendments (NMAC 14.7.7) which strengthen the IEBC are also required (see ESM Ch 1 Section Z10 Subsection Codes and Standards).

   a. When making a building or system modification, follow the most stringent requirements of existing building requirements between IEBC, IFC, NFPA 101 Life Safety Code, and New Mexico and LANL (herein) amendments to same.

   b. The IEBC requirements supersede the 50% value rule that may still exist in some ESM chapters (except for non-facility systems; see ESM Chapter 1 Section Z10 regarding mandatory upgrading from code of record).

   Interpretations (Approved): Those from the ICC are here:
   https://www3.iccsafe.org/cs/Codes_List.cfm

   Any LANL interpretations will be on the Chapter 16 or other relevant chapter webpage; they are incorporated into the ESM chapters upon next revision and removed from website.

4. *The IEBC is online for LANL at*
   https://idp.lanl.gov/idp/startSSO.ping?PartnerSpId=https://sam.ihsmarkit.com/sso/lanl&TargetResource=https://accounts.ihsmarkit.com/erc/login?prod=EWB1

   (NOTE: Many users will only need some of the first 16 chapters, not the long appendices, and can stop printing at about page 83 of the ~300-page file).

5. The LBO has the authority to require upgrade of any or all of a system to current code on a case-by-case basis (regardless of percentage) when safety is a concern.

6. Under very limited circumstances defined herein (at 301.1 below), the "codes of record" can be applied to later modifications, replacements, or rehabilitation projects when justifiable. See also ESM Chapter Section Z10 regarding Code of Record. *(Guidance: For complex situations, the justification should follow the methodology and documentation process in AP-341-515, System Adequacy Analysis).*

[1] IEBC was adopted by New Mexico effective July 1, 2004; State law is required to be followed by LANL; a LANL multi-disciplinary team determined that it was appropriate for LANL (ref EMRef-37 -- IEBC Meeting Minutes of 11-10-2004) (Note: EMref refers to a Standards Program internal filing system for hard-to-find references.).

7. In addition to the global program amendments in IBC-GEN and its Att A LBC, amendments to the IEBC for LANL are as follows (based on 2015 edition):

LEBC	**CHAPTER 1 SCOPE AND ADMINISTRATION** **101.1. Title.** These regulations shall be known as the LANL Existing Building Code. **101.4.1 Buildings not previously occupied. Add:** Once there is occupancy (partial or full) or it has gone operational, then repairs, alterations, additions etc. follow the IEBC edition required by ESM. **101.5.1 Prescriptive Compliance Method.** **101.6 Appendices.** Delete and substitute: IEBC Appendices A and B are adopted. **101.7 Correction of violations of other codes.** Deleted. **102.5 Partial invalidity.** Deleted. **103 - Department of building safety.** See IBC-GEN **104 - Duties and powers of the code official.** Also see this chapter. **105 - Permits.** See this chapter. **106 - Construction documents.** Also see IBC-GEN
LEBC	**107 - Temporary structures and uses.** Also see IBC-GEN. **108 - Fees.** Deleted. **109 - Inspections.** Also see this ESM chapter. **110 - Certificate of occupancy.** Also see IBC-GEN. **111 - Service utilities.** See App A of IBC-GEN **112 - Board of appeals.** See App A of IBC-GEN. **113 - Violations.** See App A of IBC-GEN. **114 - Stop work order.** See App A of IBC-GEN. **115 - Unsafe buildings and equipment.** See App A of IBC-GEN. **116 - Emergency measures.** Deleted. **117 - Demolition.** Deleted.
LEBC	**CHAPTER 2 DEFINITIONS** **202. General definitions.** IEBC terms shall be interpreted identically to the IBC amendments in IBC-GEN App. A**.**
LEBC	**CHAPTER 3 PROVISIONS FOR ALL COMPLIANCE METHODS** **301.1 General (exception on code of record):** LANL Interpretation: Regarding IEBC Chapter 4, for any project, if fire code deficiencies relative to the current fire codes (IBC, IFC, and NFPA 101) will remain after project completion, as determined by the Fire Marshal, then Chapter 4 cannot be used and Chapters 5-13 for work area compliance method must be used. **COR for Electrical, Fuel Gas, Mechanical, Plumbing system installations**. The LBO is the approver. Hazardous means the project may not increase the hazard (risk) to people. Furthermore, the LBO cannot let a hazard like a significant structural or fire code noncompliance go unresolved by a project. Also, the

LEBC	approach shall not lessen health, accessibility, life- and fire-safety, or structural requirements (104.10, Modifications). Beyond this, the LBO may allow certain alterations to only meet code of record. **<u>Overall LANL Policy on IEBC Provisions for Code of Record</u>** For any project, the LBO may allow use of code of record for any alteration except when more than "limited structural alteration as defined in Section 907.4.4" per 301.1 Exception is involved (Chapter 4 may only be used when building is substantially fire code compliant and when changes do not increase the hazard). However, the LBO cannot let a hazard like a significant structural or fire code noncompliance go unresolved by a project affecting that location. Beyond this, the LBO may allow certain alterations to only meet code of record within the restrictions set forth in the IEBC (including concept that cannot weaken building or make building or system less conforming to code). The LBO may do this on an individual project basis in writing, and has also designated the following scope as automatically approved – i.e., **the following alterations are considered "minor" and automatically approved to follow code of record where and how allowed by the IEBC as noted above**:[2] <u>Building Structural, Structures, and Nonstructural Components</u> In an existing facility, unless the building is undergoing more than a limited structural alteration as defined in the IEBC (907.4.4 in 2015), anchorage may be designed to the loading requirements of the building's code of record, but no less than 0.1 x the weight of the component—with the anchorage itself designed to current codes. Other situations only as approved by LBO. **See also 301.1.4.1 below.**
LEBC	<u>Building Non-Structural (e.g., floor plan, finishes)</u> As approved by LBO. Add clarification at 403.1: The <u>work shall not make the building less conforming</u> to the building, plumbing, mechanical, electrical or fire codes of the jurisdiction, or to alternative materials, design and methods of construction, or to any previously approved plans, modifications, alternative methods, or compliance alternatives, than it was before the repair was undertaken. <u>Fire</u>[3] 1. Work involving 5 or less fire alarm or detection devices when panel is current as determined by Fire Marshal 2. Work involving 9 or less fire sprinkler heads. Note: Hydraulics, placement, and vertical load design must meet current NFPA 13; only sway bracing and flexible joints between new and existing

[2] Once LANL has more experience with code of record, we may allow that Code of Record be used when approved by the LBO (in consultation with a structural POC if applicable)
[3] These are consistent with NM and ESM Ch 1 Z10 threshold for PE involvement in fire design. Beyond this limit, full ESM requirements must be met (e.g., sway bracing and flexible joints between new and old work).

LEBC	may be omitted (if the remainder of the system lacks currently compliant protection provisions for earthquake, then there is no need to provide these for the mod area) Mechanical/Plumbing/Piping/Fuel Gas 1. For existing mechanical components being modified but with no increase in weight or center-of-gravity and not being removed/re-anchored, structural anchorage need not meet current ESM Chapter 5 requirements. 2. New piping/tubing shall meet all current requirements except for small additions to existing systems (on the order of 9 additional sprinkler heads worth of piping or less) that may omit sway bracing and flexible joints to existing system. Electrical 1. For existing electrical components being modified but not removed/re-anchored, structural anchorage need not meet current ESM Chapter 5 requirements. 2. For conduit, tray, and duct bank runs (must be under 100 amps[4]), sway bracing and flexible joints to existing system may be omitted.
LEBC	301.1.3 Performance compliance method is deleted (see LEBC Ch 14 below) **301.1.4.1, Compliance with IBC-level seismic forces[5]** 301.1.4.1.2, ASCE 41-13 / IEBC Table 301.1.4.1: 1. The BSE-1N hazard design spectrum shall be taken to be the same as that required by ESM Ch. 5 Sect. II for the design of new structures (ref. paras. 1.6.A.1.d and 1.6.A.1.e in rev. 11). 2. The BSE-2N hazard design spectrum shall be taken to be 3/2 (or 1.5 times) the BSE-1N hazard design spectrum. a. In constructing the BSE-2N spectrum (i.e., 1.5 x BSE-1N), the values of the various accelerations and periods will change (i.e., from those that apply to the BSE-1N spectrum). i. Accordingly, the definitions of S_{D1} and S_{DS} will change (i.e., S_{D1} & S_{DS} = 1.5 times the values of S_{D1} & S_{DS} in ESM Ch. 5 Sect. II, para. 1.6.A.1.d); however, the definitions of T_0, T_S and T_L don't change (i.e., T_0 = 0.12 s, $T_S = S_{D1}/S_{DS}$, T_L = 6 s, in which S_{D1} & S_{DS} are as prescribed in Ch. 5 Sect. II paras. given above). **301.1.4.2, Compliance with reduced IBC-level seismic forces** 301.1.4.2.3, ASCE 41 / IEBC Table 301.1.4.2: 1. The BSE-1E hazard design spectrum shall be taken to be 3/4 (or 0.75 times)

[4] One trigger for when Electrical AHJ requires design, per ESM Ch 7 Section D5000 (r3 para 1.1E)
[5] Refer to ASCE 41-13 paras. 2.4 and 2.5 for rationale/justification

the BSE-1N hazard design spectrum.

a. In constructing the BSE-1E spectrum (i.e., 0.75 x BSE-1E), the values of the various accelerations and periods will change (i.e., from those that apply to the BSE-1N spectrum).

i. Accordingly, the definitions of S_{D1} and S_{DS} will change (i.e., S_{D1} & S_{DS} = 0.75 times the values of S_{D1} & S_{DS} in ESM Ch. 5 Sect. II, rev 11, para.1.6.A.1.d); however, the definitions of T_0, T_S, and T_L <u>don't</u> change (i.e., T_0 = 0.12 s, $T_S = S_{D1}/S_{DS}$, T_L = 6 s, in which S_{D1} & S_{DS} are as prescribed in Ch. 5 Sect. II paras. given above).

<u>SDC-C Exception to 301.1.4.1 and 301.1.4.2</u>
For structures that were originally designed using SDC C, the following hazard design spectra may be used. Subject to an approved variance, these spectra can also be used for structures that were originally designed using SDC D[6].

1. BSE-1N: The BSE-1N hazard design spectrum shall be constructed using the following acceleration and period values:[7] S_{DS} = 0.49 and S_{D1} = 0.23; T_0 = 0.1 s, T_S = 0.5 s, and T_L = 6 s.

2. BSE-2N: The BSE-2N hazard design spectrum shall be taken to be 1.5 times the BSE-1N hazard design spectrum, which will result in the following acceleration and period values: S_{DS} = 0.74 and S_{D1} = 0.35; T_0 = 0.1 s, T_S = 0.5 s, and T_L = 6 s.

3. BSE-1E: The BSE-1E hazard design spectrum shall be taken to be 0.75 times the BSE-1N hazard design spectrum, which will result in the following acceleration and period values: S_{DS} = 0.37 and S_{D1} = 0.18; T_0 = 0.1 s, T_S = 0.5 s, and T_L = 6 s.

CHAPTER 4 PRESCRIPTIVE COMPLIANCE METHOD
401.2.2. New and replacement materials. LANL Interpretation: This applies to use of code of record materials for building components such as windows (used in commentary example), not systems.

CHAPTER 14 PERFORMANCE COMPLIANCE METHODS
Deleted, to be used only with prior approval of LBO and subsequent approval of calculations and outcome.[8]

[6] The variance is only applicable if/when all conditions and provisions of ESM Ch. 5 Sect. II (r11 para. 1.6.A.2) apply (i.e., other than the SDC being C originally), and the variance justification must include sufficient detail to allow the LBO to discern that this is so. The primary reason for limiting use of such variance for "SDC-D structures" is that the IBC exception for determining SDC -- the basis for LANL's SDC-C exception -- first appeared in the IBC (i.e., 2000), and ESM Ch. 5 adopted the IBC (2003 edition) in Feb 2004.
[7] These values can be found on page 19 of CAL-99-MULT-651 under "Site Class D." This calculation is the source of the SDC-C exception in ESM Ch. 5 Sect. II (r11, para. 1.6.A.2).
[8] Deletion recommended by ENG-DECS (now ES-EPD) C/S/A Team 7/11/05; see EMRef-50. There was some disagreement about when LANL began to comply with the UBC, a decision necessary for use of this method.

	CHAPTER 15 CONSTRUCTION SAFEGUARDS The methods described and others as specified by LANL are required for areas resembling urban or campus, including all of TA-3 and within the TA-55 fence. For other areas, including those resembling rural/industrial, requirements may be reduced by LANL ES&H based on the analysis of construction hazards.

RECORD OF REVISIONS

Rev	Date	Description	POC	RM
0	10/27/06	Initial issue. Requirements formerly in Ch 1 Section Z10.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
1	6/19/07	Added NM Bldg Code. Org changes.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
2	7/21/08	Update for 2006 IEBC, other minor changes.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
3	9/15/09	Excluded Supplements; added provisions for minor work similar to code of record under IEBC Ch 3 Prescriptive Compliance Method.	Tobin Oruch, *CENG-OFF*	Gary Read, *CENG-OFF*
4	8/25/10	Very minor clarifications.	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*
5	6/20/11	2009 IEBC adoption.	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*
6	9/24/13	Minor clarification on fixture count for Level 2.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
7	3/30/15	2015 IEBC adoption.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
8	10/6/16	Added anchorage to code of record allowances at 301.1.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
9	3/24/21	Section 301.1 updated for new seismic spectra and SDC C allowance in ESM Ch 5 Sect. II r11.	Tobin Oruch, *ES-FE*	Jim Streit, *ES-DO*