

## Appendix A

### LANL Building Code (LBC)

This mandatory Appendix summarizes adopted codes and amendments to same, especially the International Building Code.

Adoption: Comply with the codes and editions shown below.

| Topic              | Code                                   | LANL-Adopted Edition | LANL Amendments                 | NMAC Amendments (follow any more stringent <sup>1</sup> ) |
|--------------------|--|----------------------|---------------------------------|---|
| Buildings          | International Building Code            | 2009                 | See this document               | <a href="#">14.7.2</a>                                    |
| Existing Buildings | Intl Existing Building Code            | 2009                 | See IBC-GEN App B, LEBC         | See IBC-GEN App B, LEBC                                   |
| Electrical         | National Electrical Code               | 2011 <sup>2</sup>    | See ESM Chapter 7 Section D5000 | <a href="#">14.10.4</a>                                   |
| Energy             | International Energy Conservation Code | 2009                 | See ESM Chapter 14              | <a href="#">14.7.6</a>                                    |
| Fire               | NFPA 1 and 101 Life Safety Code        | 2009                 | See ESM Ch 2                    | <a href="#">10.25.5</a> <sup>3</sup>                      |
| Fire               | International Fire Code                | 2006 <sup>4</sup>    | See ESM Ch 2                    | <a href="#">10.25.5</a>                                   |
| Mechanical         | IAPMO Uniform Mechanical Code          | 2009                 | See ESM 6                       | <a href="#">14.9</a>                                      |
| Plumbing           | IAPMO Uniform Plumbing Code            | 2009                 | See ESM 6                       | <a href="#">14.8.2</a>                                    |

Follow later editions of the above codes only if they newer edition dates themselves are specifically stated in the LANS/DOE contract or project's Subcontract; likewise, do not use later editions only because another ESM chapter states or implies latest edition.<sup>5</sup>

<sup>1</sup> ESM Chapter 1 Section Z10 addresses most stringent concept in its initial pages.

<sup>2</sup> Use latest edition when mandated by D5000. FYI, edition above is in the context of new work and mods; the edition for simple maintenance (not mods) is occasionally different during transition times; see the [PI01-13](#) Electrical Safety for that.

<sup>3</sup> Per [St. FM Office](#) (Enforcement tab), NM only follows these NFPA docs for existing buildings, but LANL follows them for all buildings

<sup>4</sup> IFC-2006 added by LANL July 2008 anticipating NM adoption (did not occur officially; NMAC and [St. FM Office](#) (Enforcement tab) says 2003 at time of writing. But many Marshals use 2006 and they are reviewing 2009.

<sup>5</sup> Adoption of newer codes by NM becomes effective when this chapter (and normally ESM Chapter 5 also) is revised to reflect them. DOE O 420.1B (in LANS Contract) states in the Contractor Requirements Document Section 1.c: "All new construction, as a minimum, must comply with national consensus industry standards and the model building codes applicable for the state or region supplemented in a graded manner with additional safety requirements for the associated hazards in the facility that are not addressed by the codes." Since IBC is the model code in NM, it is the one LANL must follow. See also ESM Chapter 1 Section Z10 regarding State code compliance and DOE NSEP direction on same.

New Mexico code amendments (refs above) which strengthen the above codes are also required (see ESM Ch 1 Section Z10 Codes and Standards Subsection) except where variance is granted by LANL Building Official (LBO).

I-Code Supplements (ICC-published, approved changes between editions) are not mandatory. They may be consulted or followed where they do not lessen the requirements of the currently-adopted edition.

LANL-Approved Interpretations

Interpretations from the ICC are here: [http://www2.iccsafe.org/cs/Codes\\_List.cfm](http://www2.iccsafe.org/cs/Codes_List.cfm)

LANL interpretations and variances to this chapter may be listed on ESM Chapter page; they are incorporated into the ESM chapters upon next revision.

Access: The IBC and IFC are online for LANL at <http://lib-www.lanl.gov/infores/stand/ihs/index.htm>

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|     | <b>CHAPTER 1 ADMINISTRATION</b>   |
|     | <p><b>SECTION 101 GENERAL</b> (substitutions apply to this section and throughout Code)</p> <p><b>101.1 Title.</b> Substitute: These regulations shall be known as the LANL Building Code, hereinafter referred to as “this code.”</p> <p><b>101.4.1.</b> Substitute ESM Electrical Chapter 7 for ICC Electrical Code.</p> <p><b>101.4.2.</b> Substitute ESM Fire Chapter 2 for International Fuel Gas Code.</p> <p><b>101.4.3.</b> Substitute ESM Mechanical Chapter 6 for International Mechanical Code.</p> <p><b>101.4.4.</b> Substitute ESM Mechanical Chapter 6 for International Plumbing Code.</p> <p><b>101.4.5.</b> For Int’l Property Maintenance Code, substitute LANL policies and procedures on facility maintenance (including O&amp;Ms, PDs, Ps, APs, etc.).</p> <p><b>101.4.6.</b> Follow ESM Fire Chapter 2. Follow the most stringent among fire and life-safety requirements of the IBC, IFC, New Mexico and Los Alamos County amendments to these; and NFPA 101-Life Safety Code. Doing so shall be considered to have met the “life safety” requirements of OSHA (29 CFR 1910).<sup>6</sup> The LANL Fire Marshal is the Authority Having Jurisdiction for resolving issues surrounding “most stringent,” and any mutually-exclusive conflicts among these documents.<sup>7</sup></p> <p><b>101.4.7.</b> Follow ESM Sustainable Design Ch 14 where it is more stringent than the International Energy Conservation Code (e.g., over \$5M, certain additions and mods)</p> |
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|     | <p><b>SECTION 103 DEPARTMENT OF BUILDING SAFETY</b></p> <p><b>103.1 Creation of enforcement agency.</b> Substitute: The LANL Building Department (a virtual department) is hereby created and the official in charge thereof shall be known as the LANL Building Official (LBO).</p> <p><b>103.2 Appointment.</b> Add: at LANL, the Lab Director-approved institutional policy document and its mandated LANL Engineering Standards process culminating in this ESM and Chapter reflecting the designation of Engineering Services Division Leader (or its successor) as LBO.</p>   |
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<sup>6</sup> Basis: [PD 1220, Fire Protection Program, Section 3.1.2](#), also J. Streit memo, (EMRef 24.) (Note: EMref refers to a Standards Program internal filing system for offline references.

<sup>7</sup> PD 1220 Section 3.1.3 as "directed" by DOE G 420.1-3 Section 4.19

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| LBC | <p><b>103.3 Deputies.</b> Add: The ES Division Design Engineering Group Leader is delegated as a Deputy to act in the LBO’s absence. The LANL Fire Marshal is delegated as Deputy acting for all fire and life-safety related matters. Others as delegated in writing by LBO.</p> <p><b>SECTION 104 DUTIES AND POWERS OF BUILDING OFFICIAL</b></p> <p><b>104.1 General.</b> Where IBC states “The building official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions,” LANL shall use the LANL Engineering Standards clarification/interpretation/variance policy stated in ESM Chapter 1 Section Z10; this will involve the POC for this chapter, the Fire Marshal for fire/life safety matters, the Electrical AHJ for those matters, and the ESM POCs for affected disciplines (e.g., structural, architectural).</p> <p>In addition, the LBO shall approve any alternate method, variance, or exception that relates to the administrative aspects of this chapter (e.g., design/plan review, inspection, occupancy).</p> <p><b>Caution:</b> When a variance may affect worker health or safety as regulated by 10CFR851 (primarily areas of OSHA; construction safety; fire protection; firearms safety; explosives safety; pressure safety; electrical safety; industrial hygiene; occupational medicine; biological safety; and motor vehicle safety; see 851.23, .27), then DOE approval may be required per 10CFR851 Subpart D.</p> |
| LBC | <p><b>104.2 Applications and permits.</b> Traditional applications and permits are not used at LANL. Therefore, instead of the LBO receiving applications and issuing permits for the erection and alteration, demolition and moving of buildings and structures, LANL shall control building activities through the internal project management/initiation (<a href="#">SD 350</a>) and PRID processes, and the LBO provides approval through the plan (design) review process described in IBC-GEN. Note: All other IBC references to permits shall be taken to mean these LANL internal processes.</p>  |
| LBC | <p><b>104.3 Notices and orders.</b> Substitute: The LBO shall issue all necessary notices and orders (including stop work orders) to ensure compliance with the IBC.</p> <p><b>104.4 Inspections.</b> Add: This chapter supersedes any conflicting statements in ESM Ch 4 Section B-C_GEN.</p> <p><b>104.5 Identification.</b> Delete.</p> <p><b>SECTION 105 PERMITS</b><br/>See 104.2 above for general amendments. In addition, in 105.2, Level 1 Alterations per the IEBC are exempt from plan review.</p> <p><b>SECTION 106 CONSTRUCTION DOCUMENTS</b><br/>See ESM Ch. 1 Section Z10 and other ESM chapters for additional requirements. Also, 106.3.4.1 is deleted since LBO is in owner organization.</p>  |
| LBC | <p><b>SECTION 107 TEMPORARY STRUCTURES AND USES</b><br/>See also IBC-GEN body regarding definition of temporary and related requirements.</p> <p><b>SECTION 108 FEES</b><br/>Deleted.</p>  |

| LBC                                | <p><b>SECTION 109 INSPECTIONS</b><br/>See also this Chapter.</p> <p><b>SECTION 110 CERTIFICATE OF OCCUPANCY</b><br/>See this Chapter for amendments.</p> <p><b>SECTION 111 SERVICE UTILITIES</b><br/>Also see O&amp;M Criterion <a href="#">302 and 303</a> and consult with LANL Utilities for utility connections and disconnections. Where those policies and the IBC conflict, the Utilities documents take precedence.</p> <p><b>SECTION 112 BOARD OF APPEALS</b><br/>Substitute: The LANL Site Chief Engineer will resolve conflicts when necessary.</p> <p><b>SECTION 113 VIOLATIONS</b><br/>Substitute: Violations will result in Non-conformance Reports being issued with elevation to upper management as appropriate.</p> <p><b>SECTION 114 STOP WORK ORDER</b><br/>Substitute: As with any LANL employee, whenever the LBO finds any work regulated by this code being performed in a manner dangerous or unsafe, the building official is authorized to issue a stop work order. Work contrary to this code will be treated as a violation (see Section 113).</p> <p><b>SECTION 115 UNSAFE STRUCTURES AND EQUIPMENT</b><br/>Deleted. In general, this is the LANL Facility Operations Director responsibility; however, the LBO or Fire Marshal may require actions to improve or vacate.</p> |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
|------------------------------------|---|--------------------|--------------|---------------|-----|----------|---|--------------------------|--|-------|--|------------------------------------|--|
| LBC                                | <p style="text-align: center;"><b>CHAPTER 2<br/>DEFINITIONS</b></p> <p>Adopted with the following amendments:</p> <table border="1"> <thead> <tr> <th>IBC Reference/Term</th> <th>Take to mean</th> </tr> </thead> <tbody> <tr> <td>Code official</td> <td>LBO</td> </tr> <tr> <td>lot line</td> <td>In the context of a construction project, the location of the physical barrier (e.g., fence or barrier) surrounding a site.</td> </tr> <tr> <td>National Electrical Code</td> <td>NFPA 70, <i>National Electrical Code</i></td> </tr> <tr> <td>owner</td> <td>The facility managing organization, typically Facility Operations Director</td> </tr> <tr> <td>Unsafe Condition (IEBC 115.1, 202)</td> <td>Further defined for electrical as not conforming to NFPA 70E, <i>Standard for Electrical Safety in the Workplace</i>.</td> </tr> </tbody> </table>                               | IBC Reference/Term | Take to mean | Code official | LBO | lot line | In the context of a construction project, the location of the physical barrier (e.g., fence or barrier) surrounding a site. | National Electrical Code | NFPA 70, <i>National Electrical Code</i> | owner | The facility managing organization, typically Facility Operations Director | Unsafe Condition (IEBC 115.1, 202) | Further defined for electrical as not conforming to NFPA 70E, <i>Standard for Electrical Safety in the Workplace</i> . |
| IBC Reference/Term                 | Take to mean  |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| Code official                      | LBO   |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| lot line                           | In the context of a construction project, the location of the physical barrier (e.g., fence or barrier) surrounding a site.   |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| National Electrical Code           | NFPA 70, <i>National Electrical Code</i>  |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| owner                              | The facility managing organization, typically Facility Operations Director  |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| Unsafe Condition (IEBC 115.1, 202) | Further defined for electrical as not conforming to NFPA 70E, <i>Standard for Electrical Safety in the Workplace</i> .  |                    |              |               |     |          |   |                          |  |       |  |                                    |  |
| LBC                                | <p style="text-align: center;"><b>CHAPTERS 3-15, 24-26, and 30-31</b></p> <p>See ESM Fire Chapter 2 and Architectural Chapter 4 for amendments.</p>   |                    |              |               |     |          |   |                          |  |       |  |                                    |  |

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| LBC | <p style="text-align: center;"><b>CHAPTERS 16 and 18-23</b></p> <p>See ESM Structural Chapter 5 Sections I and II for amendments.</p> <p style="text-align: center;"><b>CHAPTER 17</b><br/><b>STRUCTURAL TESTS AND SPECIAL INSPECTIONS</b></p> <p>See this ESM Chapter for amendments. These amendments include but are not limited to the following:</p> <p><b>1703.5 Labeling.</b> Add: Where this paragraph and others in the Code describe a need for product labeling in accordance with the IBC and/or by an LBO-approved testing agency, LANL takes exception generally; however, products required to be labeled either by the NFPA or to indicate required structural/seismic or fire resistance shall continue to require such labels from a nationally recognized testing laboratory (<a href="#">NRTL</a>) such as UL or FM.</p> <p><b>1704.2 Inspection of Fabricators.</b> Add: Special Inspection or shop approval is not required for burning and cutting of mild steel (e.g., steel to ASTM A36).<sup>8</sup></p> <p><b>1704.2.2 Fabricator Approval.</b> Add: To clarify, a fabricator approved in accordance with this section eliminates the need for inspection of fabricators required by Section 1704.2, and use of an approved fabricator also eliminates the need for special inspections for seismic resistance required by Section 1707. Since the fabricator must be approved to perform seismic resistance work, the building official's approval should consider this.<sup>9</sup></p> <p style="text-align: center;"><b>CHAPTER 34</b><br/><b>EXISTING STRUCTURES</b></p> <p>Deleted in entirety in favor of Appendix B, LANL Existing Building Code.</p> <p style="text-align: center;"><b>APPENDIX A</b><br/><b>EMPLOYEE QUALIFICATIONS</b></p> <p>Adopted as a mandatory appendix with the following amendments:</p> <p><b>A101.1 Building official.</b> No changes; national certification (e.g., ICC) remains optional. Same for Deputy LBOs.</p> <p><b>A101.2 Chief inspector.</b> A professional engineer's license or LBO judgment of suitability may substitute for the requirement to have a nationally recognized certification for the trade.</p> <p><b>A101.3 Inspector and plan examiner.</b> Substitute:</p> |
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<sup>8</sup> Removal of mild steel should not affect strength/quality in the same way as welding, so LANL takes exception for this activity.

<sup>9</sup> EMRef-52: ICC staff clarification dated 9/13/2006:

Q1. A fabricator approved in accordance with Section 1704.2.2 of the 2003 IBC eliminates the need for inspection of fabricators required by Section 1704.2. Does the use of an approved fabricator also eliminate the need for special inspections for seismic resistance required by Section 1707?

A1. Yes. Section 1704.2.2 states "Special inspections required by this *code* [emphasis added] are not required where the work is done on the premises of....." This indicates it applies to all special inspections. Since the fabricator must be approved to perform such work, the building official's approval should consider seismic resistance.

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|  | <p>1. Inspectors, including Special Inspectors, shall be qualified based on the guidelines set forth in Engineering Standards Manual Chapter 16, Section IBC-TIA, Att B (may waive national certification).</p> <p>2. Plans Examiners shall be engineers, architects, or designers selected by the LBO or Deputy and involved in the review of building designs and having at least 5 years experience. National certification not required.</p> <p><b>A101.4 Termination of employment.</b> Deleted.</p> <p style="text-align: center;"><b>APPENDIX B<br/>BOARD OF APPEALS</b></p> <p>Not adopted; appeals per ESM Chapter 1 Section Z10 on clarifications, etc.</p> <p style="text-align: center;"><b>APPENDIX C<br/>GROUP U<br/>AGRICULTURAL BUILDINGS</b></p> <p>Contact architectural POC for guidance if and when such buildings are to be constructed.</p> <p style="text-align: center;"><b>APPENDIX D<br/>FIRE DISTRICTS</b></p> <p>Not adopted; contact Fire Marshal with any questions on this matter.</p> <p style="text-align: center;"><b>APPENDIX E<br/>SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS</b></p> <p>Not adopted; addressed by ESM Chapter 4 Architectural.</p> <p style="text-align: center;"><b>APPENDIX F<br/>RODENT PROOFING</b></p> <p>Adopted.<sup>10</sup></p> <p style="text-align: center;"><b>APPENDIX G<br/>FLOOD-RESISTANT CONSTRUCTION</b></p> <p>Not adopted.<sup>11</sup></p> <p style="text-align: center;"><b>APPENDIX H<br/>SIGNS</b></p> <p>Adopted.</p> <p style="text-align: center;"><b>APPENDIX I<br/>PATIO COVERS</b></p> <p>Adopted, as it may have applicability for awnings, bus shelters, muster areas, etc.</p> <p style="text-align: center;"><b>APPENDIX J<br/>GRADING</b></p> <p>Adopted.<sup>12</sup></p> |
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<sup>10</sup> Rodents in New Mexico can carry hanta virus, plague

<sup>11</sup> LANL building construction is likely to be on high ground

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|  | <p><b>APPENDIX K</b><br/> <b>ADMINISTRATIVE PROVISIONS</b></p> <p>Not adopted.<sup>13</sup></p> |
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**RECORD OF REVISIONS**

| <b>Rev</b> | <b>Date</b> | <b>Description</b>   | <b>POC</b>                      | <b>RM</b>                            |
|------------|-------------|--|---------------------------------|--------------------------------------|
| 0          | 10/27/06    | Initial issue. Requirements formerly in Ch 1 Section Z10.                    | Tobin Oruch,<br><i>CENG-OFF</i> | Kirk Christensen,<br><i>CENG-OFF</i> |
| 1          | 6/19/07     | Added NM Bldg Code; Ch. 34, App A. Org changes.                              | Tobin Oruch,<br><i>CENG-OFF</i> | Kirk Christensen,<br><i>CENG-OFF</i> |
| 2          | 7/21/08     | Update for 2006 IBC and its appendices, other minor changes.                 | Tobin Oruch,<br><i>CENG-OFF</i> | Kirk Christensen,<br><i>CENG-OFF</i> |
| 3          | 9/15/09     | Addressed editions to be used, optional Supplements, and reference editions. | Tobin Oruch,<br><i>CENG-OFF</i> | Gary Read,<br><i>CENG-OFF</i>        |
| 4          | 8/25/10     | Added NEC, IECC. Newer code adoptions will be by revision of this document.  | Tobin Oruch,<br><i>CENG-OFF</i> | Larry Goen,<br><i>CENG-OFF</i>       |
| 5          | 6/20/11     | Adopted 2009 codes concurrent with NM.                                       | Tobin Oruch,<br><i>CENG-OFF</i> | Larry Goen,<br><i>CENG-OFF</i>       |

<sup>12</sup> Required by State of New Mexico.

<sup>13</sup> Adequately addressed by ESM Ch 7 Electrical.