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**INITIAL STATEMENT OF REASONS
FOR
PROPOSED BUILDING STANDARDS
OF THE
CALIFORNIA ENERGY COMMISSION**

California Energy Commission

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**REGARDING THE CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 1, CHAPTER 10,
and PART 6 (CALIFORNIA ENERGY CODE)**

**2016 BUILDING ENERGY EFFICIENCY STANDARDS
DOCKET NUMBER 15-BSTD-1**

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I. INTRODUCTION

This Initial Statement of Reasons (“ISOR”) describes the purposes, rationales, and necessity of the California Energy Commission’s proposed amendments to its energy efficiency standards for buildings, which would go into effect on January 1, 2017, if adopted by the Energy Commission and approved by the California Building Standards Commission.¹ These standards are in the California Code of Regulations, Title 24, Part 1, Chapter 10, and Part 6 (and are also known as the California Energy Code). This ISOR fulfills the requirements of California’s Administrative Procedure Act (see Government Code section 11340 et seq.).

The Energy Commission welcomes comments on the ISOR and on the proposed building standards that the ISOR describes. Please see the accompanying Notice of Proposed Action (“NOPA”), also dated February 13, 2012, for instructions on how to submit comments electronically, on paper, and orally at Energy Commission hearings.

A. A Brief History of the Energy Commission's Building Standards

In 1975 the Department of Housing and Community Development adopted the state’s first energy conservation standards for buildings, under the State Housing Law authority, which required basic levels of insulation. Also in that year the Energy Commission began operations, under the Warren-Alquist Act (Public Resources Code section 25000 et seq.) That Act gives specific directives to the Energy Commission regarding what the standards are to address, what criteria are to be met in developing standards, and what implementation tools, aids, and technical assistance are to be provided. (Public Resources Code sections 25402(a)-(b), 25402.1, - 25402.8.) The most important requirement is that the standards save building owners more money in reduced bills for electricity and natural gas than any additional construction costs that the standards impose. The building standards must also meet the requirements of the Administrative Procedure Act (e.g., that they carry out the purpose of the enabling statute, that they are clear, and that they have been adopted in an open public process in which alternatives are thoroughly considered) and the California Environmental Quality Act (“CEQA”, Public Resources Code section 21000 et seq.), which requires that state agency actions not cause undue environmental harm. These requirements help ensure that the standards promote the State’s goal to have a reliable, economic, and environmentally-sound energy supply (see, e.g., Public Resources Code sections 25001, 25300(a)-(b)).

In 1976 the Commission adopted its first building standards, which addressed space heating and cooling, water heating, and windows, in addition to insulation. Since then the Commission has updated the standards in conjunction with the Building Standards Commission’s publication of all the State’s building codes, usually every three years. The updates incorporate the most advanced developments in energy conservation (e.g., new lighting technologies, new types of roofs that reflect unneeded heat) to ensure that new construction in California will be as energy-efficient as possible, consistent with the requirement that the standards be cost-effective for consumers. Today, the standards contain energy efficiency – and, as recently required by statute, water efficiency requirements for newly constructed buildings, additions to existing buildings, alterations to existing buildings, and, in the case of nonresidential buildings, repairs to existing buildings.

¹ The ISOR refers to the proposed standards in various ways, e.g., “2016 Building Energy Efficiency Standards,” “proposed standards,” and “2016 Standards”; in addition, it uses “amendments” or “proposed regulations” as a shorthand reference for new provisions, revisions to existing provisions, and deletions of existing provisions, in the Parts 1 and 6 of Title 24 of the California Code of Regulations.

The Energy Commission's building energy efficiency standards are contained in two parts of Title 24 of the California Code of Regulations. Administrative regulations, such as how the standards' requirements are integrated with local governments' building permit processes, are in Part 1, Chapter 10, of Title 24, and the substantive requirements for building construction are in Part 6 of Title 24. In addition, voluntary, or "reach" guidelines for sustainable building practices that are more protective of the environment than the minimum standards are in Part 11 of Title 24, the California Green Building Standards. The Energy Commission is responsible for the Energy Chapters (separate chapters are published for residential and nonresidential buildings) of the California Green Building Standards. This document concerns proposed regulations in Part 6 and Part 1, Chapter 10 only.

B. How the Standards Work

The standards are divided into several sections, some of which apply to all buildings and all types of construction, and some of which apply only to specified subsets.

The first division in the standards is between administrative regulations in Part 1, Chapter 10, of Title 24, and substantive regulations in Part 6 of Title 24. The former describe procedural requirements, such as what information must be on building permit applications; the latter describe how buildings must be constructed. (In addition, there are voluntary, or "reach," Green Building Standards in Part 11, which are described further below.)

The substantive, how-buildings-must-be-constructed regulations in Part 6 are further subdivided. In general, each building must (1) comply with various mandatory requirements, *and* (2) meet an energy goal. In turn, meeting the energy goal can be accomplished *either* (a) by demonstrating, under the "performance" compliance approach, that the building will consume no more energy that is set forth in an "energy budget", which is established on an energy-use-per-square-foot basis; *or* (b) by installing a package of specified measures (e.g., advanced lighting controls, high-performance windows) in the "prescriptive" compliance approach. The energy budget and the prescriptive requirements vary among different building types (which are nonresidential (e.g., retail, office), low-rise residential, high-rise residential, and hotel/motel) and among 16 different "climate zones" within the state. There are also differences between construction of brand-new buildings, on the one hand, and additions, alternations, and repairs to existing buildings, on the other hand. The (1) mandatory, (2)(a) energy budget, and (2)(b) prescriptive provisions, and the different types of buildings and construction, appear in Part 6 as follows:

Subchapter 1 describes the scope of the standards (which building types and which types of construction) are covered. It also sets forth the definitions and the rules of construction that apply to Part 6.

Subchapter 2 contains mandatory requirements for all buildings.

Subchapters 3 through 5 apply to new nonresidential, high-rise (3 or more stories) residential, and hotel/motel buildings, thus:

Subchapter 3 contains additional mandatory requirements for new nonresidential, high-rise residential, and hotel/motel buildings.

Subchapter 4 contains still more mandatory requirements for new nonresidential, high-rise residential, and hotel/motel buildings.

Subchapter 5 sets the performance (energy budget) and prescriptive (package of measures)

compliance approaches for new nonresidential, high-rise residential, and hotel/motel buildings.

Subchapter 6 establishes the requirements for additions, alterations, and repairs to existing nonresidential, high-rise residential, and hotel/motel buildings.

Subchapter 7 contains the mandatory requirements for new low-rise residential buildings.

Subchapter 8 sets for the performance (energy budget) and prescriptive (package of measures) compliance approaches for new residential buildings.

Subchapter 9 establishes the requirements for additions and alterations to existing low-rise residential buildings. (Repairs to such buildings are not covered by the standards.)

Part 6 also includes a set of appendices that are adopted along with and are a part of the standards. Due to their volume and complexity, they are not codified, but are incorporated by reference.

C. Summary of the Changes Proposed in This Rulemaking Proceeding

The proposed updates that comprise the 2016 Standards focus on three key areas: updating low rise residential requirements to move closer to California's Zero Net Energy goals, updating nonresidential and high-rise residential requirements to better align with the current (2013) version of the national American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1 standards, and reviewing the entirety of the existing regulations for opportunities to improve clarity and consistency, correct errors, streamline requirements, or make adjustments to provisions in the regulations that were found to have unanticipated effects.

The following is a list of the proposals currently included in the Draft Express Terms. Note that these proposals result from broad consideration of the three focus areas stated above: the Commission will consider suggested changes within these three areas as a part of this rulemaking.

Residential

The proposed changes to the residential sections of the Standards capture as prescriptive options several important updates to building technologies and best practices. By incorporating these improvements, these regulations narrow the gap between current residential construction and what will be required in 2020 to ensure that all new residential construction is Zero Net Energy.

The proposed changes examine four aspects of the residential building, as follows:

- For attics, the current practice in residential building design is to place a majority of HVAC ducting in an uninsulated attic space. These spaces can reach temperature extremes at different times of the year, leading to significant losses even when using insulated ducting.

For this reason, the 2016 Standards propose several prescriptive options for either moving HVAC ducts into conditioned spaces, placing attic insulation at the roof deck rather than above the ceiling, or sealing the attic similar to other rooms in the house. Any of these approaches may be applied, or builders may take an optional path of installing additional solar atop a more traditional vented, above-ceiling insulated attic.

In addition to these new prescriptive options, staff have determined that tighter air leakage requirements are both feasible and cost effective in newly constructed buildings. As a result, the requirement for duct tightness has been adjusted from 6% to 5% air leakage.

- For walls, the proposed regulations update the U-factor requirements for residential walls to acknowledge several new cost-effective practices and insulation products. The Energy Commission has found that several approaches are available for meeting the proposed Standards.
- For lighting, the current regulations designate certain types of residential lighting as “high efficacy lighting”, and require a certain amount of high efficacy lighting within the home. The proposed regulations take the next step of requiring all of the lighting in new homes to be high efficacy, while also expanding the types of lighting that qualifies as high efficacy lighting. This also allows the regulations to be streamlined to a significant extent while ensuring that a variety of lighting technologies and techniques are available to builders and contractors. As a part of this, Joint Appendix 8 has been rewritten to be technology neutral, and to apply to any technology intended to qualify as high efficacy lighting.
- For water heating, the proposed regulations make the prescriptive option for installation of a gas instantaneous (or “tankless”) residential water heater the primary option considered by the regulations. The prescriptive option for installing a gas storage water heater has been updated to include either installing a compact hot water distribution system or installing HERS-verified pipe insulation on all hot water piping.

Note that the proposed regulations also specify that when an instantaneous water heater is installed, isolation valves are required to be installed with such a heater.

Nonresidential

The proposed changes to the nonresidential sections of the Standards focus on updating our regulations to align with ASHRAE 90.1 (2013). This includes making the following updates:

- Revising the prescriptive opaque envelope requirements for all nonresidential and high-rise residential buildings and relocatable public schools. These requirements also provide the baseline requirements for the standard design building in the performance method.
- Updating and aligning values relating to required space conditioning efficiencies and lighting power allowances. (Note that staff have not included changes to match values specified in ASHRAE 90.1 that were not determined, by staff analysis, to be feasible and cost effective in California.)
- Revising nonresidential lighting control requirements, in particular making occupant sensing controls more consistent in where they're required and how they're expected to perform.

- Adding requirements for elevators that ensure the lights and fans do not stay on while the cab is empty.
- Adding requirements for escalators and moving walkways in transit areas (e.g., airports, bus stations, etc.) to run at a lower, less energy-consuming speed when not in use.
- Adding requirements for mechanical systems shut off controls specifying that any directly conditioned space with operable doors must be equipped with interlock switches that turn off the space conditioning equipment while the doors are open.
- Updating requirements for electrical power distribution systems relating to service metering, voltage drop, and disaggregation to align with ASHRAE 90.1, the latter of which aligns to the specifications for energy monitoring equipment found in ASHRAE 90.1.

In addition, in analyzing ASHRAE 90.1 staff have identified areas where it is feasible and cost effective to establish a standard above the ASHRAE standard. These are:

- For Lighting Power Allowances, the Energy Commission is proposing a greater efficiency requirement for the installed lighting than that specified in ASHRAE 90.1.
- For Elevator Cab Lighting, the Energy Commission is proposing a greater efficiency requirement for the installed lighting than that specified in ASHRAE 90.1.
- Adding requirements for mechanical systems shut off controls specifying that any directly conditioned space with operable wall or roof openings (i.e., windows or skylights) must be equipped with interlock switches that turn off the space conditioning equipment while the openings are open.
- Direct digital controls were previously required to have specific features when installed, but were not required to be installed in nonresidential construction. The proposed regulations now require installation of direct digital controls and add specificity to the expected features and operation of those controls.

Code cleanup

The proposed changes to the Standards also include changes throughout the regulations to clarify, simplify, and streamline the existing language and requirements. Such changes address a potential problem of not being properly understood, provide a benefit in themselves, and improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16. The most significant of these changes are the following:

- Acceptance Test Training and Certification – The changes to Title 24 Part 1, Section 10-103A and 10-103B clarify and streamline the approval process for Acceptance Test Training and Certification Providers. Of note, new provisions have been added to allow

for amendment of a submitted application, meaning that changes to a submitted or approved application may be made without requiring a complete resubmittal.

- Commissioning – The changes to Title 24, Part 6, Section 120.8 clarify the applicability of building commissioning and correct the use of terms to be consistent with Title 24, Part 1, Section 10-103(a). Importantly, these changes also remove language that incorrectly implied that commissioning was required for alterations, or applied to covered processes. Matching corrections have been made where this Section is referenced in Section 100.0 Table 100-A, and Section 141.0.
- Nonresidential Lighting Alterations – The changes to Part 6, Section 141.0(b)2l simplify and streamline the requirements for lighting alterations. The terms “lighting alteration”, “lighting wiring alteration”, and “luminaire modification” are now cleanly separated and discussed in separate Sections. For luminaire modifications, the control requirements are being relaxed to require that existing multi-level or automatic shutoff controls remain operable in controlling the luminaires after they are modified, rather than requiring the installation of new multi-level or automatic controls.
- Alternate Calculation Method manuals – The changes to the Alternate Calculation Method manuals adopted as appendices to the Standards combine what was previously two largely identical manuals (for residential and nonresidential building modeling software) into a single manual. This manual provides more explicit and better organized requirements for the approval of compliance software. The requirements that apply to the Compliance Manager software developed by the Energy Commission are now clearly separated from the requirements for approval of vendor software and the requirements for vendor software user manuals. Two appendices have been added to the manual containing the evaluation criteria specific to residential and nonresidential software.
- Charge Indicator Displays – For residential HVAC equipment, the language relating to installation of Charge Indicator Displays has been updated to use the broader term Fault Indicator Displays, recognizing that a display may treat an incorrect charge as a fault while also being able to display other fault conditions or other information.
- Pipe Insulation – For residential and nonresidential hot water piping, the value for the required level of residential insulation was erroneously removed during the 2013 code cycle update when the tables were merged. This separate value has been returned to Table 120.3-A.
- Economizers – Testing and certification of economizer damper leakage to the Energy Commission in order to be installed as part of the prescriptive performance approach of Section 140.4(e)4 has been clarified, and the language expanded to explicitly state who is expected to certify and what information must be provided. In addition, the specification that an economizer is required for each air handler was clarified to be more explicit in where it applied.
- Electrical Power Distribution System – Circuit controls for 120v receptacle were clarified and moved to a separate section in 130.5 relating to electrical power distribution systems.

- Fault Detection and Diagnostics – References to pressure sensors were removed, and the word “unitary” removed as an unneeded term.

II. THE SPECIFIC PURPOSE OF EACH REGULATION, THE PROBLEM IT ADDRESSES, AND WHY IT IS REASONABLY NECESSARY

Pursuant to the requirements of Government Code section 11346.2(b)(1), this section of the ISOR contains a statement of the specific purpose of each adoption, amendment, or repeal, the problem the agency intends to address, and the rationale for the determination by the agency that each adoption, amendment, or repeal is reasonably necessary to carry out the purpose and address the problem for which it is proposed.

A. The General Purpose, Rationale, and Necessity of the Proposed Amendments and the General Benefits the Energy Commission Anticipates From the Regulatory Action, Including the Benefits or Goals Provided In the Authorizing Statute

The Legislature has found that

electrical energy is essential to the health, safety and welfare of the people of this state and to the state economy, and that it is the responsibility of state government to ensure that a reliable supply of electrical energy is maintained at a level consistent with the need for such energy for protection of public health and safety, for promotion of the general welfare, and for environmental quality protection.

[T]he present rapid rate of growth in demand for electric energy is in part due to wasteful, uneconomic, inefficient, and unnecessary uses of power and a continuation of this trend will result in serious depletion or irreversible commitment of energy, land and water resources, and potential threats to the state's environmental quality.

(Pub. Resources Code, §§ 25001, 25002.) Accordingly,

It is further the policy of the state and the intent of the Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals.

(Pub. Resources Code, § 25007.)

Improvements in energy efficiency are among, if not, the cheapest and most environmentally-friendly methods to address the problem of balancing the state's electricity demand and supply. Thus, existing law (e.g., Public Resources Code Sections 25213, 25402, 25402.1, 25402.4, 25402.5, 25402.8, and 25910) requires the Energy Commission to adopt these standards that prescribe minimum efficiency levels for buildings (as well as outdoor lighting and irrigation systems that are regarded as being “outside” of buildings). The benefits of these regulations may be enumerated as follows (see Gov. Code, § 11346.2, subd.(b)(1)):

- A reliable electrical system;
- Mitigation of wasteful, uneconomic, inefficient, and unnecessary uses of electricity;
- Reduction in the trend of increasing electricity consumption;
- Protection of energy, land and water resources, and the state's environmental quality;
- Creation of jobs; and
- Reduced energy costs for consumers and businesses.

The standards setting the minimum efficiency levels must be feasible and cost-effective. (Pub. Resources Code, § 25402, subd.(b)(3).) Past rulemakings have described the feasibility and cost-effectiveness of each of the efficiency standards previously adopted by the Energy Commission, and this ISOR describes the feasibility, cost-effectiveness, and other key features of the proposed 2016 amendments to the current 2013 Building Energy Efficiency Standards.

In addition to the enumerated benefits of adopting new cost effective efficiency provisions, the benefits of revising language to be clearer and more consistent are manifold. They include better public understanding of the regulations and participation in regulatory proceedings, more transparency in the application of the regulations by regulatory authorities, improved compliance with the regulations, and enhancing the effectiveness of education and outreach.

Generally, the regulatory changes described below are intended to carry out the benefits and achieve the goals described in this section, which apply to all of the proposed changes described in this document. Additionally, for specific benefits regarding energy cost savings of specific measures, please see Section III and Table 2 in Section VI of this document, as well as the documents relied upon for this ISOR listed in Section IV Table 1.

B. The Specific Purpose, Rationale, and Necessity of Each Section of the Proposed Amendments

TITLE 24, PART 1, CHAPTER 10 (ADMINISTRATIVE REGULATIONS)

ARTICLE 1 – ENERGY BUILDING REGULATIONS

10-101(c): The purpose of this addition is to explicitly state the Energy Commission's intent in developing these regulations; specifically, that if any provisions are found invalid, they should be severed from the rest of the regulations, leaving the remainder in effect. This change is being made to avoid a potential problem identified when considering recent challenges to the current provisions. If the Energy Commission's intent were unclear, a court could conclude regulations other than those explicitly at issue in a challenge should be invalidated. Thus, a severability clause is an important aspect of a consistent and predictable regulatory landscape to inform interested persons that even if a specific regulation were invalidated, the remaining provisions are intended to remain in effect. A severability clause also reduces the risk that if a particular provision were found invalid, Commission resources would have to be devoted to redeveloping the remaining, otherwise valid, regulations. This change is necessary to expressly state that the regulations are separable, and to provide the noted benefits.

10-102: The definition for 'NSHP Guidebook' was removed because the relevant provisions naturally expired based on the dates in the current regulations. The purpose of this change is to enhance clarity by removing a definition that applies to a program that no longer needs to be specified in regulation. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-103(a): The phrase “Beginning on January 1, 2015” was removed wherever it occurred, given that this effective date has already passed. The purpose of this change is to enhance clarity by removing an effective date that no longer needs to be specified in regulation, and to be consistent in presenting currently effective regulations without explicit effective dates. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16..

10-103(b): The purpose of this change is to enhance the clarity of this Section and support the changes to Section 150.0(k) by specifying that the maintenance information required to be left in the building for the building owner at occupancy shall, for residential buildings, include a schedule of all interior luminaires and lamps that have been installed to comply with Section 150.0(k). This change is necessary to clarify that replacing lamps is considered “routine maintenance” and that luminaires are “manufactured devices” covered by this Section. The benefit of this change is that by receiving a schedule of the installed luminaires and lamps, building owners can confirm that the correct lamps have been installed in each luminaire and can ensure correct replacements are made over time.

10-103(d): The purpose of this change is to remove a reference to the NSHP program which is set to naturally expire based on the dates in the current regulation. The purpose of this change is to enhance clarity by removing a definition that applies to a program that no longer needs to be specified in regulation. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16..

10-103-A (and subsections): The purpose of the changes to this Section are to clarify the regulations that apply to lighting control Acceptance Test Technicians, Employers, and Certification Providers, and streamline the approval mechanism by creating a process for amending a submitted or approved application.

The change to 10-103-A(b)2 clarifies without materially altering the requirements in the original text by removing the phrase “in its entirety” from the second sentence. This phrase does not appear to serve a distinct purpose or have any regulatory effect, and the Section reads more clearly without it.

The changes to 10-103-A(c) clarify without materially altering the requirements in the original text, with the exception of specifying a required minimum amount of quality assurance sampling in Section 10-103-A(c)3F, as explained below. The changes to 10-103-A(d) clarify without materially altering the requirements in the original text, in part by separating the section into two numbered paragraphs. 10-103-A(e) naturally expired per the dates specified in 10-103-A(e)4, and thus this Section was removed and the following Section was re-lettered from (f) to (e) to improve clarity. The changes to 10-103-A(f), now (e), clarify without materially altering the requirements in the original text.

A new Section 10-103-A(f) was added to provide a mechanism for certification providers to amend an application either received by, or approved by, the Energy Commission. The purpose of this provision is to allow for changes to be made to a received application without requiring a complete resubmittal by the applicant; this process also benefits the applicant because the

applicant avoids repeating the complete application process for an amendment to an application already submitted to the Energy Commission. An additional benefit of this provision is that it reduces the costs of administering and complying with the regulations because the Energy Commission can review the amendment without reviewing the entire application again, and the applicant avoids resubmitting the entire application that was already submitted. These changes are consistent with the State policy of streamlining operations and reducing regulatory burden, and are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

The substantive change to Section 10-103-A(c)3F is necessary to clearly specify the minimum amount of quality assurance testing required for approval. The benefit of specifying a minimum amount of quality assurance testing is that all affected persons share an understanding of the quality assurance requirements imposed by the regulation, while preventing case-by-case evaluations performed by the Energy Commission from inadvertently creating a rule of general application outside of the rulemaking process.

10-103-B (and subsections): The purpose of the changes to this Section are to clarify with the criteria and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16, the regulations that apply to mechanical Acceptance Test Technicians, Employers, and Certification Providers, and streamline the approval mechanism by creating a process for amending a submitted or approved application.

The changes to 10-103-B(c) clarify without materially altering the requirements in the original text, with the exception of specifying a required minimum amount of quality assurance sampling in Section 10-103-B(c)3F. The changes to 10-103-B(d) clarify without materially altering the requirements in the original text, in part by separating the section into two numbered paragraphs. 10-103-B(e) naturally expired per the dates specified in 10-103-B(e)5, and thus this Section was removed and the following Section was re-lettered from (f) to (e) to improve clarity. The changes to 10-103-B(f), now (e), clarify without materially altering the requirements in the original text. A new Section 10-103-B(f) was added to provide a mechanism for certification providers to amend an application either received by, or approved by, the Energy Commission. The purpose of this provision is to allow for changes to be made to a received application without requiring a complete resubmittal by the applicant. The benefit of this provision is that it reduces the cost of complying with the regulations.

These changes are consistent with the State policy of streamlining operations and reducing regulatory burden and necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16. The substantive change to Section 10-103-B(c)3F is necessary to clearly specify the minimum amount of quality assurance testing required for approval. The benefit of specifying a minimum amount of quality assurance testing is that all affected persons share an understanding of the quality assurance requirements imposed by the regulation, while preventing case-by-case evaluations performed by the Energy Commission from inadvertently creating a rule of general application outside of the rulemaking process.

10-106(b): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change is necessary to improve the code's compliance with the clarity and consistency criteria of

California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-108(a): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-109: The purpose of the change is to include Alternative Residential Field Verification Protocols to the formal Energy Commission approval process as described in this Section. Currently the Residential Reference Appendix offers a process for applicants to submit Alternative Residential Field Verification Protocols. Including the approval of Alternative Residential Field Verification Protocols in this Section is necessary to give structure to, and provide additional details about, the application and review process.

10-109(a): The purpose of the change is to include Alternative Residential Field Verification Protocols to the formal Energy Commission approval process as described in this Section. Currently the Residential Reference Appendix offers a process for applicants to submit Alternative Residential Field Verification Protocols. Including the approval of Alternative Residential Field Verification Protocols in this Section is necessary to give structure to, and provide additional details about, the application and review process.

10-109(b): The purpose of the change is to include Alternative Residential Field Verification Protocols to the formal Energy Commission approval process as described in this Section. Currently the Residential Reference Appendix offers a process for applicants to submit Alternative Residential Field Verification Protocols. Including the approval of Alternative Residential Field Verification Protocols in this Section is necessary to give structure to, and provide additional details about, the application and review process.

10-109(d): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-109(f): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16

10-109(j): The purpose of the change is to include Alternative Residential Field Verification Protocols to the formal Energy Commission approval process as described in this Section. Currently the Residential Reference Appendix offers a process for applicants to submit Alternative Residential Field Verification Protocols. Including the approval of Alternative Residential Field Verification Protocols in this Section is necessary to give structure to, and provide additional details about, the application and review process.

10-111 Heading: The purpose of the change in this Section is to improve consistency by adding the phrase “visible transmittance” to the heading, matching its occurrence in the Section. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-111(a)1: The purpose of the change in this Section is to improve clarity and consistency by making edits for grammar to subparts A and C, and adding “air leakage” to the list that begins subpart B since NFRC 400 is an Air Leakage test. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-111(a)2: The purpose of the change in this Section is to improve clarity and consistency by adding “consistent with their rating and certification” for consistency with the rest of Section 10-111, and correcting “can be used” to “shall be usable” for consistent use of the word “shall” in regulatory requirements. The unnecessary specification of “NFRC” is also removed to enhance clarity. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-113(b): The purpose of the change in this Section is to improve clarity and consistency by using the abbreviation for “National Fenestration Rating Council” specified earlier in Section 10-113. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-113(c): The purpose of the change in this Section is to improve clarity and consistency by using the abbreviation for “National Fenestration Rating Council” specified earlier in Section 10-113. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of

California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-111(e): The purpose of the change in this Section is to improve clarity and consistency by correcting the language to use “or” rather than “and.” For fenestration used for Residential buildings visual transmittance (VT) is not required (as it is in Nonresidential buildings) so “or” is needed rather than “and”. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-113(c): The purpose of the change in this Section is to improve clarity and consistency by using the abbreviation for “Cool Roof Rating Council” specified earlier in Section 10-113. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-113(d): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

10-114(d): The purpose of the change in this Section is to update the punctuation used for the numbered list to be more consistent with other lists found elsewhere in the regulations. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 10-114-A: The proposed regulations add a new lighting zone 0 (LZ0) to the Table in order to be consistent with the exterior lighting zones specified in ASHRAE 90.1-2013. The new lighting zone, LZ0, is intended for undeveloped spaces in parks, recreation areas, and wildlife preserves. Permanent lighting is not expected and a very small amount of lighting is permitted for safe navigation of the park. This change is necessary to align our Standards with the national ASHRAE 90.1 standards with respect to lighting zones.

TITLE 24, PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

Subchapter 1 – All Occupancies—General Provisions

100.0(e)2C and Table 100-A. The purpose of the changes in this Section and Table is to correct errors and omissions, and make the Scope text and Table accurate and consistent with each other and with the provisions of the rest of the Standards for which Section 100 is providing explanation and a road map. The proposed changes clarify without materially altering the requirements in the original text, and are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); California Code of Regulations, Title 1, Section 16; and Health and Welfare Code Section 18930(a)6.

100(e)3. The purpose of the changes in these sections is to provide additional clarity that new construction in existing buildings are additions, alterations and repairs; that the sections of the Standards regarding additions, alterations and repairs provide both requirements that are uniquely applicable to additions, alterations and repairs, as well as specify requirements that apply to newly constructed buildings that also apply to additions, alterations and repairs; and that when alterations change the occupancy category of the building, the Standards requirements are those that apply to the occupancy after the alterations. The proposed changes clarify without materially altering the requirements in the original text, and are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); California Code of Regulations, Title 1, Section 16; and Health and Welfare Code Section 18930(a)6.

100.0(a)3B: The purpose of the change in this Section is to improve clarity and consistency by correcting a comma splice and removing the unneeded comma. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

100.0(h): The purpose of the change is to improve clarity and consistency by limiting the section to a scope statement regarding the need to follow certification requirements for manufactured systems, equipment, appliances and building components specified in sections 110.0 and 110.1, and to move the specific certification requirements to co-locate them in section 110.0 and make them consistent with closely related requirements concerning such certification. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

100.1(b): The purpose of the change in this Section is to improve clarity and consistency by stating that, terms not defined in Part 6 but defined in Parts 1 through 5 shall have those definitions. This change does not change any of the requirements imposed by Title 24, Part 6. The change also does not preclude adoption in Part 6 of a definition that differs from a definition in Parts 1 through 5. However, the change does potentially alter the ability to use a definition found in Webster's Third New International Dictionary of the English Language where the use of that definition would be preferable to use of a definition found in Title 24 Parts 1 through 5. The benefit of this change is that it improves consistency between terms in Parts of the California Building Code. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

The following definitions in Section 100.1 have been updated:

100.1(b) ALTERATION: The purpose of the change is to expand the definition of what is considered an "alteration." This change is necessary to now explicitly include covered processes.

100.1(b) ASME A17.1/CSA B44: The purpose of the change is to add a definition for the Standard “ASME A17.1/CSA B44.” This change is necessary because it is referenced in the Standards.

100.1(b) BACK-UP COMPRESSORS: The purpose of the change is to add a definition for “back-up compressors.” This change is necessary to clarify the requirements for compressed air systems by defining the difference between a back-up compressor and an online compressor.

100.1(b) ONLINE CAPACITY: The purpose of the change is to add a definition for “online capacity.” This change is necessary to clarify the requirements for compressed air systems by distinguishing what is considered as online.

100.1(b) ONLINE COMPRESSORS: The purpose of the change is to add a definition for “online compressors.” This change is necessary to clarify the requirements for compressed air systems by defining what is considered as online.

100.1(b) OPTIMUM START CONTROLS: The purpose of the change is to add a definition for “optimum start controls.” This change is necessary to clarify the control requirements given that because this term is used in the Standards.

100.1(b) OPTIMUM STOP CONTROLS: The purpose of the change is to add a definition for “optimum stop controls.” This change is necessary to clarify the control requirements given that because this term is used in the Standards.

100.1(b) THERMOSTAT: The purpose of the change is to add a definition for “thermostat.” This change is necessary to clarify the Standards.

100.1(b) ELECTRICAL POWER DISTRIBUTION SYSTEMS: The purpose of the change is to add a subsection definition for “electrical power distribution systems” for terms and phrases used for Section 130.5 and other related sections. This change is necessary to clarify the Standards.

100.1(b) EQUIPMENT: The purpose of the change is to add a definition for “equipment.” This change is necessary to clarify the Standards.

100.1(b) PLUG LOAD: The purpose of the change is to add a definition for “plug load.” This change is necessary to clarify the Standards.

100.1(b) ELECTRICAL METERING: The purpose of the change is to add a definition for “electrical metering.” This change is necessary to clarify the Standards.

100.1(b) COMPACT FLUORESCENT LAMP: The purpose of the change is to revise the definition for “compact fluorescent lamp.” This change is necessary to clarify the Standards.

100.1(b) LANDSCAPE LIGHTING: The purpose of the change is to revise the definition for “landscape lighting.” This change is necessary to clarify the Standards.

100.1(b) NON-INTEGRATED LED LAMP: The purpose of the change is to add a definition for “non-integrated LED lamp” as it, which is used for LED luminaire classifications in Section 130.0. This change is necessary to clarify the Standards.

100.1(b) INSTITUTIONAL TUNING: The purpose of the change is to add a subsection definition for “institutional tuning” for terms and phrases used for Section 140.6 and other related sections. This change is necessary to clarify the Standards.

100.1(b) INTEGRATED LED LAMP: The purpose of the change is to add a definition for “integrated LED lamp” as it, which is used for LED luminaire classifications in Section 130.0. This change is necessary to clarify the Standards.

100.1(b) LUMINAIRE: The purpose of the change is to revise the definition for “luminaire” which is used in Section 130.0. This change is necessary to clarify the Standards.

100.1(b) LUMINANCE: The purpose of the change is to revise the definition for “luminance.” This change is necessary to clarify the Standards.

100.1(b) LUMINOUS EFFICACY: The purpose of the change is to add a definition for “luminous efficacy.” This change is necessary to clarify the Standards.

100.1(b) MARQUEE LIGHTING: The purpose of the change is to add a definition for “marquee lighting” which is used with ornamental lighting. This change is necessary to clarify the Standards.

100.1(b) ORNAMENTAL LIGHTING - LUMINAIRES: The purpose of the change is to revise the definition for “ornamental lighting - luminaires.” This change is necessary to clarify the Standards.

100.1(b) ORNAMENTAL LIGHTING – DECORATIVE LUMINAIRES: The purpose of the change is to revise the definition for “ornamental lighting - decorative luminaires.” This change is necessary to clarify the Standards.

100.1(b) RECESSED LUMINAIRE: The purpose of the change is to add a definition for “recessed luminaire.” This change is necessary to clarify the Standards.

100.1(b) SHUT-OFF CONTROL: The purpose of this change is to add a definition for the term “shut-off control” consistent with its use in Section 130.1(c), Section 141.0(b)2J, and Table 141.0-E. This change is necessary to ensure that the term is understood to have the same meaning where it occurs in separate sections of the regulations. Adding this definition improves the clarity and consistency of the regulations.

100.1(b) TRACK LIGHTING INTEGRAL CURRENT LIMITER: The purpose of the change is to relocate the definition of “track lighting integral current limiter” to be under the definition of “TRACK LIGHTING.” This change is necessary to clarify the Standards.

100.1(b) TRACK LIGHTING SUPPLEMENTARY OVERCURRENT PROTECTION PANEL: The purpose of the change is to relocate the definition of track lighting supplementary overcurrent protection panel to be under the definition of “TRACK LIGHTING.” This change is necessary to clarify the Standards.

100.1(b) AUTOMATIC SCHEDULING CONTROL: The purpose of the change is to add a definition for “automatic scheduling control” and because this term is used in “Outdoor Lighting Controls” Section. This change is necessary to clarify the Standards.

100.1(b) DIMMER, FULL RANGE: The purpose of the change is to revise the definition for “full range dimmer.” This change is necessary to clarify the Standards.

100.1(b) NEMA SSL-7A: The purpose of the change is to add a definition for “NEMA SSL-7A.” This change is necessary to clarify the Standards.

100.1(b) Shut-off Controls: The purpose of the change is to add a subsection definition for “shut-off controls” for terms and phrases used for Section 130.1 and other related sections. This change is necessary to clarify the Standards.

100.1(b) COMMERCIAL VEHICLE FUEL STATION SALES CANOPY: The purpose of the change is to add a definition for “commercial vehicle fuel station sales canopy” and because this term is used in a new subsection under “Outdoor Lighting Controls.” This change is necessary to clarify the Standards.

100.1(b) OUTDOOR SALES FRONTAGE: The purpose of the change is to revise definition for “outdoor sales frontage” and to define the vicinity of outdoor sales frontage. This change is necessary to clarify the Standards.

100.1(b) OUTDOOR LIGHTING ZONE: The purpose of the change is to revise definition for “outdoor lighting zone” and to add a new lighting zone, LZ0. This change is necessary to clarify the Standards.

Subchapter 2 -- All Occupancies—Mandatory Requirements For The Manufacture, Construction And Installation Of Systems, Equipment And Building Components

110.0: The purpose of the changes in this Section is to improve clarity and consistency by specifically referencing the Scope section and providing a note that explains how the subsections of Section 110.0 apply to newly constructed buildings and additions, alterations and repairs. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.0(b): The purpose of the change is to improve clarity and consistency by co-locating all general provisions regarding certification of manufactured systems, equipment, appliances and building components in this section, including moving requirements that are currently inappropriately placed in section 100.0(h). This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.1(a): The purpose of the change in this Section is to improve clarity and consistency by ending the sentence comprising this Section with a period. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.1(b) and (c): The purpose of the change is to improve clarity and consistency by providing more specificity. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions

(a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.2(a): The purpose of the change is to add an exception for space conditioning equipment serving refrigerated warehouses or commercial refrigerated spaces because equipment serving these spaces are covered in other sections of the Standards. This change is necessary because the efficiency requirements found in Section 110.2 conflicts with the efficiencies requirements of Section 120.6, which regulates commercial refrigeration and refrigerated warehouses.

110.2(c): The purpose of the change in this Section is to improve clarity and consistency by removing the term “unitary” and “including heat pumps.” This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 110.2-A: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-B: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Section 6316(b)2) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-D: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes given that the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-E: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments

the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes given that the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-G: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes given that the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-H: The purpose of the change in this Section is to improve clarity and consistency by replacing the word “per” with the phrase “as specified by” to ensure consistent phrasing is used throughout the regulations. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 110.2-I: The purpose of the change in this Section is to improve clarity and consistency by replacing the word “per” with the phrase “as specified by” to ensure consistent phrasing is used throughout the regulations. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 110.2-J: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes given that the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

Table 110.2-K: The proposed regulation aligns the space conditioning equipment energy efficiency requirements with minimum efficiency requirements of ASHRAE 90.1-2013. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2013 efficiency requirements into the local building codes given that the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2013 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2013.

110.3(c)3: The purpose of the change in this Section is to improve clarity by explicitly stating that the limitation on the outlet temperature applies to the temperature at the fixture. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.3(c)7: The proposed regulations add requirements for isolation valves for instantaneous water heaters. This requirement will assist with the flushing of the heat exchanger, which will extend the lifespan of the water heater and allow the unit to operate at peak efficiency, thereby minimizing the energy use for both residential and nonresidential buildings.

110.6(a)1: The purpose of the change in this Section is to improve clarity and consistency by being explicit in stating that the requirements for external doors apply to pet doors. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.6(a)5: The purpose of the change in this Section is to improve clarity and consistency by removing specification of the contents of temporary labels on fenestration that are the same as the requirements in Part 1, Section 10-111, and adding the word "temporary" to match the preceding sentence. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.8(d)3: The California Mechanical Code (CMC), California Code of Regulations, Title 24, Part 4, changed the section code from 605.0 to 604.0 for duct insulation criteria. The purpose of the change is to keep up with the latest CMC document.

110.8(e): The purpose of the change in this Section is to improve clarity and consistency by moving the language in this Section to more appropriate locations in Section 120.7 (for language applying to nonresidential construction) and Section 150.0 (for language applying to residential construction). This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.8(f): The purpose of the change in this Section is to improve clarity and consistency by moving the language in this Section to a more appropriate location in Section 120.7, which regulates insulation for demising walls in Nonresidential Buildings. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.8(i): The purpose of the change in this Section is to improve clarity by removing reference to ASTM D6083 and D6848. These test procedures are no longer published by ASTM, and the situations they would apply to are equivalently covered by the other procedures referenced in this Section. This change is necessary to avoid directing readers to outdated test procedures when current alternatives are available and specified in the same Section.

Table 110.8-C: The purpose of the change in this Section is to improve clarity by adding an "@" sign where appropriate for each entry in the Requirement column. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.9(b): The proposed regulations add requirements for setting up lighting occupant sensing control devices to be no longer than 20 minutes. The factory default setting for these devices is often 30 minutes. The benefit of this new requirement is that the occupant control device can switch off luminaires 10 minutes sooner when the space is unoccupied and therefore minimize potential energy use.

110.9(c): The purpose of the change in this Section is to improve consistency with the language used in Title 24 Part 1 by using the term "enforcement agency" in place of "building official." This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.9(e): The purpose of the change to this Section is to make the language technology-neutral and remove explicit reference to LED technology. This change is necessary to ensure consistency with the proposed changes for Section 150.0(k) and Joint Appendix 8.

110.10(a)1: The phrase "on or after January 1, 2014" was removed where it occurred, given that this effective date has already passed. The purpose of this change is to enhance clarity by removing an effective date that no longer needs to be specified in regulation, and to be consistent in presenting currently effective regulations without explicit effective dates. The proposed change

is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.10(a): The purpose of the change in this Section is to improve clarity and consistency by inserting the word “habitable” in two places. This Section was not intended to consider non-habitable floors in determining whether a building would be covered by Section 110.10. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.10(b): The purpose of the change in this Section is to improve clarity and consistency by inserting the word “habitable” in one place. This Section was not intended to consider non-habitable floors in determining whether Exception 3 applied. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

110.11: The proposed regulations add a new section for minimum efficiency requirements for “low-voltage dry-type transformers”. The requirement is based on Title 10 of the United States Code of Federal Regulations, Section 431, Subpart K, for distribution transformers. The modification is also to align the Standards with the ASHRAE 90.1-2013 requirement for low-voltage dry-type transformers. It will minimize energy use of buildings and provide energy savings to California building owners and users.

Subchapter 3 -- Nonresidential, High-Rise Residential, And Hotel/Motel Buildings-Mandatory Requirements

120.0: The purpose of the changes in this Section is to improve clarity and consistency by specifically referencing the Scope section and providing a note that explains how the subsections of Section 120.0 apply to newly constructed buildings and additions, alterations and repairs. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.1: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.120.1(c): The purpose

of the change in this Section is to improve clarity and consistency by replacing the word “per” with the term “as specified by”. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.2: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.2(b): The purpose of the change in this Section is to improve clarity and consistency by removing the term “unitary single zone.” This term is not defined in the Standards and unintentionally narrows the scope of the thermostatic control requirements. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.2(f): The proposed regulations add requirements for dampers serving air supply and exhaust equipment. Dampers must now automatically close during unoccupied periods as well as during setback heating and cooling periods. Several exceptions were added to these requirements that allow for the dampers to remain open during certain periods when outdoor air is necessary. The damper can remain open during pre-occupancy purge cycles or if the zone is enabled by an override signal from an occupancy sensor, automatic time switch control or a manually operated 4-hour time. This proposal will save energy by not unnecessarily conditioning outside air during unoccupied periods.

120.2(i): The proposed regulations clarify the requirements for Fault Detection and Diagnostic (FDD) devices and do not impose any additional requirements. The FDD can be either stand alone or integrated, any references to pressure sensors was deleted and language was added to only require heating outputs if the HVAC system is capable of heating. The fault reporting requirements was clarified to explain the method in which each fault is annunciated depending on the control device, either a zone thermostat, energy management control system or fault management application that notifies a remote HVAC service provider. Another addition was a reference to JA6.3 which outlines the certification protocol. Each of these proposed changes benefit the manufacturers, installers and code enforcers by detailing the minimum functionality required for FDD.

120.2(j): The proposed regulations add requirements for Direct Digital Controls (DDC) for select applications. These applications are outlined in Table 120.2A, which include HVAC system capabilities and capacity. The DDC system must be capable of monitoring zone and system demand for fan pressure pump. By adding these requirements, large HVAC systems will now be

required to be controlled more efficiently and will in turn save energy.

120.2(k): The proposed regulations add requirements for space conditioning systems equipped with DDC to the zone level to have optimum start/stop controls. This requirement takes advantage of the DDC system capabilities outlined in section 120.2(h). The benefit of optimizing the controls is to ensure that the DDC system is maximizing energy savings.

120.3: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.3 and subsections: The purpose of the changes in this Section is to improve clarity and consistency by reorganizing the Section. The Section was broken into multiple subsections with descriptive headings, and the Exceptions were moved to the end of the Section. A numbered list of the space-conditioning and service water-heating piping covered by Section 120.3 was added to more clearly state where the sections requirements applied. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 120.3A: The proposed changes create separate columns for residential and nonresidential pipe insulation thickness requirement for space cooling system under 2 inches diameter. This restores the 2008 Residential requirements of 0.75 inch of insulation for cooling system lines less than 2 inches diameter after they were unintentionally deleted in the 2013 Standards when the pipe insulation requirements were consolidated to Section 120.3.

120.4: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.4(a): The purpose of the change in this Section is to improve clarity and consistency by removing the reference year when referring to the California Mechanical Code. The Standards define the California Mechanical Code, including the reference year in Section 100.1. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1,

Section 16.

120.4(b): The purpose of the change in this Section is to improve clarity and consistency by removing the word “test” when referring to an industry adopted test method. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.5: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.5(a)2: The purpose of the change in this Section is to improve clarity and consistency by deleting the word “unitary.” The acceptance test is applicable to all single zone air conditioning or heat pump systems. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.5(a)8: The purpose of the change in this Section is to improve clarity and consistency by replacing the word “per” with the term “as specified by.” The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.6: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.6(a): The purpose of the change in this Section is to improve clarity and consistency by adding the term “included but not limited to” to Exception 3 to Section 120.6(a)3B. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.6(c): The purpose of the change in this Section is to improve clarity and consistency by replacing "4" with "four." The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.6(f): The proposed regulation added new requirements for elevators in regards to the cab lighting and ventilation fan. These systems must now comply with lighting and fan efficacy requirements as well as automatic shut off controls to maximize energy savings while the elevator is not in use.

120.6(g): The proposed regulation added new requirements for escalators and moving walkways located in airports, hotels and transportation function areas. Escalators and moving walkways located in these areas will now be required to reduce speed to a minimum when not conveying passengers in order to save energy.

120.7: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.7(a): The purpose of the change in this Section is to improve clarity and consistency by relocating language from Section 110.8(e) that is solely applicable to nonresidential, high-rise residential, hotel/motel occupancies, and covered processes, and is therefore more appropriately located in this Section. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.7(b): The purpose of the change in this Section is to improve clarity and consistency by relocating language from Section 110.8(f) that is solely applicable to nonresidential, high-rise residential, hotel/motel occupancies, and covered processes, and is therefore more appropriately located in this Section. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.8: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to

improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.8 and subsections: The purpose of the changes to this Section is to improve the clarity and consistency of the regulations, as follows:

The opening paragraph was split into two paragraphs to more clearly separate requirements for buildings under 10,000 square feet and those of 10,000 square feet or more. The term “new buildings” was amended to “newly constructed buildings” to more closely match the term defined Section 100.1. Language was added specifying that the 10,000 square feet was of conditioned space, consistent with the specification in Section 100.0(e)2C that Section 120.8 does not apply to unconditioned buildings and process spaces. The new second paragraph was expanded to clarify how the requirements of Section 120.8(e) are to apply to buildings under 10,000 square feet. A third paragraph was added to directly state that the commissioning requirements of this Section are in addition to, not instead of, the commissioning requirements of Part 11.

The change to Section 120.8(a) is a grammar correction to use the active voice, and clarifies without materially altering the requirements in the original text.

The change to Section 120.8(b) clarifies without materially altering the requirements in the original text by removing an exception that is redundant with the language in the opening paragraph of the Section.

The changes to Section 120.8(c) clarify without materially altering the requirements in the original text. This removes the same redundant exception as in Section 120.8(b), and removes the term “covered process” from the numbered list as covered processes are similarly excluded in the opening paragraph.

The changes to Section 120.8(d) clarify without materially altering the requirements in the original text. These changes create consistency with Part 1, Section 10-103 by directly referencing that Section where appropriate and by ensuring identical terms are used in both Sections.

The changes to Section 120.8(e) correct the use of the word “should” and rephrase the language to avoid an awkward use of the phrase “commissioning measures.” The third and fourth sentences are removed, as they were providing guidance without regulatory effect that would be more appropriate as published instructions than as regulatory language.

The change to Section 120.8(f) clarifies without materially altering the requirements in the original text by removing an exception that is redundant with the language in the opening paragraph of the Section.

The changes to Section 120.8(g) clarifies without materially altering the requirements in the original text by removing an exception that is redundant with the language in the opening paragraph of the Section, and removing an unneeded reference to Section 120.6: Section 120.6 applies solely to covered processes, which are excluded from Section 120.8 by the opening paragraph.

The change to Section 120.8(h) clarifies without materially altering the requirements in the original text by removing an exception that is redundant with the language in the opening paragraph of the Section.

The changes to Section 120.8(i) clarify without materially altering the requirements in the original text by removing an exception that is redundant with the language in the opening paragraph of the Section, and by inserting the word “owner’s” to match the phrasing used in Part 1, Section 10-103.

The rationale for these changes is that the changes are necessary to reduce ambiguity, improve consistency with Title 24, Parts 1 and 11, and enhance the clarity of the regulations, thereby improving the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

120.9: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Subchapter 4 -- Nonresidential, High-Rise Residential, And Motel/Motel Occupancies—Mandatory Requirements For Lighting Systems And Equipment, And Electrical Power Distribution Systems

130.0 Heading: The purpose of the change in this Section is to maintain consistency with the contents of and proposed changes to the Section by replacing the term “lighting controls” with the broader term “lighting systems” and by adding “electrical power distribution systems” to the Section's heading. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.0: The purpose of the changes in this Section is to improve clarity and consistency by specifically referencing the Scope section and providing a note that explains how the subsections of Section 130.0 apply to newly constructed buildings and additions, alterations and repairs. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.0(c): High efficacy and good light quality LED lamps are being developed in the marketplace and these lamps are available in screw base. LED lamps can stay in a socket for a long time and save energy when they replace incandescent lamps. The proposed regulations delete the disallowance of using, and thus allow, LED lamp technology in claiming wattage savings when converting existing fluorescent lamp luminaires to LED lamp luminaires. Also, the proposed regulation deletes the disallowance of using, and thus allow, screw based LED light source in

luminaires for compliance with Title 24. These changes are anticipated to increase energy efficiency because LEDs use much less energy for the same amount of light than incandescent lamps.

130.0(c)5: The purpose of the proposed change is to clarify that the intent of the provision is to state that incandescent screw-base sockets shall remain classified as incandescent regardless of the lamps installed in the sockets. The change acknowledges that a field modification can remove the socket, and therefore result in a luminaire that would be more appropriate with a different classification. The use of the word “including” was also clarified to be “including but not limited to”. This change is necessary to allow for proper classification of certain luminaire modifications, and to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.0(c)6: The proposed regulation adds a new subsection to specify how to determine luminaire wattage when the luminaire comes with LED driver(s). LED luminaires operate with LED drivers and are a different technology from the conventional lamps and ballasts. LED drivers are listed under UL 8750, which is also different from the UL luminaire Standard, UL1598. It is necessary to have a new subsection for this new technology.

The proposed regulation also recognizes installation of LED replacement lamps in luminaires rated for use with linear fluorescent lamps. This modification allows LED light source technology, which has many benefits over fluorescent lamps, to be used for retrofitting legacy luminaires. LED light sources consume less energy in comparison with the legacy light source when they are selected to be installed over the legacy light source.

130.0(c)9: The proposed regulation clarifies the screw based LED module requirement so that no screw base adapters of any kind may be used to meet the lighting efficiency requirements of Title 24, Part 6. These language clarifications will improve code compliance by making the requirements easier to understand.

The proposed regulation also allows screw based LED light source in luminaires for compliance with Title 24. In addition, the proposed regulations add an exception to the section requirement for LED luminaires installed in residential building so that LED lamps are allowed to be installed and recognized for the installed wattage. There are high efficacy, and good light quality, LED lamps being developed in the marketplace and these lamps are available in screw base. In residential buildings, LED lamps can stay in a socket for a long time and save energy when they replace incandescent lamps. Therefore, allowing the LED lamp technology will increase the energy efficiency of these buildings.

130.1: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and

130.1(a): The proposed regulation deletes the dimmer switch requirement for controlling dimmable luminaires. The requirement is relocated from this section to the multi-level lighting control section as the requirement is related to multilevel lighting control. The reorganization improves the clarity, and therefore the effectiveness, of the Standards in saving energy.

130.1(b): The proposed regulations delete the subsection lighting control requirements already required under other sections. The manual dimming, automatic daylighting, and demand responsive lighting control requirements are already required by other sections. The tuning and lumen maintenance requirements are deleted as they are not required as part of the multi-level control requirements. The dimmer switch requirement is relocated from another Section to this Section in order to improve clarity. These modifications clarify the Standards and make the Standards easier to understand, thereby increasing the effectiveness of the Standards.

130.1(c)1: The proposed regulations delete the signal from another building system as one of the shutoff control technologies. The term “signal from another building system” invited a broader reading of the requirement than intended, and any such communication that would result in control of the lighting is sufficiently covered by the last clause of the sentence (“other control capable of automatically shutting OFF all of the lighting when the space is typically unoccupied”). The proposed change is necessary to remove the term “signal from another building system” where it occurs. The modifications make the Standards easier to understand, thereby increasing the effectiveness of the Standards.

The proposed regulations also revise the egress lighting power requirement so that it applies to all buildings. The egress lighting power value has been adjusted to allow enough power to be used for egress lighting required for the building spaces in accordance with California Building Code. Another exception is added to the shut-off controls requirement for lighting systems serving emergency egress illumination. The modification is necessary so that lighting systems can meet both the Energy Code and the life safety requirement of emergency egress lighting.

130.1(c)5: The proposed regulations add partial-ON occupant sensor and vacancy sensor technologies as mandatory requirements for areas where occupant sensing controls are required. This modification aligns Title 24 requirement to the ASHRAE 90.1-2013 requirement of the partial-On occupant sensor. The benefit is that the controls will switch off lighting when the space is unoccupied and will reduce building energy use.

130.1(c)6: The purpose of this change is to clarify that the requirements of Section 130.1(c)6 apply where multi-level lighting is installed, but do not create a requirement to install multi-level lighting separate from what is specified in Section 130.1(b), Multi-Level Lighting Controls. This improves consistency between these Sections, as any requirements to install multi-level lighting would be expected to be present in Section 130.1(b). This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision

(a)(1); and California Code of Regulations, Title 1, Section 16.

130.1(c)7: The purpose of this change is to clarify that the requirements of Section 130.1(c)7 apply where multi-level lighting is installed, but do not create a requirement to install multi-level lighting separate from what is specified in Section 130.1(b), Multi-Level Lighting Controls. This improves consistency between these Sections, as any requirements to install multi-level lighting would be expected to be present in Section 130.1(b). This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.1(d): The proposed regulations clarify the photosensor requirement: that it can be accessible to authorized personnel for calibration adjustment. The requirement will help prevent those people that are not authorized personnel from tampering with the photosensor. The photosensor is one of the key parts of the automatic daylighting control, and thus should not be tampered with. This modification strengthens the effectiveness of the Standards because it is anticipated to prevent photosensors from being tampered with, and thus increases the effectiveness of automatic daylighting controls.

Table 130.1-A: The proposed regulation corrects the typo for the required control steps for fluorescent lamp luminaires so that the multilevel lighting control requirements can be met. This modification clarifies on one of the required control steps with a correct and achievable value, and thus increases the effectiveness of multilevel lighting controls. There is no change to the intent and the purpose of the regulations.

130.2: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.2(c): The proposed regulations lower the allowed wattage reduction during dimming from 80 percent to 90 percent for all installed outdoor lighting. The benefit of this change is that it will capture the savings of outdoor LED light technology, which allows dimming to 90 percent, and this is not feasible with other lighting technologies.

The proposed regulations also add an exemption for commercial fuel station sales canopies as the commercial fuel station customers take longer to refuel and the potential savings from having these lighting controls is significantly lower because customers arrive more frequently at night and take longer to refuel. Also, the proposed regulations streamline and simplify the requirements for outdoor sales lots and outdoor sales canopies as there are reduced number of subsection requirements to comply.

Table 130.2-B: The proposed regulations add a new lighting zone 0 (LZ0) to the Table as the existing Table has lighting zone 1, 2, 3 and 4. Lighting Zone 0 is intended for undeveloped spaces in parks, recreation areas, and wildlife preserves and very low ambient illumination level is allowed in Lighting Zone 0. LZ0 is also defined in Table 10-114-A. This modification aligns the Standards with the exterior lighting zones as specified in ASHRAE 90.1-2013 and ensure LZ0 is included as part of the Standards in terms of lighting power allowance regulation. The regulation ensure there is no unnecessary lighting power allowed in areas which fall under LZ0 as very low ambient illumination level is allowed in lighting zone 0. This also minimizing the energy use in LZ0 except as allowed by the regulation, and thereby improves the state's economic and environmental health.

130.3: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.4: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.4(a): The proposed regulations delete the language referring to new construction in regards to the lighting control acceptance test requirements. This modification clarifies the requirements as lighting control acceptance tests are applicable for all construction types regardless of whether it is new construction, or an addition or alteration. The proposed regulations also clarify how the necessary acceptance test is indicated on the construction document. This modification clarifies the documentation requirement for the lighting control acceptance test process and increases the effectiveness of the Standards because. In addition, the proposed regulations delete some of the listed references to the Nonresidential Appendix of Lighting Controls Acceptance Test as the references are null and do not refer to any lighting control acceptance tests. The deletion clarifies the requirements of the Standards. There is an addition to the proposed regulation to add a new lighting control acceptance certification requirement for a newly added prescriptive measure of Institutional Tuning Power Adjustment Factor.

130.5: The purpose of the change in this Section is to improve clarity and consistency by using consistent language across similar sections throughout the Standards when identifying which sections are applicable to particular building categories. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349,

subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

130.5(a): The proposed regulations clarify that metering can be installed at building service location or at feeder location. The modification provides building owners the flexibility to locate the metering where it is more appropriate and still meet the metering requirements. The title of the subsection is changed from service metering to electrical metering to better reflect this is electrical energy that the metering is measuring.

It also adds the electrical usage recording requirements and how long the recorded data shall be retained. This modification aligns the Standards to the recording requirements of ASHRAE 90.1-2013 and ensures the electrical energy usage data is recorded and retained for future use by building owners or others for purposes such as energy management and building efficiency improvement.

130.5(b): The proposed regulations reorganize this Section and revise the language to clarify requirements of the Standards. The subsections within this section have been renumbered and reorganized for clarity. These modifications will clarify how disaggregation of electrical circuits can be accomplished by the listed methods and that the purpose of the disaggregation is to make it possible to monitor electrical usage of the different types of loads. Details of each method have been added to provide clarity. Alteration requirements are removed and relocated to Section 141.0 of Subchapter 6. These modifications improve the organization of the Standards, thereby making the requirements easier to understand and comply with.

130.5(c): The purpose of this change is to align the regulations with ASHRAE 90.1 by revising the voltage drop requirement so that it is a combination requirement of feeders and branch circuits. This change is necessary to align the voltage drop requirement in our regulations with that of ASHRAE 90.1-2013. This regulation is to ensure no excessive voltage drop is developed under design load condition and thereby no electrical energy is wasted due to excessive voltage drop.

130.5(d): The proposed regulations clarify the controlled receptacle requirements by listing the type of automatic shutoff controls which meet the requirement. This provides clarity to the Standards as the requirement was previously referenced to other subsections. Furthermore, the proposed regulations add two new subsections. The subsections include a two-hour override functionality and a holiday shutoff functionality for the controlled receptacle requirement. These are not new requirements as they are required in the existing language but were previously referenced to the lighting section which could be confusing. This modification provides clarity and enhances the effectiveness of the Standards.

Note: The proposed regulations add a new note with directions for where the definition of terms and phrases contained in the Section can be found. The note will allow the reader to understand the requirements of the Standards, and that the terms and phrases can be found either in Section 100.1 or in Article 100 of California Electrical Code, Title 24, Part 3, of the California Code of Regulations. This modification ensures the completeness of the electrical power distribution system requirement and increases the clarity of the Standards.

Subchapter 5 -- Nonresidential, High-Rise Residential, And Hotel/Motel Occupancies— Performance And Prescriptive Compliance Approaches For Achieving Energy Efficiency

140.0: The purpose of the changes in this Section is to improve clarity and consistency by using consistent language across the Standards when cross-referencing sections, and providing a note that explains how the subsections of Section 140.0 apply to newly constructed buildings and additions, alterations and repairs. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.3(a): The exception to Section 140.3(a)1Aia is no longer needed as the tradeoff table for Insulation vs. Aged Solar Reflectance, has been updated to have a U-factor lower than the existing 0.048 (it is now 0.041) which would make the exception no longer valid.

Table 140.3: The U-factors for the tradeoff table of Insulation versus Aged Solar Reflectance was updated to be consistent with the proposed U-factors for the roof/ceiling insulation in the Prescriptive table, Table 140.3-B. This change is necessary to preserve the consistency of the regulations and meet the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Tables 140.3-B and C: The proposed changes increase Envelope maximum U-factors to values shown to be feasible and cost effective using contemporary materials and techniques. These changes are necessary to update these requirements to the proposed new levels, and the benefit of increasing these values is that new homes will include more effective insulation that will result in lower heating and cooling costs and greater overall energy efficiency within the home.

Table 140.3-D: The proposed changes re-format the table for clarity. The changes are necessary to make the table easier to understand, and to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.3(c): The proposed regulations add a minimum 3% of the total roof area to be skylight area to align with the minimum skylight fenestration area requirement in ASHRAE 90.1-2010. The proposed regulation also revise the visual transmittance (VT) of skylight being at least 0.40. An exception to the minimum daylighting requirement is added to allow special conditions where there is an obstruction of direct sunlight to the space due to existing structures or natural objects.

These new requirements are added to align the Standards requirement to the ASHRAE 90.1 requirement. The benefit of providing skylight along with automatic daylighting controls is utilizing daylight to supplement electric lighting for the space and reduce the energy use of indoor lighting systems, thereby increase energy efficiency of the building and improves the state's economic and environmental health.

140.4(d): The purpose of the change in this Section is to improve clarity and consistency by replacing the word “per” with the phrase “as specified by” to ensure consistent phrasing is used throughout the regulations. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.4(e)1: The proposed regulation replaces the term “fan system” with “air handler” and clarifies that the air economizer's capability is to modulate the outside and return air dampers to only deliver outside air. This change is necessary because of confusion in the industry with the terms “fan system” and “100 percent of the design supply air quantity.” The change will ultimately make this requirement easier to enforce because it improves clarity.

140.4(e)4: The purpose of the change in this Section is to improve clarity and consistency by removing repeated language for when an economizer is required, which is already stated in Section 140.4(e). This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.4(e)4B: The proposed change replaces “after” with “for” in order to clarify that the economizer assembly is to be tested at rated airflow and pressure for 60,000 actuations rather than after 60,000 actuations. This change is necessary to clarify the intent of the reliability test, which has caused confusion within the economizer manufacturer industry. This altered language is in line with industry practice for this test, whereas the current language is not.

140.4(e)4C: The proposed regulation adds the term “outdoor air” to emphasize that the economizer outdoor air damper is required to be tested for leakage. The proposed regulation also changed the units of pressure from US units to the International System of Units (SI), added “D” at the end of AMCA Standard 500 to identify the AMCA damper test rather than the louver test, and added detail to the certification requirement. During the implementation of the 2013 Standards this section was found to need additional clarity, thus these changes are necessary to clarify the damper leakage requirement, including the responsibility of the manufacturer to certify the test results to the Energy Commission. These proposed changes will result in better understanding of the requirement, which will facilitate implementation and enforcement.

140.4(e)5: The purpose of the change in this Section is to improve clarity and consistency by removing effective dates that would have already passed by the time these Standards become effective. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.4(h): The purpose of the change in this Section is to improve clarity and consistency by replacing the word “per” with the phrase “as specified by” to ensure consistent phrasing is used throughout the regulations. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.4(m): The proposed change is to reference each cooling system in proposed Table 140.4-D given the changes to that table. This change improves consistency since 140.4(m) refers to information in proposed Table 140.4-D, which has different values than the 2013 version of Table 140.4-D. The current table lists cooling systems types, capacities and effective dates for when the fan control requirement becomes applicable. Each effective date will have already passed by the time these Standards are effective. The change is necessary for both consistency and clarity.

Table 140.4-D: The proposed change is to update the table to reflect the correct cooling system types and cooling capacities for which the fan control requirements are applicable. The table is currently set up by cooling system type, fan motor size, cooling capacity and effective date. The cooling capacity steps down by effective date resulting in fan control requirements for smaller cooling systems. Each effective date will have already passed by the time these Standards are effective. The change is necessary for both simplicity and clarity to no longer listing redundant system types and capacity thresholds.

140.4(n): The proposed regulation adds new shut off control requirements for space conditioning equipment serving zones with operable windows or doors. The purpose of the new regulation is to save energy by shutting off the space cooling or space heating equipment to the zone when the operable window or door is open. The change is necessary to save, and has the effect of saving, energy during periods when outside air is desired by the occupant.

140.6(a): The proposed regulations add language to exempt makeup and costume preparation lighting for performance arts facilities if the lighting has vacancy sensor controls. The current regulation contains an exemption for lighting for theatrical and other live performances and theatrical lighting. The added language ensures makeup and costume preparation lighting for performance arts facilities is treated consistently.

The proposed regulations delete the power adjustment factor (PAF) allowance for Partial-ON Occupant Sensing Control and Combined Manual Dimming plus Partial-ON Occupant Sensing

Control. Both Partial-ON Occupant Sensing Control and Combined Manual Dimming plus Partial-ON Occupant Sensing Control are proposed to be mandatory lighting control requirements for specific spaces in nonresidential buildings. As such, it is not necessary to provide the power adjustment factor (PAR) allowance as incentive for the lighting control measure. There is no effect to the regulations in terms of energy savings as Partial-on Occupant Sensing Control and dimming are mandatory requirements of the Standards.

The proposed regulations delete the exemption for automatic teller machine (ATM) lighting, for ATMs that are located inside parking garages. This deletion is directly related to the other proposed regulation providing a lighting power allowance for ATM Machine Lighting in Section 140.7. The exemption is no longer necessary as the proposed regulation in Section 140.7 will govern the lighting power requirements for ATM Machine Lighting.

The proposed regulations add two new power adjustment factor (PAF) allowances; one for daylighting dimming plus off control and another for institutional tuning and both of these are prescriptive requirements.

The addition of daylighting dimming plus off control is to align the Standards with the ASHARE 90.1 mandatory requirement and also to prepare the building industry for this lighting control strategy being the mandatory daylighting controls requirement in future Standards update. Daylighting dimming plus off control requires the dimming system to be switched off instead of at a fully dimmed mode which consumes power. This new requirement can provide energy savings which in turn improves the state's economic and environmental health.

This addition of institutional tuning as a prescriptive measure allow the lighting system at the institution to be adjusted to a lower level from full light output or full power draw and also allow the lighting system to be tuned to provide no more light than the initial design illuminance of the space. This new requirement can provide energy savings which in turn improves the state's economic and environmental health.

Table 140.6-A: The proposed regulations delete the power adjustment factor (PAF) allowance for Partial-ON Occupant Sensing Control and Combined Manual Dimming plus Partial-ON Occupant Sensing Control. Both Partial-ON Occupant Sensing Control and Combined Manual Dimming plus Partial-ON Occupant Sensing Control are proposed to be mandatory lighting control requirements for specific spaces in nonresidential buildings. As such, it is not necessary to provide PAR allowance as incentive for the lighting control measure. There is no effect to the regulations in terms of energy savings as Partial-on Occupant Sensing Control and dimming are mandatory requirements of the Standards.

The proposed regulations also add two new power adjustment factor (PAF) allowances; one for daylighting dimming plus off control and another for institutional tuning and both of these are prescriptive requirements.

The addition of daylighting dimming plus off control is to align the Standards with the ASHARE 90.1 mandatory requirement and also to prepare the building industry for this lighting control strategy being the mandatory daylighting controls requirement in future Standards update. Daylighting dimming plus off control requires the dimming system to be switched off instead of at a fully dimmed mode which consumes power. This new requirement can provide energy savings which in turn improves the state's economic and environmental health.

This addition of institutional tuning as a prescriptive measure allow the lighting system at the institution to be adjusted to a lower level from full light output or full power draw and also allow the lighting system to be tuned to provide no more light than the initial design illuminance of the

space. This new requirement can provide energy savings which in turn improves the state's economic and environmental health.

Table 140.6-B: The proposed regulations adjust and reduce the indoor lighting power density (LPD) values to be comparable in energy efficiency to the levels recommended in ASHRAE 90.1-2013 for those levels that have been determined to be cost effective. The watts per square feet of lighting power allowed for specific building types are reduced; this saves energy because it reduces the amount of lighting allowed for specific building types. These lighting power density reductions will further increase the energy efficiency of specified building types, thereby minimizing the energy use of such buildings.

Table 140.6-C: The proposed regulations adjust and reduce the indoor lighting power density (LPD) value to be comparable in energy efficiency to the levels recommended in ASHRAE 90.1-2013 for those levels that have been determined to be cost effective. The watts per square feet of lighting power allowed for specific building function area types are reduced. These lighting power density reductions will increase the stringency of the Standards, thereby minimizing the energy use of buildings. The modified requirements reduce the energy use of indoor lighting systems, which in turn improves the state's economic and environment health.

The proposed regulations also split the Transportation function area into two categories: "Concourse & Baggage" and "Ticketing." Different lighting power density values are assigned for these new categories as the two area categories serve different functions and have different illumination requirements. Providing different lighting power density values for different function areas allow appropriate use of lighting power for the areas and thereby increase the lighting energy efficiency for these areas. It will also avoid the possibility of over-generalization of two different function areas as one homogeneous function area in terms of power density. The modified requirements increases the stringency of the Standards, thereby minimizing the energy use of indoor lighting systems, which in turn improves the state's economic and environment health.

Table 140.6-G: The proposed regulations adjust and reduce the lighting power density value to be comparable in energy efficiency to the levels recommended in ASHRAE 90.1-2013 when they prove to be cost effective. The watts per square feet of lighting power allowed for specific illumination level for tailor method are reduced. These lighting power density reductions will increase the stringency of the Standards, thereby minimizing the energy use of buildings. The modified requirements reduce the energy use of indoor lighting systems, which in turn improves the state's economic and environment health.

140.6: The proposed regulations add requirements for lighting associated with ATM locations in outdoor areas as this lighting is exempted from the 2013 Standards.

140.7: The proposed regulations lower the lighting power allowance for some of the outdoor lighting areas to align with the ASHRAE 90.1-2013 recommendations to lower outdoor lighting power. The proposed regulations also reflect the shift to LED lighting technology as the baseline,

as LED lamp efficacy is improving beyond pulse start metal halide (PSMH) lamp technology (which is the 2013 Standard baseline). The efficiency of LED luminaires is expected to exceed PSMH luminaires in late 2014 or 2015 according to DOE. Also, the proposed regulations recognize widely adopted LED lighting technology in outdoor lighting applications, the energy savings of such installations, the expected long product life time, as well as its dimming capability. The modified requirements reduce the energy use of outdoor lighting systems, which in turn improves the state's economic and environment health. Also the proposed regulation clarifies that the lighting requirement for tunnels and other covered pathways will be the same as the general hardscape lighting allowance. There is no change to the outdoor lighting luminaire power requirement exceptions for public right-of-way such as roadways and streets. The modified requirements reduce the energy use of outdoor lighting systems, which in turn improves the state's economic and environment health.

140.7(a): The proposed regulations remove the outdoor lighting power exemption for Automated Teller Machines (ATMs). This is to align Title 24 with the ASHRAE 90.1-2013 ATM lighting requirements. The lighting requirements for ATMs will now be in Section 140.7(d) as an allowance for specific lighting applications. This allowance for specific lighting applications will increase the energy efficiency of these areas, thereby minimizing the amount of energy used.

The proposed regulations remove the outdoor lighting power exemption for pedestrian tunnels and bridges. The lighting requirements for pedestrian tunnels and bridges are now in Section 140.7(d) as an allowance for specific lighting applications. This allowance for specific lighting applications will increase the energy efficiency of these areas, thereby minimizing the amount of energy used.

The lighting requirements for tunnels and bridges are now contained in Section 140.7(d) and are considered as part of the general hardscape lighting.

Table 140.7-A: The proposed regulations adjust and reduce the lighting power allowance value of incumbent light source technologies to the value of comparable LED light source technology for all exterior applications where it is technically feasible to do so. The watts per square feet, watts per linear feet, and watts allowance for lighting power of general hardscape lighting are reduced. These lighting power allowance reductions will increase the stringency of the Standards, thereby minimizing the energy use of buildings.

Table 140.7-B: The proposed regulations adjust and reduce the lighting power allowance value of incumbent light source technologies to the value of comparable LED light source technology for all exterior applications where it is technically feasible to do so. The watts per square feet, watts per linear feet, and watts allowance for lighting power of general hardscape lighting are reduced. These lighting power allowance reductions will increase the stringency of the Standards, thereby minimizing the energy use of buildings.

140.9(b): The purpose of the change in this Section is to improve clarity and consistency by replacing the word "per" with the phrase "as specified by" to ensure consistent phrasing is used throughout the regulations. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and

consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

140.9(b)2Biii: The purpose of this change is to correct an error currently in the Standards. The change makes it clear that the requirement of 140.9(b)2B is satisfied with either of i, ii, iii or iv. The change is necessary to clarify the Standards.

Subchapter 6 -- Nonresidential, High-Rise Residential, And Hotel/Motel Occupancies—Additions, Alterations, And Repairs

141.0 Title: The purpose of this change is to remove unnecessary specificity. This unnecessary specificity caused confusion for readers. This change clarifies, without materially altering, the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0 Preamble: The purpose of this change is to add a statement prior to the subsections of Section 141.0 that establishes the framework for the regulations in this Section and concisely states how the requirements of Title 24, Part 6 apply to additions, alterations and repairs. This change clarifies, without materially altering, the requirements in the original text.

This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NOTE to 141.0: The purpose of this change is to clarify how the Standards apply in the relatively rare case when alterations result in a change in occupancy. The change is consistent with Section 100.0(e)3. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(a): The purpose of the changes to this section is to add “electrical power distribution system” for consistency with the addition of Sections 141.0(b)2O and 141.0(b)2P, to remove the unneeded phrase “serving the addition” that did not have any regulatory effect, and to be more consistent in the use of commas and semicolons in lists. The removal of the phrase “serving the addition,” and replacing two commas with semicolons, clarify without materially altering the requirements in the original text. These changes are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349,

subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2A: This section was rewritten to provide the necessary clarifications needed to prevent confusion to the readers. This rewrite is to meet the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2E: The purpose of the change in this Section is to remove parenthetical text that had no regulatory effect. This change clarifies, without materially altering, the requirements in the original text. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2I: The purpose of the change in this Section is to simplify and clarify the requirements applying to alterations to indoor lighting, streamline the requirements that apply to luminaire modifications, and remove the complex and conditional interactions between “lighting systems alterations” and “luminaire modifications-in-place” as these phrases were used within the Section. To do so, the entirety of the existing language in Section 141.0(b)1I is being removed, and new language proposed: Sections 141.0(b)2Iii, iii, and iv are being moved to existing Section 141.0(b)2I and proposed Sections 141.0(b)2J and 141.0(b)2K, respectively, with the remaining language in Section 141.0(b)2I being incorporated into those Sections or removed as appropriate.

The requirements for Lighting Systems Alterations previously in Section 141.0(b)2Iii are now in Section 141.0(b)2I. The proposed language more clearly enumerates the actions that are alterations to the lighting system and uses simpler phrasing. Exception 1 is removed, as the actions previously described as “luminaire modifications-in-place” are now described as luminaire modifications in proposed Section 141.0(b)2J.

The proposed Exceptions are consistent between Sections 141.0(b)2I and 141.0(b)2J. Exception 1 in both Sections preserves, without materially altering, what was previously Exception 2 to Section 141.0(b)2Iii. Exception 2 in both Sections clarifies, without materially altering, the language previously in Section 141.0(b)1Ivii describing indoor lighting alterations not required to comply with Title 24. Exception 3 clarifies, without materially altering, the requirements relating to asbestos previously specified in Section 141.0(b)1Iviii, including the prior Exception to that Section.

The proposed text does not specify the use of Section 130.0(c) to determine luminaire classification and power, previously in Section 141.0(b)2Ii, as doing so would be redundant with the specification in Section 140.6(a)4. Removing this specification therefore clarifies, without materially altering, the requirements in the original text.

The proposed text also does not include the Exception to the use of Section 130.0(c) previously stated in Section 141.0(b)2Ii. This Exception allowed a luminaire to be “classified as a luminaire having a different number of, or type of light source(s),” which would allow the use of different provisions of Section 130.0(c) for determining luminaire power. However, this would have no effect on the determination of Actual Indoor Lighting Power Density as specified in Section 140.6,

as the same maximum wattages would be identified for the luminaire. This Exception therefore had no effect on the requirements of Section 141.0(b)2I or Tables 140.1-E or 140.1-F, and retaining it would have no effect on the proposed Sections 141.0(b)2I and 141.0(b)2J. Its removal is therefore a change without regulatory effect.

The requirements for Luminaire Modifications-in-Place previously in Section 141.0(b)2Iiii are now in Section 141.0(b)2J. This Section retains and clarifies the four actions considered to be luminaire modifications-in-place in Section 141.0(b)2Iiiia and describes them simply as “luminaire modifications.”. The proposed language structures these requirements as a separate type of action rather than treating them as an Exception to the lighting system alteration language. A sentence has also been added to explicitly state that the replacement of a removable lamp is not a modification to the luminaire. These changes clarify, without materially altering, the requirements in the original text.

The conditions formerly specified in Section 141.0(b)2Iiib are removed because they are no longer necessary. This Section was intended to reinforce that luminaire modifications are distinct from lighting system alterations and lighting wiring alterations. While the complex interactions of exceptions in the original language made this Section necessary, the proposed language separates each type of action and removes the nested exception language. Therefore, this Section’s statement that “luminaire modification” does not cover a general remodeling or renovating of the lighting, which would be a lighting system alteration, and does not cover changes to wiring or controls, which would be a lighting wiring alteration. is redundant with the plain language proposed for Sections 141.0(b)2I, J, and K. For this reason, removing the language in Section 141.0(b)2Iiib clarifies, without materially altering, the requirements in the original text.

The proposed lighting control requirements for luminaire modifications are streamlined to better align with the opening sentence of Section 141.0(b), which specifies that the Section applies to “[t]he altered components of the envelope, or space conditioning, lighting and water heating systems [.]” For a luminaire modification the “altered component” is the luminaire, and while the luminaire must be connected to appropriate controls there was ambiguity regarding whether the controls would, or should, be treated as an “altered component” if they were otherwise untouched.

For this reason, the control requirements applying to modified luminaires are being relaxed to require that existing multi-level or automatic shutoff controls remain operable in controlling the luminaires after they are modified, rather than requiring the installation of new multi-level or automatic controls in place of existing, simpler controls. Luminaires are still required to be connected to a control of some kind, meaning something that controls the lights in the enclosed space where the modified luminaires are located and allows the lights to be manually turned on and off. This change addresses concerns that the cost of compliance for luminaire modifications was underestimated in the 2013 regulations due to potentially triggering additional requirements if new multi-level or automatic controls are installed, and also makes the requirements more consistent with the scope of the Section 141.0(b).

The changes to Section 141.0(b)2I are necessary to simplify and streamline the requirements applying to lighting system alterations and luminaire modifications, and to ensure the code’s compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2K: The purpose of the change in this Section is to simplify and clarify the requirements applying to alterations to wiring of indoor lighting, formerly in Section 141.0(b)1Iiv, and use

phrasing consistent with the revised language of Section 141.0(b)2I and J. To do so, the entirety of the existing language relating to wiring alterations in Section 141.0(b)2I is being removed, and new language is proposed.

The proposed language clarifies, without materially altering, the requirements previously specified in Section 141.0(b)2Iiv, with one exception: an Exception is added for alterations that would directly cause the disturbance of asbestos, consistent with the Exceptions specified for other subsections of 141.0(b)1.

The proposed change also removes an Exception for "Lighting Wiring Alterations allowed for Luminaire Modifications-in-Place in accordance with Section 141.0(b)2Iiii." This change clarifies, without materially altering, the requirements in the original text, as the only lighting wiring allowances specified in Section 141.0(b)2Iiii were for altering wiring internal to a luminaire, or for disconnecting and reconnecting luminaires. The proposed language does not identify these actions as actions that would be considered a lighting wiring alteration, and therefore no Exception is required.

These changes are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2L et seq.: The purpose of the re-lettering of these Sections is to accommodate the insertion of the two additional Sections noted above, and to combine two related Sections, formerly 141.0(b)2K and L, into a single Section. This change clarifies, without materially altering, the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2P: The purpose of this change is to add requirements for Electrical Power Distribution Systems that reflect the addition of these systems to Section 130.5 and ensure that these requirements are applied as appropriate to building alterations. This change is necessary for consistency with the proposed language in Section 130.5 and the proposed preamble to Section 141.0, per the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

141.0(b)2Q: The purpose of this change is to add requirements for Demand Responsive Controls and Equipment that reflect the addition of these systems to Section 130.1 and 130.5 and ensure that these requirements are applied as appropriate to building alterations. This change is necessary for consistency with the proposed language in Sections 130.1 and 130.5 and the proposed preamble to Section 141.0, per the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 141.0-E: The purpose of this change is to align the formatting and verbiage used within the proposed language in Section 141.0(b)2I, and to remove specifications in the original table that would be redundant with the specifications in Section 141.0(b)2I.

This change is necessary to preserve consistency with the proposed rewrite of Section 141.0(b)2I, and to ensure the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Table 141.0-F: The purpose of this change is to remove this table, consistent with the proposed language for Section 141.0(b)2J that states the lighting control requirements applicable to luminaire modifications within the Section rather than by reference to a Table. This change is necessary to ensure the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Section 141.1: The purpose of this change is to replace individual specification of covered processes and their applicable requirements in Section 120.6 with a single, blanket statement that covered processes shall comply with the applicable requirements of Section 120.6. This change clarifies, without materially altering, the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Subchapter 7 -- Low-Rise Residential Buildings-- Mandatory Features And Devices

150.0: The purpose of the changes in this Section is to improve clarity and consistency by using consistent language across the Standards when cross-referencing sections, and providing a note that explains how the subsections of Section 140.0 apply to newly constructed buildings and additions, alterations and repairs. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NOTE to 150.0: The purpose of the changes in this Section is to improve clarity and consistency by specifically referencing the Scope section and providing a note that explains how the subsections of Section 150.0 apply to newly constructed buildings and additions, alterations and repairs. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(a): The purpose of the change in this Section is to improve clarity and consistency by moving the language in Section 110.8 applying to residential construction to Section 150.0(a). As this language applies solely to residential construction, it is more appropriate to locate it in the Section specific to residential construction. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(c): The purpose of the change in this Section is to improve clarity and consistency by re-wording the Section and using an active voice. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(d): The purpose of the change in this Section is to improve clarity and consistency by condensing two numbered items into a single sentence. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(f): The purpose of the change in this Section is to improve clarity by moving the requirements for slab edge insulation specified in Section 150.0(l) closer to the other insulation requirements in Sections 150.0(a) through (d). The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(g): The purpose of the change in this Section is to improve clarity and consistency by specifying the use of Class I and Class II vapor barriers in a manner consistent with the California Residential Code Sections R408.3, regarding unvented crawl space, and R702.7, regarding wall covering. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(h): The proposed regulation will now require liquid line filter driers on outdoor condensing units when specified by the manufacturer. The purpose of this requirement is to require the use of cost-effective equipment that removes non-condensable materials from the equipment's refrigerant, resulting in both increased efficiency and longer compressor life. This change is necessary to further increase residential energy efficiency.

150.0(j): The purpose of the change in this Section is to improve consistency with federal

regulations by removing a clause applying to water heaters with an efficiency equal to or below the federal minimum standard. Water heaters below the federal minimum standard may not be imported or sold within the United States, therefore a clause regarding their installation potentially conflicts with federal law. In addition, although this clause also applies to water heaters with an efficiency meeting the federal minimum standard, the federal standards for water heaters have been updated since the original adoption of this language and now require a more efficient water heater than originally considered when this language was adopted. Accordingly, the justification for requiring additional insulation for water heaters meeting the minimum federal standards no longer applies. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(k): Residential Lighting: The proposed regulations reorganize this section and delete obsolete language to improve clarity. Subsections have been renumbered and reorganized as necessary in order to achieve the purpose of improving clarity of the Standards. Additional changes to specific subsections are described below:

150.0(k)1A: The method used to classify residential luminaires either as high efficacy or low efficacy is changed in order to improve clarity of the Standards. The proposed regulations remove the low efficacy requirement and all residential luminaire shall be high efficacy. The proposed regulations simplify the residential luminaire requirement, thereby providing greater clarity and improving code compliance and enforcement.

150.0(k)1B: The proposed regulation removes the “hybrid luminaires” classification as all residential luminaires have to be high efficacy for 2016 Standards and hybrid luminaires are no longer allowed. The proposed regulation also revises and relocates the electrical blank box requirement to this subsection. The number of electrical blank box ties to the number of bedrooms and must be controlled to allow reduction of light level, and thereby energy used can be reduced.

150.0(k)1C: The proposed regulations remove the luminaire wattage calculation and the luminaire wattage classification requirement as only high efficacy luminaires are required and allowed for residential buildings. The removal of the calculation requirements simplifies the compliance procedure and will result in improved code compliance and enforcement.

150.0(k)1G: The proposed regulations add this provision allowing screw based luminaires when the installed lamps meet the JA8 criteria and the luminaire is not the recessed luminaire type. The proposed regulations add an exception to the subsection for luminaires with pulse start metal halide lamps, and high pressure sodium lamps as these lamp technologies are defined as high efficacy light sources in Table 150.0-A.

150.0(k)2 – Interior Lighting Switching Devices And Controls: The proposed regulations revise the lighting controls requirements covering dimmers and vacancy sensors. In addition:

150.0(k)2A: The proposed regulations remove the requirement that low efficacy luminaire be switching separately from high efficacy luminaire switching requirement. All residential luminaires are required to be high efficacy and low efficacy luminaires are no longer allowed for residential lighting. The modification clarifies the Standards as the requirement is no longer applicable.

The proposed regulations also add a new requirement that phase cut dimmers shall comply with the NEMA SSL-7A Standard, which is an industry initiated phase cut dimmer requirement. The requirement can ensure compatibility between the phase cut dimmer and the LED lamp and

reduce dissatisfaction of consumer from using incompatible LED lamps and phase cut dimmers.

150.0(k)2J: The proposed regulations revise the lighting control requirement for bathrooms, garages, laundry rooms and utility rooms. The change simplifies the control requirement so that at least one luminaire has to be controlled. The benefit is that the modifications bring simplicity and improve clarity of the Standards, thereby improving code compliance and enforcement.

150.0(k)2K: The proposed regulation adds the control requirement of JA8 compliant light sources to be controlled by dimmers or vacancy sensors, with the exception for closets and hallways. The benefit is that the combination of JA8 light sources and the control devices can allow homeowners to reduce energy use.

150.0(k)3 – Outdoor Lighting Requirements: The proposed regulation revises the residential outdoor luminaire efficacy classifications so that all outdoor luminaires have to be high efficacy. This requirement ensures both indoor luminaires and outdoor luminaires have the same efficacy requirements. The modifications bring simplicity and also improve clarity of the Standards, thereby improving code compliance and enforcement. In addition:

Subsection 150.0(k)3A: The proposed regulation revises the lighting controls requirements including motion sensor controls, photocontrols, and astronomical time clock controls. The revisions add clarity to the Standards, thereby improving code compliance and enforcement.

150.0(k)4: The proposed regulations remove the cabinet lighting requirement as part of the process to improve clarity and streamline the lighting requirements. All residential luminaires have to be high efficacy and calculations of luminaire wattage are no longer required to show compliance to the Standards.

150.0(k)5 through (k)7: The proposed regulation deletes several subsections containing requirements for bathrooms, garages, laundry rooms, and utility rooms. The deletion is necessary so that the lighting requirements can be reorganized. The modifications improve clarity and ensure coherence of the Standards, thereby improving code compliance and enforcement.

150.0(k)8: The proposed regulation deletes the subsection containing requirements for recessed luminaires in ceiling. The deletion is necessary so that the lighting requirements can be reorganized. The modifications improve clarity and ensure coherence of the Standards, thereby improving code compliance and enforcement.

150.0(l): The purpose of the change in this Section is to improve clarity by moving the requirements for slab edge insulation specified in Section 150.0(l) closer to the other insulation requirements in Sections 150.0(a) through (d). The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.0(m): The proposed regulation reduces the duct leakage target percentage from 6 percent to 5 percent of total system airflow. The CASE team recommended this change after reviewing test data submitted to the HERS Registry for newly constructed buildings in 2012. Reducing the target leakage to 5 percent total system airflow, coupled with increased duct insulation and attic insulation, are key measures of the high performance attic prescriptive package and are necessary in order to achieve the code's energy use requirements.

150.0(n): The purpose of this change is to add instantaneous water heaters to the list of water heaters with mandatory requirements and to reference Section 110.3(c)7, where a requirement to install isolation valves with instantaneous water heaters has been added. This change is necessary to maintain internal consistency with the proposed mandatory requirements for instantaneous water heaters added to Section 110.3(c)7.

Table 150.0-A: The proposed regulations revise and reorganize Table 150.0-A, as all residential luminaires shall be high efficacy. Low efficacy light sources are deleted and replaced by JA8 compliant light sources, as low efficacy sources are no longer allowed to be installed in residential buildings. The modifications improve clarity and ensure coherence of the Standards, thereby improving code compliance and enforcement.

Table 150.0-B: The proposed regulations delete Table 150.0-B. There is only one luminaire efficacy requirement, regardless of the luminaire power, in Joint Appendix JA8. It is no longer necessary to specify the minimum luminaire efficacy requirements for the full range of luminaire power rating in a tabulated format of Table 150.0-B. The change of this section simplifies the code.

Tables 150.0-C and D: The purpose of the change to these tables is to improve clarity and consistency by re-lettering Tables 150.0-C and D. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Subchapter 8 -- Low-Rise Residential Buildings—Performance And Prescriptive Compliance Approaches For Newly Constructed Buildings

Subchapter 8 and 150.1 Titles. The purpose of this change is to improve accuracy, clarity and consistency by deleting language that suggests that the Section applies only to newly constructed buildings and that it applies to all residential buildings. These changes are consistent with Section 100.0(e)3. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.1: The purpose of the changes in this Section is to improve clarity and consistency by providing a note that explains how the subsections of Section 150.1 apply to newly constructed buildings and additions, alterations and repairs, consistent with Section 100.0(e)3. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a)

and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.1(a): The purpose of the changes in this Section is to improve clarity and consistency by removing a phrase that is redundant with the subchapter title and section heading and by making a separate grammatical correction to use the present tense. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.1(c)1: The proposed language will change the prescriptive requirements for Roof and Ceiling insulation. The proposed prescriptive requirement provides 3 options in how to meet the code requirement, which closely depends on where the mechanical system is located and where the roof deck insulation will be placed.

150.1(c)3 Exception 1: The purpose of the change in this Section is to improve clarity and consistency by correcting a typographical error. This change clarifies without materially altering the requirements in the original text: as Section 150.1(c)3 is titled, and specifically regards, fenestration, the use of the word “indoors” would not be understood to mean interior to the building, making the error obvious. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.1(c)7: The purpose of the change is to rename “charge indicator display” to “fault indicator display” in order to inclusively allow fault detection equipment capable of detecting refrigerant charge to satisfy these requirements. This change is necessary to more inclusively refer to devices capable of indicating a charge deficiency among other faults they may be capable of detecting.

150.1(c)7Aia: The purpose of this change is to add a reference to the new airflow verification section of Reference Residential Appendix RA3. This is necessary because airflow is required to be verified when confirming correct refrigerant charge.

150.1(c)8A: The proposed language will change the prescriptive requirements for water heating in newly- constructed single-dwelling unit. The proposed prescriptive requirement can be met by either the installation of an instantaneous water heater, or a storage water heater less than or equal to 55 gallons with Quality Insulation Installation (QII) plus either compact hot water distribution system or field verified pipe insulation, or a storage water heater over 55 gallons with either compact hot water distribution system or field verified pipe insulation. These requirements will cost-effectively increase the stringency of the Standards, while maintaining flexibility and recognizing the increased minimum efficiency requirement for storage water heaters larger than 55 gallons, thereby minimizing the energy use of newly-constructed single-dwelling units.

150.1(c)8D: The proposed language will add an exception to meet the water heating prescriptive requirement when natural gas is not available by the installation of heat pump water heater. The proposed language will also allow demand recirculation systems to be installed. These changes will add flexibility by allowing more cost-effective systems to be installed without changing the stringency of the current requirements.

150.1(c)9: The proposed regulation will impose prescriptive requirements on distribution systems that are located in high performance attics or in conditioned space. The requirements vary depending on the location of the distribution system. The requirements for ducts in high performance attics include increased insulation. For ducts in conditioned space, the requirement includes field verification of the duct location. The purpose of this change is to decrease the heat loss or heat gain from the attic space to the conditioned air in the distribution system. This change is necessary to achieve increased energy efficiency.

150.1(c)12: The purpose of the change is to relax the existing prescriptive requirement for minimum cubic feet per minute (CFM) per square feet and attic vent free area. The 2013 Standards were the first to introduce whole house fans as a prescriptive requirement. The amount of airflow required by 2 CFM per square feet and vent free area proved to be too much for wide implementation and resulted in whole house fans being traded away under the performance approach. This change is necessary to encourage the installation of whole house fans to take advantage of cool outside air temperatures instead of using the air conditioner, which is more energy intensive.

Table 150.1-A: The purpose of the changes to this Table is to update the U-factors and R-values specified in the table and to reformat the table for clarity. The rationale for the updated U-factors and R-values is to meet the ZNE goals by 2020.

The changes to the formatting of the table are necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

Subchapter 9 -- Low-Rise Residential Buildings—Additions And Alterations In Existing Low-Rise Residential Buildings

150.2 Title: The purpose of this change is to remove unnecessary specificity. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NOTE to 150.2: The purpose of this change is to clarify how the Standards apply in the relatively rare case when alterations result in a change in occupancy. The change is consistent with Section 100.0(e)3. This change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

150.2(a)1: The criteria of the continuous insulation in the prescriptive package for newly constructed residential buildings does not pertain to existing walls that are being extended with an addition greater than 700 square feet. The rationale for this change is that because adding exterior continuous insulation to the extended portion the wall would cause the new wall facade to not line up properly with the existing wall facade, requiring the new portion of the wall to meet this requirement would cause an aesthetic issue in construction. However, adding new walls which are not an extension of an existing wall are required to meet the Prescriptive requirement, as this concern does not exist in this case. This change is necessary to prevent the regulations from causing an unintended aesthetic issue when existing walls are extended.

150.2(a)1Dii: The proposed language would allow recirculation system to be installed if it is a demand system with manual control pumps. This change makes the requirement consistent with the requirement for newly constructed buildings.

150.2(b): The proposed language removes the 150.0(n) requirements of high performance water heater ready for alterations. The requirements were originally developed for the 2013 Standard intended for newly constructed buildings and additions only. The removal of this language restores the intent of the 2013 language and avoids unreasonable additional cost for alteration of existing water heaters.

150.2(b)1C: The proposed change includes a reference to Table 150.2-A, which lists the requirements for ducts systems by climate zone. This change is necessary since the changes to Table 150.1-A cannot be applied to alterations.

Table 150.2-A: The proposed table will require increased duct insulation above the mandatory minimum and will vary by climate zone. Given the changes to section 150.1(c)9, the purpose of this table is to require insulation to adequate levels for ducts that are not located in high performance attics. This change is necessary to capture energy savings by reducing the amount of heat transfer between the conditioned air and the surrounding space where the duct system is installed.

150.2(b)1F: The proposed change is to replace CID (charge indicator display) with FID (fault indicator display). The change does not change the required functionality of the device. This change is necessary to maintain consistency throughout the regulation.

150.2(b)1Fi: The purpose of the change in this Section is to improve clarity and consistency by referencing the new airflow section, Section RA3.2.4 of the Residential Reference Appendix. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

EXCEPTION to 150.2(b)1Fi: The proposed change is to add minimum system airflow verification to the exception. The exception is to the standard refrigerant charge verification when the outdoor conditions do not allow for a proper charge test. The existing exception allows the weigh-in charging procedure to be used instead. However, the system airflow does not depend on climate conditions; therefore there is no reason to offer the exception to minimum system airflow. Also, the weigh-in charging procedure in RA3.2.3 includes minimum airflow verification. This change is necessary for clarity and proper system performance.

150.2(b)1Fii: The proposed change is to require minimum airflow verification for systems complying with the refrigerant charge verification by using the weigh-in charge procedure. The weigh-in charging procedure in RA3.2.3 includes minimum airflow verification. This change is necessary for clarity and proper system performance.

150.2(b)1G: The proposed language clarifies the requirements for water heating system alteration and would allow a recirculation system to be installed if it is a demand system with manual control pumps. This change makes the requirement consistent with the requirement for newly constructed buildings.

150.2(b)1H: The purpose of this change is to clarify that when the entire roof is being replaced down to the roof deck, it is considered a new roof and therefore needs to meet the Prescriptive requirements applicable to new roofs. This change makes the requirement consistent with the requirement for newly constructed buildings.

150.2(b)1I: The proposed regulations clarify that the mandatory requirements for new residential buildings apply to alterations.

The proposed regulations delete the language on describing how the wattage of altered luminaires with LED modules are being determined as it is no longer necessary to use the installed luminaire wattage to determine compliance with Title 24. This deletion will ensure languages in different sections are uniform.

150.2(b)2: The purpose of the change in this Section is to improve clarity and consistency by rewording the statement in Exception 3 to be more explicit and by updating the lettering of Tables

150.2-A and B, now B and C. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

DOCUMENTS ADOPTED WITH THE ENERGY EFFICIENCY REGULATIONS

(APPENDICES TO THE REGULATIONS)

All of these documents are adopted along with and are a part of the standards. Due to their volume and complexity, they are not codified. They are incorporated by reference. The purposes, rationales, necessity and benefits of the changes to these documents are described below.

REFERENCE APPENDICES

JOINT APPENDICES

JA1 – Glossary

Definitions between “Demand Response” and “Design Review”: Carriage returns were added to correct a formatting error where these definitions were shown in a continuous block of text. The purpose of this change is to improve clarity and consistency by appropriately separating these definitions. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1 Article 2 of the California Code of Regulations.

JA2 - Reference Weather/Climate Data

JA 2.1.1 – The proposed language will allow new ZIP codes to be added to JA2 as an addendum. This change is necessary to allow for changes to ZIP codes to be accounted for between code adoption cycles. The benefit of this change is that it will allow the publication of the most up-to-date information for ZIP codes and climate zones.

Table 2-2 and 2-3 – The purpose of this change is to add new ZIP codes and climate zone

listings to these tables, making the tables current with respect to current California ZIP codes. These changes are necessary to accurately include all of the current ZIP codes in California in these tables. The benefit of having a complete and accurate ZIP code table is that it provides a single, accurate reference for builders, inspectors, and other users of the code.

JA3 - Time Dependent Valuation (TDV) Data

(No changes to this Section.)

JA4 - U-factor, C-factor, and Thermal Mass Data

JA 4.2: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

Table 4.2-3: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

JA 4.3: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

Table 4.3-1: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

Table 4.3-2: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to

designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

Table 4.3-3: As more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

Addendum to JA 4: Added a new table, as more insulating options and insulation R-values are available in the market more columns and rows are added to the tables to provide a larger prescriptive option for the designers. This change is necessary to improve compliance rates, provide appropriate options to designers and builders, and ensure that the regulations do not inadvertently exclude any known, effective approaches to building insulation.

JA5 – Reference Design For Upgradeable Setback Thermostats

JA 5.1: The proposed regulations clarify the physical and logical communication requirements of Occupant Controlled Smart Thermostats (OCST). It clarifies that it allows open, non-proprietary technologies and communication protocol. Open, non-proprietary communication protocols can improve interoperability. It also reduces barriers to participate in demand response events and better positioning customers to take advantage of utility programs that could result in lower energy bills. It also improves clarity by defining what is physical communication and logical communication.

JA5.2: The proposed regulations clarify the required functional resources of OCSTs. It adds clarity by renaming Price Signals as Demand Responsive Control and defines the mechanism of Demand Responsive Control. It allows open technologies for the expansion port or the removable module so that customers can have additional choices and flexibility for the OCST communication. Default Restart Settings is revised to ensure that programmed response to DR signals can be retrieved after unintended power loss. Automatic Rejoin is added to ensure that a connection is restored upon restart for OCSTs that were previously connected to a utility or third party signal provider, prior to power loss.

JA5.3: The proposed regulations clarify the functional description of OCSTs. It provides greater clarity around acceptable physical communication protocols and logical communication protocols; reduces the risk of stranded asset by setting a minimum standard that reflects current and anticipated future market adoption of logical communication protocols. It also clarifies the definition and requirement of Expansion Port when the port is not enabled so that it is clear on how the OCST function as a thermostat.

JA5.5: The proposed regulations delete the definition of Price Signal as it is a type of Demand Response signal, and the regulations do not intend to treat different Demand Response signals differently. Demand Response signal is already defined in Joint Appendix JA1, and Price Signal is already stated to be a type of Demand Response Signal in JA 5.2.3.1. The regulations do not require a definition for Price Signal beyond stating that it is a type of Demand Response Signal, and this definition is therefore removed to prevent confusion and enhance clarity. This change is necessary to make the regulations clearer and more consistent, and has the benefit of creating fewer technical terms within the regulations.

JA6 – HVAC Fault Detection and Diagnostic Technology

JA 6.1: The proposed change to this section is a global change from charge indicator display (CID) to fault indicator display (FID). The CID has been a part of the Building Energy Efficiency Standards since the 2008 cycle, however a CID-specific device has not been developed. The HVAC industry has been working toward fault detection devices for residential size systems which would detect more than just refrigerant charge (i.e., that would detect low or incorrect charge in addition to detecting other possible faults). Given the perception that the CID is a refrigerant charge indicator only, the manufacturers were reluctant to pursue the development of a CID-only device since they are working towards devices that can perform more functions. This change is therefore necessary to encourage the industry to develop fault indicator displays capable of facilitating field verification of proper refrigerant charge and providing the home owner with valuable information if the system begins to lose charge. Ensuring proper charge during installation and continuing to monitor system performance will contribute to energy savings and longer equipment life.

JA 6.3: The proposed change is to add minimum testing requirements for Fault Detection and Diagnostic (FDD) equipment. FDD's are currently required to be certified to the Energy Commission but there was no uniform direction aside from a signed declaration from the manufacturer stating that the FDD met all the requirements of the Building Energy Efficiency Standards. After collaborating with the HVAC industry a guidance document was created that offered a minimum level of FDD testing to show that the device indeed met the requirements of the Building Energy Efficiency Standards. Manufacturers have been voluntarily using this guidance document to submit their devices to be certified to the Energy Commission. The purpose of incorporating that guidance document and making it a requirement for certification is to set a bottom bar for FDD functionality. This change is necessary to create an even field for all manufacturers.

JA7 – Data Registry Requirements

JA 7.1: The purpose of the change in this Section is to correct a typographical error by inserting a comma. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

JA 7.6.2.3.4: The purpose of this change is to update the year specified for an internal reference to the Standards to remain consistent following adoption of the revisions proposed within this Rulemaking. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

JA 7.6.2.4.1: The purpose of this change is to update the year specified for an internal reference to the Standards to remain consistent following adoption of the revisions proposed within this Rulemaking. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

JA 7.6.3.1.2.2.1: The purpose of this change is to update the year specified for an internal reference to the Standards to remain consistent following adoption of the revisions proposed within this Rulemaking. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

JA 7.10: The purpose of this change is to update the year specified for an internal reference to the Standards to remain consistent following adoption of the revisions proposed within this Rulemaking. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

JA8 – Qualification Requirements for Residential Luminaires Using LED Light Sources:

JA 8: The proposed regulations substantially modify existing language such that it will be technology neutral and specify the requirement for any light source that can comply with the requirement as a high efficacy light source. The new requirement also includes coverage of replacement lamps in addition to light sources that are integral to luminaires and light engines. The proposed regulations reorganize JA8 and delete obsolete languages to improve clarity. Subsections have been renumbered and reorganized. This full-section rewrite is necessary to create clear, direct and well organized regulatory language that is technology-neutral in accommodating various lighting technologies, and has the benefit of expanding the types of lighting that can qualify as High Efficacy Lighting. This rationale applies to all JA8 subsections, in addition to any other rationale as articulated below.

Some of the JA8 requirements are the same as the existing JA8 requirements, including the

following:

- Minimum CRI of 90
- Laboratories conducting the testing must be accredited by the National Voluntary Accreditation Program (NVLAP)
- Complying products are labeled with a permanent marking on the light source.

JA8.1: The proposed regulations state the purpose and scope that it is for high efficacy light sources to be installed in residential buildings.

JA8.2: The proposed regulations modify the reference to light sources. This change clarifies that any light sources can be tested. The certification of test apparatus and test labs requirement is relocated here and renumbered as such.

JA8.3: The proposed regulations add testing requirements for high efficacy light sources and this is to ensure the light source is of high efficacy.

JA8.3.1: The proposed regulations add efficacy test requirements for high efficacy light sources and the test procedures are based on existing federal standards and industry standards for different light source technologies.

JA8.3.2: The proposed regulations add power factor test requirement for high efficacy light sources and the test procedures are based on existing ANSI standards.

JA8.3.4: The proposed regulations add start time test requirement for high efficacy light sources and the test procedure are based on ENERGY STAR Lamp Program start time test method.

JA8.3.5: The proposed regulations add elevated temperature life test requirement for high efficacy light sources and the test procedure are based on ENERGY STAR Lamp Program elevated temperature test method.

JA8.3.6: The proposed regulations add flicker test requirement for dimming light sources and the test procedure are based on JA10 requirement.

The proposed regulations add noise test requirement for dimming light sources and the test procedure are based on ENERGY STAR Lamp Program Noise Recommended Practices.

JA8.4: The proposed regulations state the performance qualification of high efficacy light sources and these qualifications include luminous efficacy, power factor, start time, color temperature, color rendering, dimming, reduced flickering, and noise level.

JA8.4.1: The proposed regulations of the efficacy requirement are the same as the existing JA8 requirement.

JA8.4.2: The proposed regulations add the power factor requirement and this is identical to the requirement in the Voluntary LED lamp Quality Specification.

JA8.4.3: The proposed regulations add the start test requirement to ensure an insignificant time delay between switching the light on and the illumination of the source.

JA8.4.4: The proposed regulations add the color temperature requirement to ensure the warm white color temperature of the high efficacy light source closely matches to the color temperature of incandescent light sources.

JA8.4.5: The proposed regulations add the color rendering index (CRI) requirement as high CRI and high R9 are important for rendering skin tones, wood, food and other natural materials.

JA8.4.6: The proposed regulations add the dimming, reduced flickering and audible noise level requirement.

JA8.4.7: The proposed regulations add the lumen maintenance to ensure significant light output remains after long hour of operation. The proposed regulations add the rated life requirement to ensure the high efficacy light source can run for long hour of operation.

JA8.5: The proposed regulations add the marking requirement so that JA8 light sources can be merely enforced by looking in the luminaire and seeing if the light source bears the JA8 compliant label. This addition will improve the effectiveness of the Standards by improving the verification of code compliance.

JA8.6: The proposed regulations add data reporting requirement that test data indicated in Table JA-8 shall be submitted to the Energy Commission. The submitted data can be used by the Energy Commission and others to verify the light source information.

JA8(a): The proposed regulations remove the existing language about LED luminaires not intended for use in residential applications, LED landscape luminaire, and luminaire housings not containing a light engine. The purpose and the scope of JA8 is defined in a subsection of JA8.

JA8(b): The proposed regulations delete the subsection. This subsection requirement of efficacy and the reference to Table JA-8 is no longer valid. New requirement of luminous efficacy is added in a subsection of JA8.

JA8(c): The proposed regulations revise and relocate the Correlated Color Temperature (CCT) requirement to another subsection of JA8.

JA8(d): The proposed regulations revise and relocate the CRI requirement to another subsection of JA8.

JA8(e): The proposed regulations remove the existing language about the LED light engine as it is obsolete. The proposed regulations allow the LED light engine meeting the criteria to be a JA8 compliant light source.

JA8(f): The proposed regulations remove the existing language about LED lamp as it is obsolete. The proposed regulations allow the LED lamp meeting the criteria to be a JA8 compliant light source.

JA8(g): The proposed regulations relocate the existing language about the certification of test apparatus and test labs to another subsection of JA8.

JA8(h) thru JA(l): The proposed regulations remove the existing language about testing of LED luminaires and LED light engines as the requirement is no longer valid. New testing requirements is added in other subsections of JA8.

Table JA-8: The proposed regulations delete the efficacy table as the table is no longer valid. New requirement of luminous efficacy is added in a subsection of JA8.

JA9 – Qualification Requirements for Low Leakage Air Handling Units:

JA 9.2.2: The proposed regulations add the acronym (ILAC MRA), for International Laboratory Accreditation Cooperation Mutual Recognition Arrangement, for additional clarity. This change is necessary to present the name represented by the acronym, and thus for the internal consistency of the regulations.

JA10 – Test Method for Measuring Flicker of Lighting Systems and Reporting Requirements (new Appendix)

JA10: The purpose of the proposed regulations are to establish a test method for quantifying the amount of flicker from lighting systems, including but not limited to lamps, ballasts, drivers, and dimming controls. The test method measures the fluctuation of light from lighting systems and processes this signal to quantify flicker as a mathematical measure, “percent amplitude modulation” (also known as “percent flicker”). JA8 lays out the percent flicker threshold that the light sources should not exceed, while this proposed JA10 specifies the procedure for determining the flicker of a specific light source.

JA10.2: The proposed regulations add the Equipment Combinations to be tested under the JA10 test method.

JA10.3: The proposed regulations add the Test Equipment Requirements for measuring flicker of lighting systems.

JA10.4: The proposed regulations add the Flicker Test Conditions requirement including light source product wiring setup, product pre-conditioning, input power to the unit under test, temperature to be maintained during test, and dimming levels to be measured.

JA10.5: The proposed regulations add the Test Procedure to be carried out during the test. They include lamp stabilization, lamp light output, equipment measurement period, and number of measurements,

JA10.6: The proposed regulations add the calculations required as part of the test and the calculation includes percent amplitude modulation.

JA10.7: The proposed regulations add Test Report and Data Format requirement. Test report is required to be submitted to the Energy Commission in the data format as described in JA10.7. The report can be used to verify if the product is qualified as a JA8 compliant light source.

These changes are necessary to establish a procedure for confirming that the flicker requirements applied by JA8 are met. The benefit of establishing this procedure is in preventing intolerable but low-energy-consuming lighting from being installed to meet the requirements of the Standards.

RESIDENTIAL APPENDICES

RA1 – Special Case Residential Field Verification and Diagnostic Test Protocols

RA 1.1 and subsections: The proposed changes are to globally replace “special case” with “alternative” as well as reference the proposed language in Section 10-109. The current Residential Reference Appendix (RA) offers the ability for applicants to submit “special case” protocols to serve as an alternative to the existing protocols in the RA, however there was not much direction given to the formal process to review the application. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA 1.2.3: The purpose of the change are to reference the correct section of the Residential Reference Appendix given that the airflow requirements currently in section RA3.2.2.7 have been move to section RA3.2.4. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA2 – Residential HERS Verification, Testing and Documentation Procedures

Table RA 2-1: The purpose of the proposed changes to this table is to clarify that duct location verification applies to both the supply and return ducts, to reference the new prescriptive option of placing duct in conditioned space and changing the reference from Charge Indicator Display to Fault Indicator Display. These changes are necessary for consistency and clarity.

RA 2.3.1.1: The purpose of the change in this Section is to improve clarity and consistency by distinguishing that the duct surface area credit applies to the duct system rather than only the supply duct. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA 2.4.4: Refrigerant charge verification is required to be conducted by the installing contractor and the HERS Rater. The installer has the option to perform weigh-in charge verification rather than standard charge verification. If the installer chooses to perform the weigh-in charge verification due to adverse weather conditions and elects to not have a HERS Rater present for the weigh-in, then the HERS Rater is required to return to the home when the weather is favorable for a standard charge verification. The purpose of the proposed change is to facilitate the HERS Rater re-entry into the home. This change is necessary for verification of the installed HVAC system.

RA3 – Residential Field Verification and Diagnostic Test Protocols:

RA 3.1.4.1 and subsections: The purpose of the change in this Section is to improve clarity and consistency by distinguishing that reduced duct surface area applies to the complete duct system rather than only the supply duct. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA3.1.4.3.1 and subsections: The purpose of the proposed change is to clarify that the duct system is to be sealed at each connection and to remove the air filter prior to pressurizing the duct system. These changes are necessary in order to limit the sources of duct leakage through unsealed openings as well as ensure proper pressurization during the duct tightness test. This change clarifies without materially altering the requirements in the original text, and is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA 3.2.1 and subsections: The purpose of the proposed change is to identify the possibility of an approved alternative protocol and to mention that, if one were to be approved; both the HVAC Installer and HERS Rater must perform the same test. This change is necessary for consistency in test results in the event that the Energy Commission approves an application for an alternative protocol.

RA 3.2.2: The purpose of the change in this Section is to improve clarity and consistency by referencing the correct airflow requirements given that the airflow requirements have been moved to Section RA3.2.4. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA 3.2.2.5: The purpose of the proposed change is to verify that the liquid line filter drier is installed given that the liquid line filter drier is also a proposed mandatory measure in Section 150.0(h). This change is necessary for consistency with the mandatory measures.

RA 3.2.2.7 and subsections: The purpose of the change in this Section is to improve clarity and consistency because the airflow requirements moved from this section to RA3.2.4. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

RA3.2.3: The purpose of the proposed change is to require airflow verification when the installer

chooses to use the weigh-in charging procedure. This procedure is mostly used because of weather conditions, which have no bearing on the system airflow, thus the minimum airflow must still be verified. This change is necessary for clarity.

RA 3.2.3.1.5: The purpose of the proposed change is to verify that the liquid line filter drier is installed and accounted for during the weigh-in, given that the liquid line filter drier is also a proposed mandatory measure in Section 150.0(h). This change is necessary for consistency with the mandatory measures.

RA 3.2.3.2: The purpose of the proposed change is to verify that the liquid line filter drier is installed and accounted for during the weigh-in, given that the liquid line filter drier is also a proposed mandatory measure in Section 150.0(h). This change is necessary for consistency with the mandatory measures.

RA 3.2.4 and subsections: The purpose of the proposed change is because the airflow requirements have been moved from Section RA 3.2.2.7 to this section. The reason for the move is because the minimum airflow requirements were intended to apply to both the standard and weigh-in charging procedures. Currently, the airflow procedure is a subsection to the standard charge procedure but Section RA3.2.1.2(c) requires compliance with minimum airflow. Thus, it is more appropriate for the airflow procedure to be its own section and referenced by both the standard and weigh-in procedures. This change is necessary for clarity and consistency.

RA 3.5.3.2.9: Modified for clarity, when constructing with a single-member headers and no continuous insulation is required for QII. Not all types of headers can have insulation applied to them.

RA 3.5.4.2.9: Modified for clarity, when constructing with a single-member headers and no continuous insulation is required for QII. Not all types of headers can have insulation applied to them.

RA 3.5.5.2.9: Modified for clarity, when constructing with a single-member headers and no continuous insulation is required for QII. Not all types of headers can have insulation applied to them.

RA 3.5.6.2.9: Modified for clarity, when constructing with a single-member headers and no continuous insulation is required for QII. Not all types of headers can have insulation applied to them.

RA 3.5.7.2.7: Modified for clarity, when constructing with a single-member headers and no continuous insulation is required for QII. Not all types of headers can have insulation applied to them.

RA 3.5.8.2.7: Modified for consistency with the ENERGY STAR Thermal Bypass Check List.

RA 3.6.2: Modified for clarity. Language modified to point specifically to the pipe insulation requirement in section 150.0(j).

RA 3.6.5: Modified for clarity. Language modified to point specifically to the pipe insulation requirement in section 150.0(j).

RA 3.6.6 [and subsequent renumbering]: The proposed change will delete this entire section. This change moves the Point-of-Use credit from a HERS-verified to a non-HERS verified credit. This allows easier adoption of the Point-of-Use credit and reduces the complexity of the number of HERS-verified distribution systems. Subsequent sections have been renumbered as a result.

RA 3.6.6 (previously RA 3.6.7): Modified for clarify. Replaced wording from hot water use location to hot water fixture location.

RA 3.6.7 (previously RA 3.6.8): Modified for clarify. Replaced wording from hot water use location to hot water fixture location.

RA4 – Eligibility Criteria for Energy Efficiency Measures:

RA 4.4.5: This change moves the Point-of-Use credit from a HERS-verified to a non-HERS verified credit. This section contains language previously located at RA 4.4.17. This allows easier adoption of the Point-of-Use credit and reduces the complexity of the number of HERS-verified distribution systems.

RA 4.4.9: Modified for clarify. Replaced wording from hot water use location to hot water fixture location.

RA 4.4.10: Modified for clarify. Replaced wording from hot water use location to hot water fixture

location.

RA 4.4.11: The proposed language removes the equipment listing requirement for the Multiple Dwelling Units: Recirculation Temperature Modulation Control credit.

RA 4.4.12: The proposed language removes the equipment listing requirement for the Multiple Dwelling Units: Recirculation Continuous Monitoring Systems credit.

RA 4.4.17 [and subsequent renumbering]: The proposed change will delete this entire section and move the language to RA 4.4.5. This change moves the Point of Use credit from a HERS-verified to a non-HERS verified credit. Subsequent sections have been renumbered as a result.

RA5 – Interior Mass Capacity:

(No change to this Section.)

NONRESIDENTIAL APPENDICES

NA1 – Nonresidential HERS Required Verification, Testing and Documentation Procedures:

(No change to this Section.)

NA2 – Nonresidential Field Verification and Diagnostic Test Procedures:

(No change to this Section.)

NA3 - Fan Motor Efficiencies:

(No change to this Section.)

NA4 - Compliance Procedures for Relocatable Public School Buildings:

(No change to this Section.)

NA5 - Envelope Tradeoff Procedure:

(No change to this Section.)

NA6 - Alternate Default Fenestration Procedure to Calculate Thermal Performance:

NA 6.1: The proposed change corrects a typographical error in a reference to Section 110.6; this Section is correctly referenced in two other places in the paragraph containing the error, and therefore the change clarifies without materially altering the requirements in the original text. The purpose, problem being addressed, rationale and benefit of this change are to correctly specify the location of the Default Tables in Title 24, Part 6, and to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA7 – Acceptance Requirements for Nonresidential Buildings:

NA7.4.3.1: Removed references to default values and certificates as they are not valid for Dynamic glazing. If Dynamic Glazing do not have a NFRC label, they must be treated as Regular Fenestration product.

NA7.4.3.2: Removed references to default values and certificates as they are not valid for Dynamic glazing. If Dynamic Glazing do not have a NFRC label, they must be treated as Regular Fenestration product.

NA 7.5.4.1: The proposed changes reflect the proposed changes in Section 140.4(e)1, including the new language regarding the economizer damper capability and certification of the economizer damper leakage to the Energy Commission. This change is necessary for consistency and clarity.

NA 7.5.11.1: The proposed change is to remove the refrigerant pressure sensors from the construction inspection. Refrigerant pressure sensors were originally part of the 2013 Building Energy Efficiency Standards 45 day language because the FDD was required to detect refrigerant faults. Through the 2013 rulemaking the refrigerant fault requirement was deleted because the FDD technology was not widely available for refrigerant faults. References to refrigerant pressure sensors remained in the Standards and NA, thus making this change is necessary for clarity. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA 7.5.11.2.4: The proposed change is to remove the field functional test for refrigerant pressure sensors. Refrigerant pressure sensors were originally part of the 2013 Building Energy Efficiency Standards 45 day language because the FDD was required to detect refrigerant faults. Through the 2013 rulemaking the refrigerant fault requirement was deleted because the FDD technology was not widely available for refrigerant faults. References to refrigerant pressure sensors remained in the Standards and NA, thus making this change necessary for clarity. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA 7.5.15.1: The purpose, problem being addressed, rationale and benefit of the change in this Section are to improve clarity and consistency by referencing the correct year. The proposed change is necessary to improve the code's compliance with the clarity and consistency criteria of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA 7.6.1: The proposed regulations revise the title of the Daylighting Controls Acceptance Test so that it is consistent with the style of the rest of the Joint Appendices document.

NA 7.6.1.2.1: The proposed regulations revise some of the referenced Step number so that they are correct.

NA 7.6.2: The proposed regulations revise the title of the Shut-off Controls Acceptance Test so that it is consistent with the style of the rest of the Joint Appendices document.

NA 7.6.2.1: The proposed regulations revise the subsection title to "General Requirements" so that it is consistent with the style of the rest of the Joint Appendices document.

NA 7.6.2.2: The proposed regulations revise the abbreviated name of passive infrared sensor

type so that it is spelled out in full name.

NA 7.6.2.3: The proposed regulations revise the programmed time setting of occupancy sensors, as this is the new mandatory requirement for occupancy sensors.

NA 7.6.2.5: The proposed regulations revise the functional testing direction and describe the unoccupied condition to be verified and document for the non-exempt lighting. This modification improves the clarity of Joint Appendices.

NA 7.6.3: The proposed regulations revise the title of the Demand Responsive Controls Acceptance Test so that it is consistent with the style of the rest of the Joint Appendices document.

NA 7.7.4.1: The purpose of the change in this Section is to remove potential ambiguity by replacing the word “construction” with the word “installation”. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code’s compliance with the clarity and consistency of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA 7.8: The proposed regulations reorganize the section and add subsections for the different outdoor lighting controls requirement in the Standards. The modifications improves clarify of the requirement of the acceptance test, thereby improve the effectiveness of the Standards and code compliance. The proposed regulations revise the title of the outdoor lighting controls acceptance test so that it is consistent with the style of the rest of the Joint Appendices document.

NA7.8.1.1: The proposed regulations remove the subsection number and title so that it is consistent with the style of the rest of the Joint Appendices document. The body of the subsection remains.

NA7.8.1.2: The proposed regulations remove the subsection number and title so that it is consistent with the style of the rest of the Joint Appendices document.

NA 7.8.1: The proposed regulations add the subsection title of “Motion Sensor Construction Inspection” to reflect the content of the subsection and it is for the construction inspection requirement. The modification improves clarity of the requirement, thereby improving the effectiveness of the Standards and code compliance. The proposed regulations also revise that the “sensor” has to be installed properly. The modification clarifies the requirement applies to

sensors.

NA 7.8.2: The proposed regulations add the subsection title of “Motion Sensor Functional Testing” to reflect that the content of the subsection is for the motion sensor construction inspection requirement. The proposed regulations also remove the subsection number and title, as they are superseded by the new reorganized subsection number and title. The modification improves clarity of the requirement, thereby improving the effectiveness of the Standards and code compliance.

NA7.8.3: The proposed regulations add a new subsection “Photocontrol Construction Inspection” for the outdoor lighting control acceptance testing. The purpose of this procedure is to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance, and realizing the energy savings anticipated by the Standards.

NA 7.8.4: The proposed regulations add a new subsection, “Photocontrol Functional Testing” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA7.8.5: The proposed regulations add a new subsection “Astronomical Time-Switch Control Construction Inspection” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA 7.8.46: The proposed regulations add a new subsection, “Astronomical Time-Switch Control Functional Testing” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA7.8.7: The proposed regulations add a new subsection “Part-Night Outdoor Lighting Control Construction Inspection” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA 7.8.8: The proposed regulations add a new subsection, “Part-Night Outdoor Lighting Control Functional Testing” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA7.8.9: The proposed regulations add a new subsection “Automatic Scheduling Control Construction Inspection” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA 7.8.10: The proposed regulations add a new subsection, “Automatic Scheduling Control Functional Testing” for the outdoor lighting control acceptance testing. This is a new acceptance testing procedure to ensure the control is operating in accordance with the Standards, thereby improving the effectiveness of the Standards and code compliance.

NA 7.9: The purpose of the change in this Section is to rename the subsection title to the section title in lieu of the section number so that it is apparent to the reader about the subject of the section. This change clarifies without materially altering the requirements in the original text. This change is necessary to improve the code’s compliance with the clarity and consistency of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

NA 7.14: The proposed test is added to ensure proper control of the elevator cab lighting and ventilation fan. The purpose of the proposed language is to give instruction to the controls contractor to verify installation. The change is necessary to verify proper shut off control and realize energy savings.

NA 7.15: The proposed test is added to ensure proper control of the escalators and moving walkways. The purpose of the proposed language is to give instruction to the controls contractor to verify installation. The change is necessary to verify proper speed control and realize energy savings.

NA8 - Luminaire Power

(No change to this Section.)

NA9 – Nonresidential Fault Detection and Diagnostics

(No change to this Section.)

NA10 – Nonresidential Documentation procedures

(No change to this Section.)

ALTERNATIVE CALCULATION METHOD (ACM) APPROVAL MANUAL

Computer software programs that are developed by private entities for demonstrating compliance with the Standards under the performance approach are Alternative Calculation Methods (ACMs). (Cal. Code Regs., tit. 24, pt. 1, ch. 10, §§ 10-102, 10-109.) They provide the market with another tool than the public domain software developed by the Energy Commission.

The overall purpose and rationale of the ACM Approval Manual is to provide instructions for how ACMs are approved for use by the Commission, so that interested persons understand the requirements for ACMs, and to ensure they are reliable and accurate. The purpose and rationale of the proposed changes to the ACM Approval Manual are to simplify the approval process and resolve problems identified in the current Manuals, including providing a consistent procedure for both residential and nonresidential ACMs.

Proposed changes to the structure of the ACM Approval Manual combine the Residential and Nonresidential ACM Approval Manuals into one document, and add some requirements not previously included in the ACM Reference Manuals. This effort represents a nearly complete rewriting of the Residential Compliance Manual and the striking of the Nonresidential Compliance Manual. A majority of the changes consolidate requirements that were spread throughout the document and organize them in a more logical and consistent manner. All of the changes proposed for the ACM Approval Manual share a rationale of improving organization and clarity, adding specificity, and separating the obligations placed on the Energy Commission relating to its Compliance Manager software from those placed on vendors of privately developed compliance software. All of these changes are necessary to improve the code's compliance with the clarity and consistency of California Government Code Sections 11349, subdivisions (c) and (d); 11349.1, subdivisions (a) and (b); 11346.2, subdivision (a)(1); and California Code of Regulations, Title 1, Section 16.

The specific purposes of the changes proposed for each Section of the ACM Approval Manual follow.

Section 1. Overview is now re-titled as an Abstract, to make clear that this language is descriptive rather than regulatory, and the language has been edited for clarity. Section 1 is now proposed to begin immediately prior to Section 1.1.

Section 1.1 has been expanded to provide a complete list of items needed in an approval application, with complete descriptions of each item, consistent with the Section's title.

Section 1.2 consolidates the sections of the ACM that discussed approval of an application. This Section now concisely describes the approval process, and eliminates the separation between "full" and "streamlined" approval. The section regarding amendments to applications has been consolidated into the section regarding when approval is not required, now proposed as Section 1.2.2.

Section 1.3 is rewritten to consolidate the requirements placed on approved software that apply when the Compliance Manager is updated, to specify the types of Compliance Manager updates,

and to state the process required by vendors of compliance software. Updates to the Compliance Manager may be either “major” or “minor”; updates found to be “major” proceed on a different schedule from updates found to be “minor”.

Section 1.4 supports Section 1.2 by specifying the types of changes that do not require approval.

Section 1.5 consolidates language regarding when approval ends. Approval may either naturally expire, or it may be ended through a decertification process. The specifications for the decertification process are moved from Section 1.4 of the current regulations to Sections 1.5.2 and 1.5.3 of the proposed regulations, and have been edited for consistency and clarity.

Sections 1.6 states the requirement to perform and pass certain software tests. The existing language regarding requests to perform alternate software tests has been moved to proposed Section 1.6.1.

All of the language relating to the Energy Commission’s Compliance Manager software is consolidated in Section 2 of the proposed language. This new Section now describes, in full, the nature and behavior of the Compliance Manager software and the criteria that apply to it. The ACM Reference Manuals are now defined as reference manuals that document the internal operation of the software; a portion of the language that was previously in the Reference Manuals and is relevant to the regulations has been added to the proposed Appendices described below.

Section 3 consolidates the requirements that apply to the User Manuals prepared and provided by vendors of approved compliance software. This Section has been enhanced to be clearer and more explicit, while removing language that did not relate to the User Manual and was better represented in other Sections of the ACM Approval Manual. In addition, the former distinction between a “user manual” and a “compliance supplement” is removed: the term “user manual” now refers inclusively to the documentation vendors are required to provide for their software.

The proposed Appendices to the ACM Approval Manual consolidate the requirements specific to residential and nonresidential software, in this way allowing a single ACM Approval Manual to apply to both types of software. The residential ACM tests, formerly part of the residential ACM Reference Manual, are placed in Appendix A. The nonresidential ACM tests, formerly part of the nonresidential ACM Reference Manual, are placed in Appendix B. These are the specific details of the tests required by vendor software when seeking approval by the Energy Commission.

As previously stated, the shared rationale for the changes to the ACM Manual are to clarify, organize, and more clearly present the requirements and criteria that apply both to external vendors that develop software to confirm compliance with Title 24, and that apply to the Compliance Manager software developed by the Energy Commission. These changes are necessary to preserve the intent and operation of the ACM regulations while correcting potential deficits in its organization and structure.

III. INCLUSION OF THE ECONOMIC IMPACT ASSESSMENT

Section 11346.2(b)(2)(A) states that, “[f]or a regulation that is not a major regulation, the [ISOR must include the] economic impact assessment required by subdivision (b) of Section 11346.3.” Due to the complexity of the analysis, and to avoid duplication with section 11346.5, the Economic Impact Statement, or Form 399, is incorporated here by reference. This document is also included in Table 1 in Section IV, below, as a document relied upon.

IV. TECHNICAL, THEORETICAL, AND EMPIRICAL STUDIES, REPORTS, AND OTHER DOCUMENTS RELIED UPON

Pursuant to the requirements of Government Code section 11346.2(b)(3), this section of the ISOR contains “[a]n identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the adoption, amendment, or repeal of a regulation.” All of these documents have been filed in this proceeding and are available to the public unless subject to copyright or other restrictions on free dissemination. They are docketed under docket number 15-BSTD-01 and are available at <http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/>.

Table 1: Documents Relied Upon

All Measures	
Document Number	Report Title
399	Economic and Fiscal Impact Statement
(none; supplement)	Attachments to Form 399 (explanatory document and spreadsheet file)
(none; supplement)	2016 Time Dependent Valuation (TDV) Data Sources and Inputs (July 2014)

Nonresidential	
Document Number	Report Title
2016-NR-ASHRAE1-F	HVAC Equipment Efficiency Based on ASHRAE 90.1-2013 (September 2014)
2016-NR-ASHRAE2-F	Proposals Based on ASHRAE 90.1 (September 2015)
2016-NR-ENV1-F	Nonresidential Opaque Envelope (December 2014)
2016-NR-ENV2-F	Final Report - Minimum Skylight Area (December 2014)
2016-NR-HVAC1-F	Nonresidential Economizer Modifications (August 2014)
2016-NR-HVAC2-F	Thermally Driven Cooling (October 2014)
2016-NR-LTG1-F	Nonresidential lighting: Indoor LPDs (October 2014)

2016-NR-LTG2-F	Nonres Lighting Controls: Partial-ON Occupancy Sensors (September 2014)
2016-NR-LTG3-F	Nonresidential Outdoor Lighting Power Allowance (December 2014)
2016-NR-LTG4-F	Outdoor Lighting Controls (September 2014)
2016-NR-LTG5-F	Nonresidential Lighting Controls: Clarifications and Control Credits (October 2014)

Residential	
Document Number	Report Title
2016-RES-DHW1-F	Residential Instantaneous Water Heaters (September 2014)
(none; supplement)	Residential IWH-LCC Spreadsheet-Appendix E of CASE Report.xlsx
2016-RES-ENV1-F	Residential Ducts in Condition Space / High Performance Attics (October 2014)
2016-RES-ENV2-F	Residential High Performance Walls and QII (September 2014)
(none; supplement)	Memorandum: Multifamily Analysis for Residential Envelope CASE Proposals
2016-RES-HVAC1-F	Residential HVAC Field Verification and Diagnostics (August 2014)
2016-RES-LTG1-F	Residential Lighting (October 2014)
PNNL-22921	Impacts of Water Quality on Residential Water Heating Equipment
OP53257R1	Study on Benefits of Removal of Water Hardness (Calcium and Magnesium Ions) from a Water Supply
(none; news article)	Businesses Are in the Dark on New Lighting Rules (San Diego Voice, November 25, 2014)
6510366	Gas Water Heater with the Flame Guard® Safety System Installation Instructions and Use & Care Guide (American Water Heaters, 2005)

6510185	Installation, Operation, and Service Manual Residential Storage Type Gas Water Heater (American Water Heaters, 2000)
186221-004	Ultra Low Nox Gas Water Heater with the FVIR Safety System Installation Instructions and Use & Care Guide (A.O. Smith, 2012)
238-47993-00C	Damper Equipped Gas Water Heater (Bradford White, 2012)
319263-000	Atmospheric Vented Water Heater Installation and Operating Instructions (GSW, 2006)
322809-001	Installation Instructions and Use & Care Guide - Residential Gas Water Heaters (Lochinvar, 2013)
AP14184	Use & Care Manual - Residential Gas - Low NOx Emissions Water Heaters (Rheem, 2007)
186489-002	FVIR Gas Water Heater Installation Instructions and Use & Care Guide (State Water Heaters, no publication date)

V. CONSIDERATION OF REASONABLE ALTERNATIVES, INCLUDING THOSE THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS

Pursuant to the requirements of Government Code section 11346.2(b)(4)(A), this section of the ISOR contains “[a] description of reasonable alternatives to the regulation and the agency’s reasons for rejecting those alternatives.” Government Code section 11346.2(b)(4)(B) also requires that the Energy Commission include a “description of reasonable alternatives to the regulation that would lessen any impact on small business and the [Energy Commission’s] reasons for rejecting them” in this section of the ISOR. Additionally, the Commission is “not required to artificially construct alternatives or describe unreasonable alternatives.” (Gov. Code, § 11346.2(b)(4)(C).)

For more than thirty-five years, legislative enactments and state energy policies have directed the Energy Commission to adopt cost-effective building standards to improve energy efficiency and thereby improve the state’s economy, energy security, and environment. (See, e.g., Public Resources Code sections 25007 and 25402(a)(1), (a)(3), & (b)(3); 2007 Integrated Energy Policy Report.) As described below, a number of alternatives to the initially developed regulations were considered and accepted as part of the mandatory pre-rulemaking public participation process. (See Public Resources Code § 25402, subd. (c)(2)).

Any alternatives that lessen any adverse economic impacts, but likewise do not achieve the energy savings of the proposed regulations, would not be a reasonable fulfillment of the Energy Commission’s statutory obligations. As described in the Informative Digest section of the companion Notice of Proposed Action, the energy savings anticipated from these measures are being counted on and are required in order to achieve the State’s policy goals of reducing greenhouse gas emissions and having new buildings that require zero net energy.

During the initial, informal stage of the rulemaking process, the Commission conducted an extensive public process, considered many suggestions from stakeholders about (1) alternatives

that could improve the feasibility of the Commission's preliminary versions of the proposed regulations or could reduce their adverse impacts; (2) the technical and cost-effectiveness analyses of those preliminary proposals; and (3) the language in those proposals.

Many of the measures in the proposed Standards were developed by the Codes and Standards Enhancement (CASE) Program of California's Investor-Owned Utilities, a statewide program that is funded with a surcharge on energy bills and that is dedicated to the advancement of California's building and appliance energy efficiency standards. In 2013 and 2014 CASE representatives held numerous meetings with building industry stakeholders to vet potential code updates, identify industry concerns, and resolve issues. In the summer of 2014, the Energy Commission began a series of 6 pre-rulemaking public workshops for all interested parties to build upon and continue this process.

During the Commission's pre-rulemaking workshops, which focused on the feasibility and cost effectiveness of potential revisions to the Standards, the Commission received a large number of comments. Based on the comments the Commission developed Preliminary Draft Standards and held a comprehensive pre-rulemaking public workshop on November 2nd to obtain public comment on those; in turn, many more comments were received and, in response to them, the Commission produced the proposed regulations that accompany this ISOR.

Thus in the pre-rulemaking process there has already been an extraordinarily detailed consideration of suggested alternatives, most of which have been incorporated into the proposed regulations in order to increase flexibility and reduce costs for the building industries. The following material summarizes the major suggestions and the Commission's responses, including changing the Preliminary Draft Standards to arrive at the language of the proposed regulations.

1. Consideration of alternatives to residential measures – The Energy Commission considered several alternative proposals for attic provisions, insulation requirements, and prescriptive options for water heaters. These alternatives resulted from close interactions with stakeholders and are reflected in the differences between the November 3rd pre-rulemaking publication of proposed changes and the attached Draft Express Terms.

In particular, staff considered several alternative prescriptive options for water heaters, and the proposed option for storage water heaters above 55 gallons began as one of these alternatives. Staff received competing proposals to both add and remove language relating to electric and heat pump water heaters, as well as proposals relating to when electric water heaters could be installed under the prescriptive compliance path. As the prescriptive options are voluntary optional compliance paths that do not represent limits on what may be installed in a home, the Energy Commission has chosen to address this debate by reducing the compliance options for water heating to the known, non-controversial gas water heating options. This has the advantage of clearer, simpler regulatory language that is expected to cover the vast majority of installations while allowing installation of electric, heat pump, and other water heaters through the performance compliance path.

For walls and attics, staff considered several alternate U-factor requirements as well as alternate prescriptive procedures for installing high performance walls and roof deck insulation, and differing amounts of or expected properties of continuous insulation. The proposed language represents the best balance between benefit and burden among the alternatives presented to the Energy Commission.

Related to ducts, a stakeholder proposed an alternative system leakage test that would supersede the currently prescribed tests for duct leakage. The proposed test is in the process of adoption by ASHRAE but is not yet adopted. As the currently prescribed duct leakage test already provides the majority of the benefit that would be realized by the system leakage test, the Energy Commission has decided not to pursue this alternative at the present time, but to continue to prescribe the current duct leakage test until ASHRAE adoption has concluded and the final version of the test can be evaluated.

Another stakeholder proposed an alternative that would require a minimum filter box width, providing an example minimum of 3", in order to accommodate installation of MERV-effective filters with lower impacts on airflow. (For filters less than 3" that may be installed, the proposal is nonspecific in indicating that a "blank" could take up the remaining space.) As the proposal uses an example of 3" but does not include any analysis or factual information that would lead to selection of a specific, appropriate standard, it does not include enough information for the Energy Commission to confidently present the alternative as proposed language.

Relating to lighting, the Energy Commission considered alternatives to the proposed updates to residential lighting requirements; however the alternatives proposed by stakeholders did not represent a reasonable or less burdensome alternative that would provide a benefit equivalent to the proposed Standards. For residential lighting, the changes allow for installation of removable lamps to qualify as having installed "high efficacy lighting", as the term is used in the regulations. The alternative of continuing to recognize only permanently installed lighting as "high efficacy lighting" would be more burdensome in its restriction of lighting options without providing a commensurate benefit. The changes disallow use of screw-base sockets in recessed fixtures due to known thermal issues of incompatible lamps being installed in recessed fixtures. The alternative of allowing screw-base sockets in recessed fixtures remains untenable while these issues persist.

The changes also included updating the performance specifications for high efficacy lighting, such as expected color, flicker, start time, and efficacy. Several stakeholders expressed a preference for less stringent standards (or no standards) for "quality attributes" including color temperature and color rendering index, citing the marginally higher cost of better performing equipment. The Energy Commission considered but ultimately rejected these alternatives as providing a reduced benefit to consumers that was not compensated for in the marginal first-cost savings, and further determined that a lack of "quality attributes" could result in unsuitable (but low energy consuming) lighting being installed in residential buildings and used as a tradeoff to install less efficient components in other areas. This would run counter to the core concept of energy efficiency, i.e., reducing energy consumed *without* reducing benefit or performance.

The required efficacy of 45 lumens per watt aligns with technology-neutral State and federal appliance efficiency standards for lamps that are due to become effective in 2018 and 2020, respectively. Alternatives, such as a higher efficacy for LED products or other "tailored" standards, were proposed and considered however the risk of becoming preempted by federal regulation or creating a conflict with current State regulation made these alternative unpalatable, and such alternatives would additionally undermine efforts

to make the requirements more technology-neutral. The changes also include specifying a power factor requirement that is feasible and cost effective at reducing energy use. Two alternatives were proposed: the alternative of not specifying a requirement for power factor, and setting a lower requirement. As the Energy Commission is directed to pursue efficiency that is both feasible and cost effective, neither alternative was found to align with this direction or provide the same benefit as the proposed standard at a reduced cost.

Lastly, the Energy Commission considered two alternatives to the proposed flicker test for LEDs, either relying on a similar ENERGY STAR test or not specifying any test or criteria relating to flicker in LED lamps and luminaires. At the time of drafting the ENERGY STAR procedure has not been finalized, rendering it unsuitable for incorporation by reference into the regulations. The Energy Commission believes that flicker is an important criteria in determining whether lighting is efficacious for its intended purpose, and thus does not consider ignoring the potential for flicker to render lighting unsuitable to be as responsible of an alternative as to propose a test for flicker.

As a part of the alternatives proposed for lighting, stakeholders proposed alternatives to a provision limiting the number of blank electrical boxes installed in residential construction. This limitation exists to prevent and protect against abuse of the regulations: by installing excessive numbers of blank electrical boxes, requirements relating to both installed lighting and installed controls could be evaded. The alternatives proposed did not provide the same protection against this potential abuse.

Staff did not find the broad alternative of neglecting to revise the residential building requirements to be either reasonable or consistent with its policy directives. The proposed measures are measures found to be feasible and cost effective at reducing energy consumption and directly support the goal of requiring all homes built by 2020 to be zero net energy homes: a more efficient home requires fewer or smaller renewable energy sources to fully account for its anticipated energy consumption. As energy efficiency is first in the state's loading order, as well as the most cost effective "source" of energy, these measures are the superior alternative to needing more and larger renewable energy products to reach Zero Net Energy, or more and larger traditional power plants to power California's new homes.

2. Consideration of alternatives to nonresidential measures – The goal of aligning the 2016 Regulations with the ASHRAE 90.1 national standard meant that much of the work investigating feasible alternatives was conducted by ASHRAE in adoption of their 90.1 national standards. The Energy Commission did conduct an independent consideration of whether the ASHRAE measures were feasible and cost effective for California and in doing so considered alternatives to the ASHRAE standards and solicited feedback from stakeholders.

Four such alternatives to the ASHRAE 90.1 requirements were selected and proposed for the 2016 code. These are identified in the Notice of Proposed Action, as follows:

- For Lighting Power Allowances, the Energy Commission is proposing a greater efficiency requirement for the installed lighting than that specified in ASHRAE 90.1.

- For Elevator Cab Lighting, the Energy Commission is proposing a greater efficiency requirement for the installed lighting than that specified in ASHRAE 90.1.
- Adding requirements for mechanical systems shut off controls specifying that any directly conditioned space with operable wall or roof openings (i.e., windows or skylights) must be equipped with interlock switches that turn off the space conditioning equipment while the openings are open.
- Direct digital controls are currently required to have specific features when installed, but are not required to be installed in nonresidential construction. The proposed regulations require installation of direct digital controls, and in doing so have created a need to add specificity to the expected features and operation of those controls. The proposed requirement and additional specificity go beyond ASHRAE requirements relating to controls.

The Energy Commission did not find the broad alternative of neglecting to align with ASHRAE 90.1 to be a reasonable alternative to the proposed regulations. Where ASHRAE has done significant work to identify energy-saving measures and practices in the construction of non-residential buildings, it would be unreasonable to refuse an examination of their results for potential inclusion in California's code. The Standards already parallel ASHRAE 90.1 in several areas, and prior editions of the Standards have adopted measures from prior versions of ASHRAE 90.1. This update can best be understood as a decision to "keep pace" with another runner on the same trail.

Alignment with ASHRAE 90.1 directly benefits builders that operate in multiple jurisdictions by creating consistency and predictability, allowing the same building designs to be used within and outside the State with a minimum of rework. To the extent that staff analysis reveals the specifications and measures in ASHRAE 90.1 to be feasible and cost effective in California, as is the case here, it makes sense to adopt matching language rather than language that arbitrarily differs from ASHRAE 90.1.

3. Consideration of alternatives to code cleanup measures – The majority of the changes proposed to improve the clarity and consistency of the existing Building Energy Efficiency Standards are not substantive, however the Energy Commission actively solicited input from stakeholders on sections of the code that could be reworded for clarity, streamlined, or otherwise improved. As a result of these interactions, additional areas of the current regulations were identified as potentially benefitting from clarification. Stakeholders also contributed to development of the proposed language. In most cases, consideration of alternatives was constrained to consideration of variations of phrasing, due to the need to hew to the existing code.

For the substantive changes resulting from this process, the Energy Commission chose the most straightforward and least burdensome alternatives that kept the intent and function of the regulations intact. For example, language was added to the regulations for certain certification providers that allowed submitted approval applications to be amended, rather than requiring a complete resubmittal and restarting of the associated approval process. This streamlining reduces the burden of the regulations compared to

the “do nothing” alternative while leaving intact the function and associated benefits of the regulations that were reviewed. The Energy Commission made every effort to identify and capitalize on such opportunities as it reviewed the 2013 Standards.

The proposed language for lighting alterations evolved over extended discussions of alternatives with affected stakeholders. Alternatives to the proposed language included more stringent measures, such as continuing to require installation of new controls with luminaire modifications, as well as less stringent measures such as ceasing to regulate luminaire modifications entirely. The Energy Commission considers the proposed language to be the best compromise between available alternatives: a less stringent approach, as proposed, would not ensure that lighting in alterations continues to advance in efficiency, while a more stringent approach would not resolve the issue of scope identified as applying to luminaire modifications. Similarly, some stakeholders proposed retaining the current structure of luminaire modifications being both a subtype of and an exception to a lighting system alteration. As the examination of this section was driven primarily by a need to clarify this complex and potentially confusing interaction, the Energy Commission chose the proposed separation of the language over the alternative of leaving this complex interaction in place.

The Energy Commission found the broad alternative of not conducting a “cleanup review” of the 2013 Standards or incorporating the resulting changes to be more burdensome than the proposed changes, given that the changes make the code clearer, more consistent, more readable, more understandable, more compliant with applicable statutes, and include changes that streamline and directly reduce the burden of the current code without compromising its effect.

In addition to the above, the Energy Commission has received comments and other materials from stakeholders that were submitted after the close of the pre-rulemaking comment period and were not timely for review, consideration, and inclusion in either the Draft Express Terms or this Initial Statement of Reasons. The Energy Commission is committed to considering all proposed alternatives, and where consideration was not able to be given prior to the publication of this Initial Statement of Reasons due to late submittal by stakeholders the Energy Commission will consider any alternatives presented in these late comments as a part of its consideration of public comments received during the 45-day public comment period.

At this time the Energy Commission is not aware of alternatives to the proposed regulations that would be more effective than the proposed regulations in achieving the energy-efficiency goals of these directives, or that would be equally effective and have a lower adverse impact on small businesses (or any other economic interests), and which were considered but rejected. (See Gov. Code, § 11346.2, subd. (b)(4)(A), (B)).

It is quite likely that during the course of the rulemaking, the Commission will receive comments that are helpful in improving the proposed standards. These comments may include additional reasonable alternatives that the Energy Commission will consider during the course of the rulemaking. The public comments received and reviewed by the Energy Commission in the pre-rulemaking period are docketed under Docket Number 14-BSTD-1, and are available on our website at <http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/>.

VI. FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS

This section must include “[f]acts, evidence, documents, testimony, or other evidence on which the [Energy Commission] relies to support an initial determination that the action will not have a significant adverse economic impact on business.” Gov. Code, § 11346.2, subd. (b)(5)(A). Because the proposed regulations are building standards, this section must also include “the estimated cost of compliance, the estimated potential benefits, and the related assumptions used to determine the estimates.” Gov. Code, § 11346.2, subd. (b)(5)(B).

The proposed regulations will increase the costs of construction – but those costs will generally be passed on to the people who purchase and own buildings. Furthermore, as is required by law, the people who ultimately pay the increased costs of construction – building purchasers and owners -- will *save* substantially *more* money on their energy bills. For owners and operators of commercial buildings, those savings will translate directly into increased profits (or expanded business operations, which in turn will create more jobs). In addition, businesses that provide energy efficiency products and services associated with the Standards’ requirements will have sales and service opportunities. Thus the proposed regulations are likely to result in the creation of new jobs and an increase in California business competitiveness. The specific estimated costs of compliance and estimated benefits of the proposed new standards, along with the related assumptions made to determine these estimates, are stated in the CASE reports specified in the documents relied upon. Based on the analysis in the CASE reports and the concurrent staff analysis in the Statement of Economic Impact (Form 399) and its supporting documentation prepared for this rulemaking, the adoption of the proposed regulations will not have a significant adverse economic impact on business.

The estimated costs of compliance and expected benefits are found in the table below. The assumptions used to determine these values are found in the documents specified above.

Table 2. Summary of Statewide Costs and Energy Bill Savings

Sector	Statewide Measure Costs of Compliance	Statewide Energy Bill Savings	Statewide Net Savings
Residential	\$381.72 Million	\$1,337.22 Million	\$955.50 Million
Nonresidential	\$652.37 Million	\$2,679.19 Million	\$2,026.82 Million
Total	\$1.13 Billion	\$4.11 Billion	\$2.98 Billion

VII. DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

The proposed revisions to the Standards do not duplicate or conflict with any federal regulations. (See Gov. Code, 11346.2, subd. (b)(6)). There are no federal regulations that prescribe building standards for non-federal buildings.