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California Energy Commission
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FINAL STATEMENT OF REASONS FOR PROPOSED BUILDING STANDARDS OF THE CALIFORNIA ENERGY COMMISSION

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

Pursuant to California Government Code Section 11346.9(a), this Final Statement of Reasons ("FSOR") contains updates to the Initial Statement of Reasons ("ISOR) and its descriptions of the purposes, rationales, and necessity of the California Energy Commission's proposed amendments to its energy efficiency standards for buildings, to account for further amendments made to the originally proposed Draft Express Terms as a result of public comments received during the rulemaking proceeding. This document accompanies a set of Final Express Terms that will go into effect on January 1, 2017, following its adoption by the Energy Commission and approval 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 FSOR fulfills the requirements of California's Administrative Procedure Act (see Government Code section 11340 et seq.).

The FSOR also includes the Commission's Final Response to Comments. Due to its size, this response is included as an Appendix to the FSOR.

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

The description of the history of the Standards found in the ISOR remains accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

B. How the Standards Work

The description of the general organization and operation of the Standards found in the ISOR remains accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

C. Updates to the Summary of the Changes Proposed in This Rulemaking Proceeding

The changes included in the Final Express Terms build upon and ultimately refine the Draft Express Terms based on consideration of the public comments received on the proposed changes to the regulations. These changes therefore remain within the summaries specified in the ISOR, improving upon but not fundamentally altering the proposed changes to regulation.

Residential

The summaries of proposed changes to the residential sections of the Standards found in the ISOR remain accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

Nonresidential

The summaries of proposed changes to the residential sections of the Standards found in the ISOR remain accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

Code cleanup

The Final Express Terms includes additional changes throughout the regulations to further clarify,

[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.

simplify, and streamline the existing language and requirements consistent with the ISOR. The majority of these changes have no material effect, such as changes to correct spelling or improve grammar. The most significant of the changes not already described in the ISOR are:

- Certificate of Compliance – The changes to the Certificate of Compliance specifications in Title 24, Part 1, Section 10-103(a) align this Section with the referenced requirements of the Businesses and Professions code by adding "architects" and "contractors" as persons able to sign Certificates of Compliance.

- Definitions – The changes to the Definitions specified in Title 24, Part 6, Section 100.1(b) update references to ASTM test procedures to their current versions and add several definitions (in particular, several lighting-related definitions) that were previously found in documents incorporated by reference but not stated directly in this Section.

- Nonresidential Lighting Alterations – The changes to simplify and streamline the requirements for nonresidential lighting alterations specifications in Part 6, Section 141.0(b)2I-L went through several iterations, incorporating extensive feedback and public commentary provided by several stakeholder groups. The terms "lighting alteration", "lighting wiring alteration", and "luminaire modification" are cleanly separated and discussed in separate Sections, consistent with the ISOR. Automatic shutoff control requirements are retained, as are requirements that apply when compliance is demonstrated using lighting power density calculations. A new compliance path allows for compliance based on the percent reduction in lighting power compared to existing lighting: this path is equivalent to the existing option to install no more than 85% of a space's lighting power allowance, except that it does not require installation of bi-level switching. This path thus avoids two common costs of lighting retrofit projects, calculating lighting power densities and installing new wiring, while achieving equivalent energy savings.

- Solar Zone Exceptions – The changes to the Solar Zone Exceptions in Section 110.10(b) replace two Exceptions, one for single family residences and one for multifamily, that had relied on installing more efficient lighting as an equivalent alternative to establishing a Solar Zone. As the lighting measures previously specified in these Exceptions are now mandatory, new non-mandatory equivalent measures were identified and incorporated. This preserves the ability to make other efficiency improvements in lieu of establishing a Solar Zone.

- Sampling of Nonresidential Lighting Controls – The specifications for conducting sampling when performing lighting control acceptance testing under NA 7.6 were made consistent between tests, to ensure that sampling is allowable for all such tests.

- Refrigerant Charge – Requirements relating to refrigerant charge of air conditioning systems were moved from where they previously occurred in the Residential Reference Appendices into the Section language of Sections 150.1(c)7A and 150.2(b)1F. As a part of this relocation, the language was redrafted for clarity and consistency.

- Concrete Parking Areas – An Exception was added to Table 140.7-A, General Hardscape Lighting Power Allowance, to incorporate recently updates to the specifications for concrete parking surfaces in IES RP-20-14. This ensures that lighting is not reduced below a safe level in concrete parking structures and areas.

- Electrical Power Distribution System – The requirements for electrical power distribution systems

in Section 130.5 were redrafted and simplified to be less prescriptive and more performance-based in their presentation. The Section now states the required behaviors and functionalities of the system and avoids unneeded specificity regarding how these requirements are to be accomplished. Matching changes to streamline the application of these requirements to alterations were made in Section 141.0(b)2P.

- Occupant Controlled Smart Thermostat (OCST) – In addition to several clarifying changes to JA 5, connection to an Ethernet network was added to JA 5.3.1 as a communication option for OCSTs in nonresidential, high-rise residential, and hotel-motel buildings. This addresses an issue where the OCST may not be within range of an appropriate wireless communications channel due to the size or configuration of the building. In addition, the use of network gateways as an acceptable approach to compliance has been clarified in a footnote to JA 5.1.

- High Efficacy Lighting – Extensive clarifying changes were made to Section 150.0(k), Joint Appendix 8, and Joint Appendix 10 to improve the clarity and specificity of the updates to high efficacy lighting requirements. At the same time, several changes were made to help streamline application of these requirements and simplify demonstration of compliance.

II. FSOR ANALYSES REQUIRED BY THE ADMINISTRATIVE PROCEDURE ACT

A. Update of the Information Contained in the Initial Statement of Reasons (Government Code section 11346.9(a)(1))

Pursuant to Government Code section 11349(a), this part of the FSOR provides an update to the information contained in the ISOR.

1. Purpose of Proposed Regulations

a. The general purpose, rationale, and necessity of the proposed amendments

The general purpose and rationale stated in the ISOR remains accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

b. The specific purpose of each regulation, the problem it addresses, and why it is reasonably necessary

Where the language in the Final Express Terms differs from the Draft Express Terms that accompanied the ISOR, this section of the FSOR contains an updated 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.

UPDATES TO TITLE 24, PART 1, CHAPTER 10

Section 10-102 – The references to Sections 10-103.1 and 10-103.2 were updated where they occurred within definitions, consistent with the change in numbering of these sections. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 10-103(a)1 – The language in the second paragraph of this Section was amended to be more

consistent with Division 3 of the Business and Professions Code, and to read more clearly. Division 3 of the Business and Professions Code specifies that licensed architects and licensed contractors can accept responsibility for the building design as well as licensed engineers, and the amended language aligns the language of this Section with the language of the Business and Professions Code. This change has the substantive effect of allowing architects and contractors to sign specified compliance forms that were previously required to be signed by engineers, 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.

Section 10-103(a)3 – The changes to this Section correct punctuation and grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 10-103.1 and 10-103.2 – Numbering of the Sections was changed from 10-103-A and 10-103-B to 10-103.1 and 10-103.2, both to be more consistent with the numbering present in other Sections of Part 1 and to avoid confusion between 10-103(a) and 10-103-A. References to these section numbers were updated throughout both Sections. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 10-103.1-(b)2 – This Section was amended to add "licensed architects", consistent with the change to Section 10-103(a)1. It is not believed that licensed architects were being denied access to ATT certification, however this change has the substantive effect of ensuring that licensed architects have the same access to this certification as licensed engineers and contractors. This change is necessary to maintain consistency between sections and thereby meet the consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

Section 10-103.1(d) – This Section was amended to add clarity and specificity regarding the contents of the annual reports specified in part 1, and the timing and process for the update reports specified in part 2. This change has the substantive effect of requiring summaries of quality assurance actions within annual reports, requiring signed certification of compliance within update reports, and specifying that update reports will be processed according to the Amendment Process specified in Section 10-103.1(f). These changes are 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.

Section 10-103.1(e)1 – This Section was amended to make more clear that the approval of Acceptance Test Technician Certification Provider applications is neither automatic nor ministerial, and to remove the ability to read the Section in a way that implied approval would be a ministerial action. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 10-103.1(f) – The changes to this Section correct punctuation: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 10-103.2-(b)2 – This Section was amended to add "licensed architects", consistent with the change to Section 10-103(a)1. It is not believed that licensed architects were being denied access to ATT certification, however this change has the substantive effect of ensuring that licensed architects have the same access to this certification as licensed engineers and contractors. This change is necessary to maintain consistency between sections and thereby meet the consistency criteria of California

Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

Section 10-103.2(d) – This Section was amended to add clarity and specificity regarding the contents of the annual reports specified in part 1, and the timing and process for the update reports specified in part 2. This change has the substantive effect of requiring summaries of quality assurance actions within annual reports, requiring signed certification of compliance within update reports, and specifying that update reports will be processed according to the Amendment Process specified in Section 10-103.2(f). These changes are 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.

Section 10-103.2(e)1 – This Section was amended to make more clear that the approval of Acceptance Test Technician Certification Provider applications is neither automatic nor ministerial, and to remove the ability to read the Section in a way that implied approval would be a ministerial action. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 10-103.2(f) – The changes to this Section correct punctuation: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 10-109 – The change to the Section Title corrects punctuation: it clarifies without materially altering the requirements in the Draft Express Terms, 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.

UPDATES TO TITLE 24, PART 6, SUBCHAPTER 1

Section 100.0(b) – The changes to this Section correct punctuation and add reference to "electric power distribution systems" for consistency with Section 130.5: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 100.0(e)3. – The changes to this Section correct grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 100.0(h) – The changes to this Section move the specified certification requirements by adding Section references to the new location of the certification requirements in Section 110.0 and 110.1, and removing language that is now redundant with those Sections. The change relocates but does not materially alter the requirements relating to certification of equipment 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.

Table 100.0-A – The change to this Table adds a reference to Section 110.11, consistent with the proposed addition of that Section within the Draft Express Terms: it clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – The changes to ASHRAE, ASTM, and NFRC test procedures update version references

to refer to the most current versions of these procedures. This has the substantive effect of requiring performance of current versions of these standards where the regulations had required performance of deprecated versions of the same standards. This change is necessary to keep the regulations current with respect to the evolution of industry standards established by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, the American Society for Testing and Materials, and the National Fenestration Rating Council.

Section 100.1 – The change to the definition of "Alteration" adds "electrical power distribution system" and the sentence "Alteration is also any change that is regulated by Part 6 to a covered process that is not an addition" in order to maintain consistency with requirements added to Section 141.0 that apply to alterations of electrical power distribution systems, and to explicitly state that changes to a covered process are considered alterations. Alterations to covered processes were unintentionally left out of the definition, but were regulated by applicable language in Section 141.0. The clarification does not materially alter the requirements for either electrical power distribution systems or covered processes, given the alteration requirements stated in Section 141.0, 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.

Section 100.1 – Added a definition for ASME A17.1/CSA B44. This standard is referenced by a new measure added to Section 120.6(g). Adding this definition does not have a material effect separate from the measure stated in Section 120.6(g), rather, it serves to add clarity to the measure by more explicitly identifying the test standard referenced in that Section. All referenced test methods must be defined, thus this change is necessary to ensure 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.

Section 100.1 – Added a definition for "back-up compressors" to clarify the requirements for compressed air systems. The addition of this definition does not materially alter the requirements relating to compressed air systems, 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.

Section 100.1 – Added definitions for CIE 13.3 and CIE 15. These standards are referenced by new lighting definitions added to this Section. Adding these definitions does not have a material effect separate from the effects noted for the added lighting definitions, rather, they serve to add clarity by more explicitly identifying the test standard referenced in those definitions. All referenced test methods must be defined, thus this change is necessary to ensure 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.

Section 100.1 – The change to the definition of "Computer Room" adds a clarifying phrase "within a building" to make more clear the relationship between computer rooms and data centers, and to support the clarifying change made to the definition of "data center". This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – The change to the definition of "Data Center" removes language that is redundant with the definition of "computer room", and instead simply state "computer room(s)". This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 –The change to the definition of "Design Review" adds "or architect" after the word "engineer", consistent with a change made to Part 1 Section 10-103 to improve consistency with the

California Business and Professions Code. As the sentence in the definition in which this occurs does not have any regulatory effect, this change does not have any regulatory effect. This change therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – Added a definition for "direct-vent appliance" as the term, though it is not used within the Standards, may be applied to some types of air handlers located in conditioned space. Given that the term is not expressly used within the Standards the change does not materially alter the requirements in the Draft Express Terms. The change is necessary to reduce ambiguity and thereby 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.

Section 100.1 –The changes to the definition of "East-Facing", "Residential Building", "South Facing", and "Wood Stove" correct punctuation. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 100.1 – The change to the definition of "Electrical Power Distribution Systems" corrects grammar. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – The change to the definition of "Plug Load" corrects grammar and adds "Information Technology" and "Computer Room" equipment to the list of equipment that is not considered a "plug load" under Title 24 Part 6. This change has the substantive effect of excluding information technology and computer room electronic equipment from inclusion when the term "plug load" is used to broadly describe plug-in electrical loads. This change is necessary for consistency in the treating of these loads as a distinct type of process load within the regulations, separate from the "plug load" load type in Table 130.5-B; this improves 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.

Section 100.1 – Added definitions for "Service" and "Service Equipment" as the terms are applied to electrical power distribution systems. These terms are generally understood by professionals in this field and are used in the Standards with that meaning, however the terms are not understood to have special or specific meaning by members of the general public. Thus, explicitly defining these terms to have their meaning within the technical field of electrical power distribution, specifically where used in relation to electrical power distribution systems, clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 100.1 – The change to the definition of "Relative Solar Heat Gain" corrects the term to the full term and acronym "Relative Solar Heat Gain Coefficient (RSHGC)", consistent with its use both elsewhere within the Standards and in the broader context of the building industry. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – Added definitions for the following terms related to lighting: "Color Rendering Index (CRI)", "Correlated Color Temperature (CCT)", and "LED Light Engine". These terms are not used within the Standards but are defined and used in the Reference Appendices: they are duplicated here to create consistency between the Standards and their Appendices. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – Added definitions for "Colored Light Source" and "Enclosed Luminaire". These terms are used in language added to Table 150.0-A and Section 150.0(k)1H, respectively. The definition for "colored light source" duplicates specifications found in federal law for "colored fluorescent lamp" and "colored incandescent lamp"; adding this definition is necessary to ensure harmonization with federal law. The definition for "Enclosed Luminaire" duplicates specifications found in UL 1598, and is necessary to ensure consistency with that standard.

Section 100.1 – The change to the definition of "Illuminance" retains the regulatory effect of the existing definition while using simpler and more direct language. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 –The change to the definition of "Inseparable Solid State Lighting (SSL) Luminaire" corrects grammar and adds an example within the definition. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 –The definition of "Light Emitting Diode (LED)" was updated to directly state the definition text that was present in the document originally referenced in the definition, rather than specifying the document within which this definition could be found. This change makes explicit language that was previously incorporated by reference, and therefore clarifies without materially altering the requirements in the Draft Express Terms. 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.

Section 100.1 – Added a definition for "online capacity" to clarify the requirements for compressed air systems. The addition of this definition does not materially alter the requirements relating to compressed air systems, 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.

Section 100.1 – Added a definition for "online compressors" to clarify the requirements for compressed air systems. The addition of this definition does not materially alter the requirements relating to compressed air systems, 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.

Section 100.1 – Added a definition for "optimum start controls" to clarify the new requirements for direct digital controls. The addition of this definition does not materially alter the requirements relating to direct digital controls, 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.

Section 100.1 – Added a definition for "optimum stop controls" to clarify the new requirements for direct digital controls. The addition of this definition does not materially alter the requirements relating to direct digital controls, 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.

Section 100.1 – The change to the definition of "Pendant" retains the regulatory effect of the existing

definition while using simpler and more direct language. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – The change to the definition of "Radiant Energy" retains the regulatory effect of the existing definition while using simpler and more direct language. This change clarifies without materially altering the requirements in the Draft Express Terms, 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..

Section 100.1 – The change to the definition of "Part-Night Outdoor Lighting Control" more clearly states the behavior anticipated for a control meeting this definition: part-night controls are distinguished from other types of controls by their ability to control lighting for a specific part of the nighttime, not by their ability to sense occupants, and this specific additional functionality can be accomplished by using time-based or light-sensor-based mechanisms to determine the appropriate portion of the nighttime to apply controls. Accordingly, "occupancy" is removed from the definition and "light sensing" is inserted to improve the accuracy of the definition in describing the equipment to which it applies. This change has the substantive effect of allowing controls that do not sense occupants to be considered "part-night outdoor lighting controls", and allowing the part-night function to be accomplished through use of light sensors as well as, or in concert with, time-based mechanisms. This change is necessary to correct the definition and ensure that it correctly describes the equipment it is intended to cover.

Section 100.1 – This change simplifies the definition of "Photo Control" by removing the word "continuously". It clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 – This change simplifies the definition of "Shut-off Controls" by removing the phrase "all of". It clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 100.1 –The definition of "Covered Processes" is edited to use terms and phrases consistent with other definitions and section language within the Standards, and to add elevators, escalators, and moving walkways for consistency with requirements for these processes added to Section 120.6. The clarification does not materially alter the requirements for either covered processes or for elevators, escalators, and moving walkways, given the requirements stated in Section 140.9, 120.6(f) and 120.6(g) respectively, 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.

Section 100.1 – The change to the definition of "Thermostat" adds the phrase "or system" to clarify that systems performing the function of a thermostat can meet the definition of a thermostat. The Energy Commission has previously interpreted the regulations as allowing thermostat requirements to be met by systems that incorporate thermostat functions. To the extent that this interpretation might not have been previously obvious, this change could appear to have the substantive effect of allowing the use of systems as well as standalone thermostats. 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.

Section 100.1 – Added a definition for UL 1598 for consistency with requirements in Sections 110.9(f) and 130.0(c) that reference this UL standard. The clarification does not materially alter the requirements for luminaires, given the requirements stated in Sections 110.9(f) and 130.0(c). All referenced test methods must be defined, thus 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.

Section 100.1 –The definition of "Zone, Critical" was amended to include the term "computer rooms", to be consistent with its use of the term "data centers". This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

UPDATES TO PART 6, SUBCHAPTER 2

Section 110.0 and 110.0(a) – The changes to these Sections add reference to Section 110.11 as the last Section of Subchapter 2, consistent with the proposed addition of that Section within the Draft Express Terms: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 110.0(b)2B – The changes to this Section correct punctuation: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 110.2(a)3 – The changes to this Section correct grammar and remove a clause that provided an example but had no regulatory effect: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Exception 3 to Section 110.2(a) – The change to this Exception amends the language to specifically refer to the process loads to which it applies. As this Exception is for a Section specifying requirements for space-conditioning equipment, and federal efficiency requirements for space-conditioning equipment are effective regardless of State law generally or the text of this Exception in particular (i.e., the State does not have the authority to waive application of federal appliance efficiency standards in 10 CFR 430 and 431), in practice the only process load to which it applied was cooling equipment used for refrigeration purposes. For this reason, this Exception was amended to explicitly identify this process load in order to enhance its clarity and more directly communicate its effect. Although federal preemption already limited the applicability of this Exception as noted above, to the extent that this interaction of State and federal regulation might not have been previously obvious, this change could appear to have the substantive effect of narrowing the availability of the Exception from equipment serving any exempt or covered process to equipment serving specifically refrigerated warehouses or commercial refrigeration. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 110.2-A and B – The changes to this Table move a footnote superscript from individual cells to the header of the column, and copy stated EER values to the "After 1/1/2016" column to make it clear that the EER values continue to apply after the IEER values change. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Table 110.2-B – Removed standards for "Water source (cooling mode)" units of 135,000 BTU/hour or greater, to be consistent with federal law and to align the contents of this Table with the specifications in ASHRAE 90.1, 2013. This change has the substantive effect of reducing the efficiency required for installed water source heat pumps from 13 EER to either a 12.3 or 12.1 EER: although the standard is completely removed from the text of this Table, water source heat pumps are regulated under the Title 20

Appliance Efficiency Regulations and Section 110.1 requires that all appliances regulated under Title 20 fully comply with those requirements before they are installed in Title 24, Part 6 regulated construction. Thus, such equipment must still comply with the efficiency requirement stated in Title 20, Section 1605.1, Table C-4 which specifies a 12.3 EER and a 0.2 EER deduction from the required EER if the unit possesses a heating function other than electric resistance heating. This change is necessary to align with the specifications in ASHRAE 90.1 2013.

Table 110.2-D – The change to this Table corrects a formatting error within the Table: it clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 110.2-G – The changes to this Table correct punctuation: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.Table 110.2-I – The change to this Table corrects a footnote reference, consistent with the text of the footnote: it clarifies without materially altering the requirements in the Draft Express Terms, and are 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.

Section 110.9(b)4F – The change to this Section clarifies the regulatory language by explicitly specifying the subsection of Section of 130.0(c) it does not apply to, rather than referring to "the applicable control requirements" of the Section as a whole. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Exception 7 to Section 110.10(b)1A – Amended the requirements for this Exception to provide measures in place of the previous lighting measures required to qualify for the Exception. Previously, in order to meet the requirements of this Exception certain lighting requirements had to be met, however those lighting requirements were updated and made mandatory in this code. For this reason, a new set of requirements were developed in order to qualify for this Exception. The change is necessary to establish appropriate measures that provide an efficiency benefit to the building, and are not already mandated, as an alternative to establishing a solar-ready zone.

Exception 4 to Section 110.10(b)1B – Amended the requirements for this Exception to provide measures in place of the previous lighting measures required to qualify for the Exception. Previously in order to meet the requirements of this Exception certain lighting requirements had to be met, however, those lighting requirements were updated and made mandatory in this code. Therefore a new set of requirements were developed in order to qualify for this Exception. The change is necessary to establish appropriate measures that provide an efficiency benefit to the building, and are not already mandated, as an alternative to establishing a solar-ready zone.

Section 110.11 – The changes to this Section correct spelling: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

UPDATES TO PART 6, SUBCHAPTER 3

Section 120.2 – The change to this Section corrects a section reference to Section 120.2(k), consistent with the numbering of the subsections of Section 120.2 in the Draft Express Terms: this clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.2(a) – This Section was amended to explicitly state that an Energy Management Control System may be used as a thermostatic control provided it possesses appropriate functionality. This language was moved from Section 130.5(f): the relocation clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.2(b)4 – This Section was amended to correct grammar and punctuation, and to remove reference to gas heating devices both in the Section and its Exception. This Section requires compliance with both Section 110.2 and Joint Appendix JA 5; JA5 applies solely to electrically powered central HVAC devices that are able to communicate with smart thermostats, and thus is not applicable to non-electric heating equipment or to non-central electric equipment. As Section 110.2 is already required for heating equipment by other Sections, and JA5 does not apply to non-central or non-electric equipment, removing mention of furnaces and of the various heating equipment in the Exception clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.2(i) – The change to this Section corrects "greater than or equal to" to "greater than" for consistency with ASHRAE 90.1, and changes "equipped" to "installed" for clarity. The change to "greater than" has the material effect of allowing systems with nominal 54,000 Btu/hr values to be installed without an FDD system; the other changes have no material effect. These changes are necessary to improve the code's alignment with ASHRAE 90.1 and its 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.

Section 120.2(i)8 – The change to this Section corrects a section reference to Section 110.0, which was stated as Section 100(h). There is no Section 100(h), following the Section re-numbering that occurred as a part of the 2013 Standards, and the Section that discusses requirements for equipment certification is numbered Section 110.0. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.2(j) – The change to this Section adds "to the zone" for clarity and consistency with the specifications in the subsections of the Section. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 120.2-A – The change to this Section corrects spelling, and amends the thresholds for air handling systems to be consistent with those for chilled and hot water systems. The new thresholds are equivalent to the previously proposed thresholds while being simpler to determine and consistent across equipment types. This change has a material effect of requiring consideration of kBTU/h rather than fan system brake horsepower in determining if the system is large enough for Direct Digital Control requirements to be applicable, however the overall effect of specifying a minimum system size for these controls remains the same. The 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.

Section 120.2(j) – The change to this Section adds specificity regarding the required behavior of Optimum Start-Stop Controls. Rather than specifying that the controls "shall have access to" data relevant to performing this function, the revised language specifies that the control algorithm "shall be a function of"

the stated data elements. In addition, the data elements were revised to be more specific. This has the material effect of requiring that Direct Digital Controls have optimized controls that account for indoor and outdoor air temperature, setpoint, time, and for certain systems floor temperature, rather than only requiring that the controls "have access to" information but not necessarily use it. This change is necessary to ensure that the controls actually utilize information about the environment in determining the optimum behavior of the HVAC equipment.

Section 120.3(a)3 – The change to this Section breaks the four requirements stated previously in a single sentence into four distinct subsections and expands the language used to specify each item in order to improve the Section's clarity. This change also replaces the phrase "piping in electronic trace-tape systems" with the more general phrase "pipes that are externally heated" to account for systems other than trace-tape systems that may be used to heat service water piping, and reduces the insulation needed for inlet piping from "the first 8 feet from the storage tank" to "the inlet pipe between the storage tank and a heat trap". The changes have the substantive effect of requiring insulation for non-trace-tape methods of externally heating service water piping, and reducing the length of insulation needed on cold-water inlet piping. These changes are necessary to ensure that different methods of heating service water piping are treated equivalently, to prevent requiring insulation where it will not provide a benefit (i.e., on the cold water inlet prior to the heat trap), and 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.

Section 120.3(b) – The changes to this Section simplify and streamline the requirements that apply to insulation protection. Reference to being "rated for outdoor use" is removed, given that the regulations do not specify who this rating is to be performed by or how it is obtained. Specific reference to cellular foam insulation is removed as redundant with the general requirement that the insulation have some form of outer covering or coating that is water retardant and provides shielding from solar radiation. Specific reference to insulation thickness is removed as redundant, given that insulation that "qualifies as" a vapor retarder would, by definition, be a vapor retarder and would therefore already meet the preceding general requirement that a vapor retarder be present. Although the change removes the ability to be "rated for outdoor use" as a path for compliance, this does not have a material effect on the requirements as any product so rated would meet the more general requirement of being "suitable for outdoor service", making any such rating unneeded under the prior Section language. This change therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 120.3-A – The change to this Table corrects the conductivity range for systems with a fluid temperature range between 251-350 degrees to prevent a gap between the conductivity ranges for this temperature range and for temperatures above 350 degrees. This change has the substantive effect of allowing a very slightly larger conductivity range for systems in the noted fluid temperature range; this change is necessary to create consistency between the noted temperature ranges.

Section 120.5(b) – The change to this Section updates the reference to Section 10-103.2 where it occurrs, consistent with the change in numbering of Sections 10-103.1 and 10-103.2 (formerly 10-103A and 10-103B). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.6(b)3 – The change to this Section removes the Exception for stores open more than a specified number of hours per week. This change has the material effect of requiring stores that are open for business 140 hours or more per week to comply with either subpart A or B of the Section. Staff note that businesses that are open for 140 or more of 168 hours during a week, including businesses open 24/7, will realize the benefits of motion sensor controls under subpart B identically to businesses open for smaller numbers of hours, and have the option of choosing either subpart at their discretion. This change

is necessary to remove an Exception that cannot be verified or enforced: building officials have no way of confirming the likely hours of operation of a tenant at the building inspection phase, and businesses are free to adjust their business hours at any time.

Section 120.7(a) – The changes to this Section correct punctuation and grammar, and remove a redundant specification applicable solely to structural sandwich constructions whose phrasing made it imply it had broader application. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 120.7(b)2 – The change to this Section corrects a value stated for metal framed walls, based on feedback from industry experts and other stakeholders. The prior specification could only be met through the use of insulation materials that would be too thick to safely mount to the exterior walls of tall buildings. The revised value is achievable using insulation products 1" in thickness or thinner, which can be safely mounted on the building exterior, at a marginal decrease in total assembly U-factor. This change has the material effect of requiring no more than a 1" thick exterior insulation product, and is necessary to ensure safe fastening of insulation to the building exterior.

Section 120.7(b)6 – The change to this Section corrects the word "glass" to the word "opaque" where used to describe curtain walls. This requirement is intended to apply to opaque glazing (i.e., it also applies to spandrel panels), however by using "glass" rather than "opaque" the language implied that translucent storefronts designed to display merchandise would also be held to this requirement, and also implied that curtain walls made of "other fill-in materials" than glazing (per the definition of "curtain wall" in Section 100.1) would not be required to meet wall insulation requirements. Although this is a correction, to the extent the prior language could have been understood either to require the stated U-factor for translucent glass or to allow non-glass curtain walls to be installed without meeting a minimum U-factor this change will appear to have the substantive effect of allowing installation of translucent glass with lower U-factors and increasing the U-factor requirements for non-glazing curtain walls. This change is necessary to correctly specify the assembly to which this Section's requirement applies and prevent it either from being applied where not appropriate, or from being inappropriately avoided.

Section 120.7(b)7 – The change to this Section edits the original text for grammar and to specify U-factors rather than an R-value. In so doing, the specifications for wood framed and metal framed assemblies have been separated: metal-framed demising walls are held to the same 0.151 U-factor specified for metal-framed walls generally (in Section 120.7(b)2), and wood-framed walls are held to a U-factor of 0.099. Both of these U-factors are equivalent to the "R-13 between framing members" requirement specified in the Draft Express Terms for this Section; the prior general U-factor specification of 0.102 was removed as redundant with these specific values. This change has the material effect of requiring wood-framed walls to have a marginally lower U-factor (0.099 versus 0.102), as such walls would have been able to use the higher general U-factor rather than the U-factor resulting from complying with the "R-13 between framing members" requirement. This change is necessary to ensure consistent use of U-factors within the Standards, ensure that demising walls are treated equivalently to other walls, and to improve clarity by providing greater specificity in this Section's requirements.

Section 120.8 – The changes to this Section add a note to clarify how the Section applies to buildings with both residential and nonresidential spaces, and to add greater specificity to the reference to commissioning requirements present in Title 24 Part 11. The note describes the regulatory effect of the other language of this Section and does not, itself, have any regulatory effect. For this reason, these changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 120.8(b) – The change to this Section adds specificity to enhance its clarity, replacing the term "program" with "documentation requirements" and adding a fifth item to the Section for "building envelope

performance expectations". In particular, "equipment and systems expectation" could be understood not to include expectations of the envelope system, meaning wall and fenestration equipment such as insulation, coatings, dual- or triple-pane glass, or other measures that would impact envelope performance. Although the term "system" has been interpreted to be inclusive of building envelope systems, to the extent that this interpretation might not have been previously obvious, this change could appear to have the substantive effect of allowing the use of systems as well as standalone thermostats. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 120.8(c) – The changes to this Section adds the phrase "and components" after each occurrence of the word "systems" to clarify that systems include their components and to prevent an inadvertent reading of the language that would appear to allow piecemealing, add explicit mention of building envelope components for consistency with the change to Section 120.8(b), and remove an incorrect reference to covered processes that conflicts with the preceding language in Section 120.8. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 120.8(d)1 – The change to this Section amends this language for consistency with the amendments made to Part 1 Section 10-103(a) by replacing the phrase "person responsible for" with the phrase "signer of". This change does not materially alter the responsibilities of the Design Reviewer; it therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

UPDATES TO PART 6, SUBCHAPTER 4

Note for Section 130.0(a) – The edit to this Note corrects a typographical error in a section reference. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.0(b) – The changes to this Section ensure consistency with Section 130.5(d) by incorporating mention of Section 130.5(d) and restating its applicability. As Section 130.5(d) applies as described here regardless of the added language, the changes clarify without materially altering the requirements in the Draft Express Terms and are 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.

Note for Section 130.0(b) – The Note added to this Section states that Section 130.0(b) is applicable to additions and alterations: alterations of the noted spaces are similarly able to comply with either residential or nonresidential lighting requirements. This Note has no regulatory effect but is added to enhance the clarity of the regulations; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.0(c)6B – The edits to this Section correct the spelling of the word "independent" and add a reference to LM-79 for consistency with Section 130.0(c)9 as well as other regulations that prescribe the use of LM-79 for determining the energy use of LED products. Adding reference to the LM-79 test standard has the substantive effect of allowing the use of either the LM-79 test procedure or the UL 8750 test procedure for determining the maximum rated input wattage for an LED driver. These changes are 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.

Exception to Section 130.0(c)9 – The edit to this Exception is more specific in stating that the Exception applies when lighting is held to the residential lighting standards of Section 150.0(k) as allowed by Section 130.0(b), as determining maximum rated wattage is therefore not necessary to show compliance. As the wording of the Exception prior to these edits was broad, the change has the substantive effect of removing the ability to use the Exception if the lighting is within the areas listed in Section 130.0(b) but compliance with nonresidential lighting requirements is preferred. Because determining maximum rated wattage is necessary for demonstrating compliance with nonresidential lighting requirements, this leads to needing to perform the testing specified in Section 130.0(c)9 anyway. This change is therefore necessary to remove a conflict and 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.

Section 130.0(e) – This Section was added to explicitly state that Energy Management Control Systems capable of performing lighting control can be used to meet lighting control requirements, and is comprised of language moved from Section 130.5(f). This change relocates language without changing its requirements; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1 – The change to the Section title simplifies its wording and makes it consistent with other Section titles that include mandatory measures (rather than prescriptive options). This change clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 130.1(a) – Removed the word "switch" and replaced with "control" where applicable to prevent implying that the controls performing the required on/off function were required to physically and directly open and close the circuit. This change is necessary to make clear that the section is specifying a required functionality of manually turning lights on and off, and is not prescribing or prohibiting any particular method of achieving this functionality. The Energy Commission has previously interpreted "switch" to specify behavior (i.e., able to be switched between two states) rather than physical design and thus does not consider this change to be a substantive change, however to the extent that the regulations could have been understood to require a physical switch that opens and closes the circuit this change would appear to have the substantive effect of allowing other methods of providing manual on-off control of lighting to satisfy the requirements of this Section.

Exception 1 to Section 130.1(a)2 – The change to this Exception amends the language referring to the noted spaces to use terms consistent with the areas specified in Section 140.6 and Table 140.6-C. Because Section 140.6 considers specified commercial and industrial areas equivalent, this change to use consistent terms has the material effect of extending the Exception formerly for industrial facilities to equivalent storage and work areas in commercial buildings. 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.

Exception 2 to Section 130.1(a)2 – The change to this Exception adds parking areas, stairwells, and corridors to this Exception, based on a finding by staff that corridors, stairwells, and parking areas have similar safety concerns to public restrooms with regards to lighting. For this reason, it is appropriate for the lighting controls for these spaces to be inaccessible to unauthorized personnel. This change is necessary to prevent potential safety hazards that could occur if unauthorized personnel shut off the lighting to the noted spaces.

Section 130.1(b)3 – The change to this Section clarifies its language to state that the dimmer controls must control lighting through the required control steps as well as provide the manual control functionality required by Section 130.1(a). This change is necessary to prevent an unintended reading of the language that dimmer controls are only required to provide manual on-off functionality and are not also required to

dim controlled lights.

Exception 1 to Section 130.1(b) – The change to this Exception adds public restrooms to the Exception, based on a finding by staff that multiple lighting levels beyond a "low" and "high" level do not provide any added utility in restrooms and for this reason would not be used. This change is necessary to avoid imposing costs that would not result in energy savings benefits to the owner or tenant.

Exception 3 to Section 130.1(b) – The change to this Section adds an Exception to prevent overlap between the requirements for lighting levels present in both Section 130.1(b) and 130.1(c). The noted Sections, 130.1(c) 6 and 7, contain specifications for partial-off controls that specify what lighting levels between full and off are required for the noted spaces (warehouses, aisle ways and library stack isles, corridors and stairwells, and parking garages, parking areas, and loading and unloading areas), making the general requirements in Section 130.1(b) both redundant and possibly in conflict with the more specific requirements for these spaces. This change is necessary to prevent the regulations from applying two differing sets of lighting control requirements to the same space, which also improves 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.

Section 130.1(c)1B – The change to this Section adds language specifying that the requirement to have separate controls on each floor does not apply to lighting in stairwells. Stairwells, by definition, are spaces of transit between floors, and with regards to automatic shutoff controls are most appropriately understood as a single space rather than a stack of separate and independent spaces. For this reason, staff finds that requiring separate and independent controls for the lighting on each floor prevents more appropriate control configurations for stairwells; this change is necessary to allow for lighting in stairwells to be appropriately configured in ways that treat the stairwell as a single continuous space.

Exception 5 to Section 130.1(c): The changes to this Exception correct grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 130.1(c)5 – The change to this Section adds language to be more explicit in how this Section applies to areas that are not required to have multi-level lighting, and to phrase the requirements for these areas in such a way that using an Exception is not required. This change clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 130.1(c)6 – The change to this Section corrects the title to specify that full-off controls are able to be used to comply with this Section's requirements. The language within the Section specifies that lighting power must be reduced "by at least 50 percent", and a reduction to zero lighting power (full off) meets this requirement. This correction to the Section's title therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(c)7 – The changes to this Section correct grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 130.1(d)1 – The edit to this Section replaces the phrase "on a plan" with the phrase "in plan view" to improve clarity. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(d)2Dii – Removed Exception 2 as redundant with the language in Section 141.0: Section 141.0 specifies the requirements that apply to alterations of existing buildings, including which provisions of Section 130.1 apply when an existing building is altered. Section 141.0(b)2 specifies that requirements for alterations apply to the altered components of the building, therefore a project that adds skylights and does not include altering any luminaires does not trigger requirements applying to luminaires. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(d)2Div – The edit to this Section simplifies the phrase "illuminance received from daylight" to the phrase "daylight illuminance". This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(d)3 – The change to this Section clarifies the application of "shall be controlled independently" by adding "from other lighting in the parking garage", to prevent an unintended reading that this Section requires independent controls for each luminaire. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(d)3Bi – The change to this Section corrects grammar and adds language to explicitly specify that access can be restricted to authorized personnel by means of a locked case or a cover requiring a tool for access: in these cases, the controls are readily accessible to authorized persons possessing an appropriate key or tool. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.1(d)3Biv – The change to this Section amends its requirement to more explicitly state how the specified lighting condition is to be determined, and to ensure that the determination is based on the potentially least illuminated spot within the daylit zones. This change has the material effect of preventing automatic shutoff of lighting when some of the daylit areas served are not receiving sufficient daylight. This change is necessary to prevent the requirement from inadvertently causing areas of a building to be underlit.

Section 130.1(e)1 – This Section was rewritten for clarity and consistency with the rest of the regulations. Spaces with a lighting power density of 0.5 watts per square foot or less are now explicitly excluded from both the calculation of square footage and lighting power, reference to "non-habitable" spaces was removed, and an Exception was added for areas that are not prevented by law from being reduced. The changes have the material effect of excluding spaces with a lighting power density of 0.5 watts per square foot or less, and any spaces that are not permitted to have their lighting reduced, from counting toward this Section's requirements. The change also has the effect of treating habitable and non-habitable spaces uniformly. This change is necessary to prevent this Section's requirements from conflicting with other applicable laws, and 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.

Section 130.1(e)2 – This Section was added to copy specifications that are located in Section 130.5(e) into this Section, given that the provision in Section 130.5(e) applies to all Demand Responsive controls including those for lighting. Including identical language in this Section avoids implying that Demand Responsive lighting controls are somehow different than other Demand Responsive controls, or are not

required to meet general requirements for Demand Responsive controls in addition to specifications for how lighting should respond to a demand response signal. Copying this provision clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.2(b) – The change to this Section adds a note to inform readers of the regulations that Title 24, Part 11 contains additional luminaire cutoff requirements that may apply. This note has no material or regulatory effect, and is necessary to enhance both the clarity and consistency of the code by directing a reader to another portion of the code that also contains specifications for backlight, uplight, and glare.

Section 130.2(c)1 – The change to this Section amends the Section's language to use phrasing consistent with similar specifications in Section 130.1(c). This change has the material effect of allowing any control capable of providing the specified automatic shutoff function to meet this Section's requirement, rather than restricting the controls to specifically photocontrols and time-switch controls. This change is necessary to remove an unnecessary restriction on the methods of providing automatic shutoff of lighting as well as 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.

Section 130.2(c)2 – Removed the phrase "circuited and" in order to prevent an unintended reading of this Section's requirements that would imply that independent circuiting of outdoor lighting is required: independent circuiting is not necessary in order for lighting to be independently controlled. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Exception 5 to Section 130.2(c)3: The change to this Section removes this Exception to maintain consistency with the removal of outdoor sales canopies from Exception 1 and from Section 130.2(c)4. This has the material effect of requiring that lighting for commercial vehicle fuel station sales canopies complies with Section 130.2(c)3. This change is necessary to maintain consistency within the regulations with the removal of "outdoor sales canopies" from excluded or excepted lighting.

Section 130.2(c)5B – The change to this Section corrects the percent reduction from 80 to 90, consistent with the change made to this percent value throughout Section 130.2(c). This change has the material effect of allowing lighting for building facades, ornamental hardscape, and outdoor dining to be automatically dimmed by 90 percent, rather than by a maximum of 80 percent. This change is necessary to maintain consistency within the regulations with regards to maximum dimming limits for outdoor lighting.

Section 130.3 – The edit to the lead-in sentence of this Section corrects a typographical error in referencing the Subsections of the Section. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.4(a) – The changes to this Section correct the requirements of Subsection 1 to the overall scope and subject of the Section, and separately correct a minor punctuation error. Acceptance testing occurs at the end of a project, and is intended to verify that the building resulting from the project meets the requirements of the Standards. Thus, the specific purpose of a Certificate of Acceptance is to certify that the acceptance testing was performed and, as a result of that testing, the building was determined to be acceptable. While the Energy Commission originally sought to clarify the language in Subsection 1 specifying that the Certificate of Acceptance "Certifies plans, specifications, installation certificates, and operating and maintenance information meet the requirement of Part 6", doing so made evident inconsistencies in the scope of this Section and of acceptance testing generally, the purpose of the

Certificate of Acceptance, and the verification being asked for by this Section. The change necessary is to provide consistency and remove an inadvertently implied requirement for an acceptance tester to certify plans and specifications during the design phase of a project. This change has the substantive effect of changing what is required to be recorded on the Certificate of Acceptance and avoiding redundant and unnecessary evaluations of plans and specifications in preparing a Certificate of Acceptance given that performing acceptance testing will inherently show where the building's lighting system is or is not acceptable (i.e., meets or does not meet the requirements of the Standards).

Separately, a correction of punctuation and grammar was made to Subsection 6 for consistency with having added Subsection 7. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.4(a)6 – The changes to this Section correct grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 130.4(c) – The edit to this Section updates a reference to Section 10-103.1 where it occurs, consistent with the change in numbering of Sections 10-103.1 and 10-103.2. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.5 – The edit to the leading sentence of this Section corrects a section reference consistent with removing Section 130.5(f), as this means that the last Subsection of Section 130.5 is now Section 130.5(e). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.5(a) – This Section was streamlined to remove proposed, explicit prescriptions of electrical meter behavior (specifically data interval, data maintenance internal to the meter, and sub-metering ability) that prevented the Section from being appropriate to apply to several types of buildings, and to improve clarity by restoring "Service" to the Section's title . This change has the substantive effect, compared to the Draft Express Terms, of allowing more varied designs and abilities of electrical metering equipment while retaining the essential requirements specified in Table 130.5-A, and of applying these essential requirements to areas previously proposed to be excepted by Exception 2.

In addition, the terms "accessible" and "user-resettable" were removed from the Section to remove ambiguity. This avoids a reading of the Standards that would prohibit installation of meters within locked closets or similar rooms due to not being "user-accessible". This also replaces the "user-resettable period" condition of Exception 1 with a "utility-defined period", which is more consistent with the interactions between utilities and customers in defining useful alternate measurement periods.

These changes are necessary to streamline the requirements of the Section, to prevent unnecessary and unintended restrictions from entering the Standards, and 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.

Table 130.5-A – The Table was edited to replace the term "Resettable kWh" with "Tracking kWh for a user-definable period". This describes the same required functionality, directly similar to the "trip meter" functionality of a car odometer, while removing the ability to read this Table as requiring that the equipment be able to be "reset" in some more comprehensive way. To the extent that the entry in the Table could have been understood to require some other form of "resetting" an electrical meter or a

measured kWh, this change has the substantive effect of requiring a more specific and limited behavior. This change is necessary to remove ambiguity and 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.

Section 130.5(b) – This Section was streamlined to remove the prescriptive language within the Section while retaining the core requirement that electrical power distribution systems be designed in a way that separates different loads and allows them to be separately monitored, and the core allowance that for each separated load type, up to 10 percent of the connected load may be of any type. Removing this prescriptive language also removes the need for two complex Exceptions that applied to this Section. The substantive effect of this streamlining is that the language is more consistent with the rest of the Standards in defining a feature, behavior or attribute the building must possess without unnecessarily restricting the ways in which the feature (in this case, the ability to measure the energy consumption of the load types specified in Table 130.5-B) can be implemented. As the previous language specified the use of "switchboards, motor control boards, or panelboards", this change is necessary to avoid preventing innovative technologies, equipment, and approaches to electrical power distribution, such as using energy management control systems or other integrated or holistic approaches, that can provide the same function and benefit. Simplifying the language of this Section also improves 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.

Section 130.5(c) – This Section was edited to replace the word "total" with the word "combined" to eliminate a risk of ambiguity. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Exception to Section 130.5(c) – Explicit references to the applicable Sections of the California Electrical Code were added to Exception 2 to enhance its clarity and ensure its consistency with the Electrical Code. As these sections include a section that permits voltage drop for fire pumps, Exception 1 was removed as redundant and the number 2 was struck from the Exception title. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 130.5(d) – This Section was rewritten for clarity and consistency, as well as to simplify and streamline the proposed requirements relating to controlled receptacles. The edits accomplish the following:

The proposed edits clarify that controls at the receptacle level can be used to meet the Section's requirements as well as controls at a circuit level, specifically by adding the phrase "and Controlled Receptacles" to the title of the Section, adding the phrase "either at the receptacle or circuit level" to the end of the first sentence of Subsection 1, and using the phrase "controlled receptacles or circuits" in Subsection 3. These edits are necessary to clarify the Section's requirements and prevent a risk of implying that receptacle controls are required to be at the circuit level, and do not have a substantive effect.

The proposed edits improve consistency by using terms for building areas that are consistent with the terms used elsewhere in the Standards and in particular in Section 140.6. Specifically, in the first sentence of the Section the terms "private office" and "open office area" are replaced by the term "office areas", the term "kitchenette" is replaced by the term "kitchen area", and the term "reception lobby" is replaced by the term "lobbies". In addition, the terms used in the first sentence were edited to uniformly refer to areas in the plural. These edits are necessary to improve the consistency of the Standards, and clarify without materially altering the requirements in the Draft Express Terms.

The proposed edits merge the requirements for automatic time switch controls stated in Subsections 4 and 5, and the prohibition of countdown timers stated in Subsection 7, into the text of Subsection 1. These edits allow Subsections 4 and 5 to be removed. These edits are necessary to more clearly and more simply state the requirements applicable to controlled receptacles, and clarify without materially altering the requirements in the Draft Express Terms.

The proposed edits merge the requirements for modular furniture in open office areas stated in Subsection 8 and Exception 1 into the text of Subsection 2. These edits allow Subsection 8 and Exception 1 to be removed. These edits are necessary to more clearly and more simply state the requirements applicable to controlled receptacles, and clarify without materially altering the requirements in the Draft Express Terms.

The proposed edits remove the word "duplex" from Subsection 2, as it is not the intention of the Energy Commission to disallow other splitwired receptacles such as splitwired quad receptacles. This edit has the substantive effect of allowing splitwired receptacles to meet the requirement for including controlled receptacles without unnecessarily restricting this allowance to specifically duplex receptacles, and is necessary to avoid unnecessarily restricting the use of splitwired receptacles as a strategy for meeting this Section's requirements.

The proposed edits add the phrase "and durable" to Subsection 3 to ensure that markings indicating controlled receptacles are present for and usable by the building occupants, and are not solely present during building inspection. Although durability is usually intrinsic to the idea of a permanent marking, this change may have the substantive effect of restricting forms of marking that are permanent but not durable.

The proposed edits renumber Subsection 8 to Subsection 4 and remove a redundant reference in this Subsection to Subsections 1, 2, and 3. These edits are necessary to improve the consistency of the Standards and clarify without materially altering the requirements in the Draft Express Terms.

The proposed edits move the discussion of plug-in power strips and control devices found in Subsection 6 and Exception 1 into a Note at the end of the Section, and augmented the language in the Note to discuss both hardwired and plug-in devices. The regulations already prevent plug-in devices from being used to meet requirements applying to installed building components, and thus this language is more appropriately presented as explanatory and informative rather than as a redundant prohibition. These edits are necessary to more clearly and more simply state the requirements applicable to controlled receptacles and to improve the overall consistency of the Standards, and clarify without materially altering the requirements in the Draft Express Terms.

The proposed edits also include edits to improve the grammar of the Section as a whole, inclusive of its Subsections. These edits are necessary to improve the clarity and consistency of the Standards and clarify without materially altering the requirements in the Draft Express Terms.

Overall, with the exception of the removal of the word "duplex" from Subsection 2 and the addition of the phrase "and durable" to Subsection 3, the changes clarify without materially altering the requirements in the Draft Express Terms and are 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 removal of the word "duplex" is necessary to prevent an unnecessary restriction of compliance strategies using splitwired receptacles. The addition of the phrase "and durable" is necessary to specify that the permanent marking is required to endure into building occupancy and avoid creating a risk that controlled receptacles will not be used because they are not able to be identified.

Exception 2 to Section 130.5(d) – This Exception was edited to remove the number 2 coincident with the removal of a preceding Exception, to replace the word "kitchenette" with the phrase "kitchen area" to use terms consistent with other sections of the Standards, and to add an item (item iv) for receptacles for

uninterruptible power supplies that are expected to be in use 24/7/365 and are therefore inappropriate to shut off via the receptacle. The changes to numbering and term use clarify without materially altering the requirements in the Draft Express Terms, and are 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 addition of item iv has the substantive effect of identifying and excepting receptacles marked for use by uninterruptible power supplies, and is necessary to prevent the regulations from creating a situation where the purpose of the uninterruptible power supply is thwarted by the action of a receptacle control.

Section 130.5(e) – The edit to this Section adds the phrase "where installed" to make clear that this Section specifies only the required behavior of installed demand response controls and is not intended to be read as specifying when or where demand response controls must be installed. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 130.5(f) – The specifications of this Section were moved to Section 120.2(a) and Section 130.0(e), as these sections dealt with thermostats and lighting controls respectively and were more appropriate locations for specifying that an EMCS can be used to meet thermostat and lighting control requirements. Moving these specifications to more appropriate Sections of the Standards clarifies without materially altering the requirements in the Draft Express Terms 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.

UPDATES TO PART 6, SUBCHAPTER 5

Section 140.2 – The changes to this Section correct the language and numbering of the subsections of this Section, which comprise a single list. Reference to Section 140.3(b) was removed, as this Section is currently reserved and does not include any regulatory language. Language was added to explicitly specify the buildings or spaces that would be considered "applicable buildings" for Section 140.3(c), moving this specification to its own subsection / list item. The word "indoor" was added in relation to reference to Section 140.6 for consistency with the language contained in that Section. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 140.3 – The changes to this Section simplify the language at the start of the Section to enhance its clarity. The changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 140.3(a) – The title of Section was amended for clarity. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 140.3-A – The change to this Table updates the values in this Table to be equivalent to updated prescriptive values in Table 140.3-B and C. This change has the material effect of requiring marginally lower U-factors for products seeking to use Exception 3 to Section 140.3(a)1Aia. This change is necessary to maintain consistency within and between Section 140.3's requirements, and thus 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.

Section 140.3(a)3 – The change to this Section updates the reference to Section 110.8(f) to instead reference Section 120.7(b)7, consistent with the relocation of the language formerly in Section 110.8(f) to

Section 120.7(b)7. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 140.3(a)5C – The changes to this Section correct punctuation and capitalization: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Exception 2 to Section 140.3(a)5D – The change to this Section removes a reference to Equation 140.3-B, as this equation does not have a defined scope and thus does not assist with the question of determining whether Nonresidential Appendix NA6 applies. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Equation 140.3-A – The changes to this Section correct the capitalization and phrasing of "Solar Heat Gain Coefficient" to be consistent both internally and with other Sections where this term is used, and additionally improve the Section's grammar. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 140.3(a)6E – The change to this Section adds an Exception for skylights designed to exclude direct sunlight. This change has the material effect of allowing additional approaches to preventing glare that are based on exclusion of direct sunlight. The change is necessary to ensure that all effective approaches to preventing glare from skylights are allowable under the Title 24 Part 6 regulations.

Table 140.3-B – The change to this Table corrects a row heading as well as a numeric value that was inadvertently not updated in the original Draft Express Terms. Although the change to the numeric value corrects an error, it has the material effect of reducing the U-factor required for wood framed and other roofs in Climate Zone 8 from 0.67 to 0.49, consistent with identical changes made for Climate Zones 6 and 7. This change is necessary to ensure that U-factor requirements are appropriately updated for all climate zones and to retain the consistency of the U-factor requirements of this Table; for this reason, the change is necessary to ensure that all effective approaches to preventing glare from skylights are allowable under the Title 24 Part 6 regulations.

Table 140.3-C – The changes to this Table correct a row heading within this Table, and add a footnote to the Table to explicitly state that glazed doors include both site-built and factory-assembled glazed doors. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Table 140.3-D – The change to this Table adds a parenthetical under Glazed Doors in order to ensure consistency between the Table entry and the related Section language. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 140.3(c) – The change to this Section amends its language to directly specify the area that is expected to be lit by skylights rather than reference another Section where these specifications are stated, to use the word "percent" rather than the percent symbol, and to add the phrase "permanent architectural features of the building" to Exception 4 for consistency with a matching Exception in ASHRAE 90.1. The change to Exception 4 has the material effect of treating permanent architectural

features of the building identical to existing structures or natural objects for the purpose of determining whether there are objects or structures that block natural light and render installation of skylights moot; the other changes have no material effect. These changes are necessary to ensure alignment with ASHRAE 90.1 as well as 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.

Section 140.4(b)6 – The changes to this Section correct capitalization: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Exception 3 to Section 140.4(n) – Removed this Exception as redundant with the language in Section 141.0. Section 141.0 denotes what measures are necessary for an alteration project; specifications that a measure either is, or is not, required for an alteration, including any relevant exceptions, are located in Section 141.0. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 140.6 inclusive, and Table 140.6-D – The change to this Section and its Subsections and related Table removes the word "Density" from the phrase "Lighting Power Density" where it occurs, as not all of the lighting power metrics in the Section referred to using this phrase are a lighting power density value, meaning a watts-per-square-foot value. The more general term "Lighting Power" is correctly inclusive of lighting power density along with lighting power described in watts or described in lux or lumen values. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 140.6(c)3I and J, and Table 140.6-E – The changes to these Sections and related Table amend the method of adjusting wall and floor display lighting values to account for mounting height, specifically by using the reciprocal of the prior values to allow for a simplified calculation. The results of the calculation are mathematically and therefore functionally identical: additional lighting watts are allowed for more distant mounting, thus accounting for the additional light output a more distant mounting necessitates. Under the revised calculation, this allowance is accomplished by discounting the lighting wattage, rather than using a multi-step calculation that produced the same result. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 140.6-C – The changes to this Table correct headings of columns of lighting power densities to consistently use the phrase "Lighting Power Density" and correct the heading of a column of task lighting allowances to use the phrase "allowed lighting power", consistent with the phrasing used throughout Section 140.6. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Table 140.7-A – The changes to this Section add a second footnote and replace the prior use of asterisks for marking footnotes with the use of superscript numbers, owing to now having two footnotes. This change has the material effect of providing a higher lighting wattage allowance for concrete-paved parking lots consistent with specifications in IES RP-20-14. The change is necessary to align the requirements of this Table with those of IES RP-20-14 and, in so doing, prevent safety concerns related to contrast and visibility of painted marks on concrete (versus asphalt) surfaces.

Section 140.9(a) – The changes to this Section amend the initial sentence to explicitly state that all of the requirements of this Section are in regards to space conditioning systems, to state the minimum power density specified in the definition of "computer room", and to replace the undefined term "noncomputer room(s)" with the phrase "other spaces within the building". These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

UPDATES TO PART 6, SUBCHAPTER 6

Section 141.0 – The changes to this Section correct grammar and punctuation, remove an unnecessary parenthetical, and correct Section references. They clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 141.0(b)2 – The changes to this Section correct grammar by ending the sentence rather than having it continue into the first sentence of the first subsection. This clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 141.0(b)2A – This Section was rewritten for clarity and consistency, specifically to make the application of the Section less conditional. The Section now separates the actions of altering vertical fenestration, adding vertical fenestration, and adding or altering skylights, placing each in a separate subsection. The square foot thresholds for each action are now stated as exceptions to each respective Section. This clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 141.0-A – The Title of this table was edited for consistency and to correct an error. As the title of the table has no regulatory effect (Section 141.0(b)2A specifies when and how it applies), this change clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 141.0(b)2Biii – Corrected grammar and punctuation, and added the phrase "low-sloped" to explicitly state that the Section applies solely to low-sloped roofs: the two Sections referenced as criteria, Section 141.0(b)2Bia and 141.0(b)2Biia, are specific in applying to low-sloped roofs and thus only low-sloped roofs are held to this Section's requirements. The changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 141.0(b)2C – Added an Exception to clarify that Section 140.4(n) is not applicable to alterations covered by Section 141.0(b)2B. This moves an Exception that had previously been stated in Section 140.4(n), in order to present all of the regulations and exceptions that apply to alterations of the specified space conditioning equipment. As this moves but does not otherwise change the effect of the Exception, this clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 141.0(b)2Di – The change to this Section removes a parenthetical list of examples and instead uses the word "includes", in order to reduce ambiguity and use more consistent language throughout the regulations. This clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 141.0(b)2F – The change to this Section removes an erroneous reference to Section 130.5. Section 130.5 does not contain requirements that are applicable to new lighting systems. As none of the language in the Section would apply to a new lighting system, and Section 141.0(b)2P specifies when and how Section 130.5 applies to alterations of power distribution systems, correcting this reference clarifies without materially altering the requirements in the Draft Express Terms 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.

Section 141.0(b)2I – This Section was rewritten, compared to the changes proposed in the Draft Express Terms, in order to more closely align its requirements with those of the 2013 Standards. The organizational change to separate alterations that involve removing or installing entire luminaires, those that only make modifications within existing luminaires, and those that only modify wiring, is retained in the rewritten Section language. The Exception relating to portable luminaires, luminaires affixed to moveable partitions, and lighting excluded by Section 140.6(a)3 is retained. The Exception relating to asbestos is also retained. The Exception relating to one-for-one replacement of luminaires, based on the language previously in Section 141.0(b)2Iviia, has been removed; in its place is a compliance path based on achieving a percent reduction in lighting power, rather than on calculation of Lighting Power Densities. This path requires the same measures as the existing path of installing no more than 85% of the specified Lighting Power Allowance, with the exception of not requiring bi-level lighting or the measures in Section 130.1(c)6 and 7 that are reliant on bi-level or multi-level lighting. This change provides the sought after streamlining benefits of not requiring measurement of the area of the space, and not requiring running of new lighting wiring, while minimizing the differences in effect between the 2013 and 2016 Standards. An Exception is also added to acceptance testing for projects including less than 20 luminaires, to address small projects where the total number of affected luminaires is too small for the benefits of this testing to outweigh its costs. Lastly, an Exception is added for enclosed spaces where two or fewer luminaires are replaced or reinstalled, to account for non-lighting projects that may require incidental or temporary changes to installed lighting and to preclude routine maintenance or repair of installed luminaires inadvertently triggering requirements applicable to alteration projects.

The substantive changes to the Section's requirements are necessary to simplify and streamline the regulations in a manner that includes consideration of impacts on businesses and small businesses, while also attaining the level of energy savings found to be feasible and cost effective in the adoption of control requirements for lighting alterations. The rewriting of the Section to improve its clarity 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.

Section 141.0(b)2J – This Section was rewritten, compared to the changes proposed in the Draft Express Terms, in order to more closely align its requirements with those of the 2013 Standards and those of preceding Section 141.0(b)2I. The organizational change to separate modifications to installed luminaires from alterations that involve removing or installing entire luminaires and those that only modify wiring is retained in the rewritten Section language. The language specifying that lamp replacements alone shall not constitute a luminaire modification is retained, and now also explicitly refers to ballast replacements for further clarity. The Exception relating to portable luminaires, luminaires affixed to moveable partitions, and lighting excluded by Section 140.6(a)3 is retained. The Exception relating to asbestos is also retained. The triggering number of modified luminaires is increased from 40 to 70 to more accurately account for the number of luminaires likely to be present in small projects, for example small retail stores using general, display, and case lighting and thus employing numerous small luminaires in a small area. The Exception relating to one-for-one replacement of luminaires, based on the language previously in Section 141.0(b)2Iviia, has been removed; in its place is a compliance path based on achieving a percent reduction in lighting power, rather than on calculation of Lighting Power Densities. This path requires the same measures as the existing path of installing no more than 85% of the specified Lighting Power Allowance, with the exception of not requiring bi-level lighting or the measures in Section 130.1(c)6 and 7

that are reliant on bi-level or multi-level lighting. This change provides the sought after streamlining benefits of not requiring measurement of the area of the space, and not requiring running of new lighting wiring, while minimizing the differences in effect between the 2013 and 2016 Standards. An Exception is also added to acceptance testing for projects including less than 20 luminaires, to address small projects where the total number of affected luminaires is too small for the benefits of this testing to outweigh its costs. Lastly, an Exception is added for enclosed spaces where two or fewer luminaires are replaced or reinstalled, to account for non-lighting projects that may require incidental or temporary changes to installed lighting and to preclude routine maintenance or repair of installed luminaires inadvertently triggering requirements applicable to alteration projects.

The substantive changes to the Section's requirements are necessary to simplify and streamline the regulations in a manner that includes consideration of impacts on businesses and small businesses, while also attaining the level of energy savings found to be feasible and cost effective in the adoption of control requirements for lighting alterations. The rewriting of the Section to improve its clarity 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.

Section 141.0(b)2K – This Section was rewritten, compared to the changes proposed in the Draft Express Terms, in order to more closely align its requirements with those of the 2013 Standards. The organizational change to separate alterations that only modify wiring from those that involve removing or installing entire luminaires and those that only make modifications within existing luminaires is retained in the rewritten Section language. The Exception for alterations strictly limited to the addition of lighting controls is retained. The Exception relating to asbestos is also retained. Requirements related to multi-level lighting matching the language in Table 141.0-E has been added to ensure consistency with 2013 and 2016 minimum requirements for multi-level lighting. Requirements relating to daylighting have also been added to ensure consistency with 2013 and 2016 minimum requirements; this requirement was given a threshold of 10 luminaires to avoid applying these requirements to spaces where only an incidental number of luminaires are within a daylit zone. A note has been added to make explicit the relationship between this Section and Section 141.0(b)2I; the note explains the interaction between the requirements of these Sections and does not, itself, impose any material requirement. An Exception is added to acceptance testing for projects including less than 20 luminaires, to address small projects where the total number of affected luminaires is too small for the benefits of this testing to outweigh its costs. Lastly, an Exception is added for enclosed spaces where two or fewer luminaires are replaced or reinstalled, to account for non-lighting projects that may require incidental or temporary changes to installed lighting and to preclude routine maintenance or repair of installed luminaires inadvertently triggering requirements applicable to alteration projects.

The substantive changes to the Section's requirements are necessary to simplify and streamline the regulations in a manner that includes consideration of impacts on businesses and small businesses, while also attaining the level of energy savings found to be feasible and cost effective in the adoption of control requirements for lighting alterations. The rewriting of the Section to improve its clarity 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.

Section 141.0(b)2L – This Section was rewritten to improve its clarity and use phrasing consistent with the prior Sections relating to indoor lighting. The language primarily clarifies without altering the requirements of the Section, and makes three substantive changes to the requirements of the Section. First, an Exception is added that allows for reducing existing lighting power by 40 percent in lieu of calculating Lighting Power Densities. This change is necessary to provide a streamlining benefit of not having to measure the area of the space while ensuring that equivalent power reductions are achieved, consistent with the streamlining of the previous Sections. Second, a minimum numeric threshold of five luminaires has been added to the minimum percent thresholds of 10 and 50 percent of luminaires. This change is necessary to ensure that the percentile thresholds are not rendered ineffective by a low total number of luminaires. Lastly, an Exception is added to acceptance testing for projects including less than 20 luminaires, to address small projects where the total number of affected luminaires is too small for the

benefits of this testing to outweigh its costs. The overall rewriting of the Section 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.

Section 141.0(b)2P – The proposed requirements of this Section were revised and rewritten for clarity, consistent with the revisions to Section 130.5(e). The language in this Section now specifies when and to what extent the specific provisions of Section 130.5(e) are applicable, rather than making a blanket reference to Section 130.5. The Section now specifies that requirements for service electrical metering, separation of electrical circuits for electrical energy monitoring, and circuit controls for 120-volt receptacles and controlled receptacles apply when an entirely new, or complete replacement of the electrical power distribution system is installed. Similarly, the Section now specifies that requirements for voltage drop apply when both feeders and branch circuits are altered. These changes have the material effect, compared to the original Draft Express Terms, of specifying that these requirements are applicable when they can be feasibly applied, rather than leaving their applicability ambiguous. The changes are necessary to ensure that these measures are implemented when they are feasible and practical to apply, and are not required where they would not be feasible or practical to implement.

Section 141.0(b)3B – The change to this Section adds the phrase "for which the additional credit is taken" in order to clarify and explicitly state that verification is only necessary when an associated credit is taken and is not required when it would have no effect. Although the Energy Commission has interpreted the existing language to already have this effect, because the language could have been read as requiring third-party verification of all of the altered components regardless of whether a credit applied, this change has the substantive effect of no longer requiring third-party verification of components that are not treated differently if so verified. 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.

Table 141.0-E – The change to this Table consolidates what was previously in Tables 141.0-E and 141.0-F, and restructures the table to be easier to read. In addition, specifications and requirements that were more appropriately stated in Section language were removed from the Table.

This has the substantive effect of treating lighting projects that add lighting or alter the space are now treated identically to lighting projects that do not. Specifically, the provision previously in Table 141.0-E that "Alterations that change the area of the enclosed space or the space type or increase the lighting power in the enclosed space" had to meet all of the provisions of Section 130.0(d) and Sections 130.1(a)-(e) is replaced by Section language that specifies when Table 141.0-E applies, and the new Section language simplifies the requirements by allowing alterations that increase the lighting power or change the area of the enclosed space but result in a lighting system that uses 85% or less of the Lighting Power Allowance for the space to be treated identically to other projects that achieve this lower level of installed lighting power.

This change also has the substantive effect of removing two of the four definitions of "building space" formerly in Table 141.0-F. The first two are now included in the language of Section 141.0(b)2J, which states that it applies "where 70 or more existing luminaires are modified on any single floor of a building". The last two, specifying "The entire space in a building of a single tenant under a single lease" and "All of the common, not leasable space in single building" would both require that a building inspector be provided with, and conduct reviews of, lease agreements in order to know whether the space being permitted met these conditions. Accordingly, these were found to be unenforceable by a building inspector and were therefore removed entirely.

The remaining requirements of the original Tables are either captured in the revised Table, or are present in the revised language in Sections 141.0(b)2I and J. The changes to the Table are necessary to clarify what the Table requires and when it applies, and to align it with the clarifying and streamlining changes made to Sections 141.0(b)2I and J. These changes also improve the Table'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.

UPDATES TO PART 6, SUBCHAPTER 7

Section 150.0 – The changes to this Section correct spelling: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(c) – The changes to this Section correct grammar and add a subpart that specifies an insulation specification for opaque non-framed assemblies identical to the requirement for framed assemblies under subpart 1. This change has the substantive effect of ensuring that non-framed assemblies are treated as equivalent to framed assemblies and held to the same expectations of overall thermal performance. This change is necessary to prevent an unintended reading of the regulations that would allow assemblies claiming to be non-framed to completely avoid mandatory thermal performance requirements.

Section 150.0(g) – The changes to this Section rephrase and reorganize the requirements of this Section for clarity. Sections 2 and 3 were combined into a new Section 1, and the previous Section 1 was renumbered to Section 2. This ensures that the general requirements for all climate zones are mentioned before the additional requirements that are specific to Climate Zones 14 and 16. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(h) – The changes to this Section correct punctuation: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(i) – The change to this Section corrects its language to more closely match that of Section 110.2, which it references. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(j)2B – The change to this Section removes the requirement that casings or sleeves for buried hot water pipes must allow for installation, removal, and replacement of the enclosed pipe and insulation. Submitted public comments as well as discussions with field professionals revealed that problems with buried pipes are typically resolved by completely replacing the piping and all associated components. It is therefore unnecessary to require that the pipe or insulation be able to be removed from the casing and replaced, as this will not occur in practice (i.e., all components will end up discarded regardless). The change to this Section has the material effect of allowing products such as corrugated foam-filled products to be installed, where the foam insulation would not be able to be removed from the product due to the corrugated shape of the outer casing. This change is necessary to prevent applying an unneeded restriction on the types of insulated water piping products that can be installed.

Section 150.0(j)2C – The change to this Section adds the word "distribution" to improve the clarity of the Section's requirements, and removes the specification regarding hot water systems in excess of a certain pressure as being redundant with the requirements of Subsection A. As Subsection A already applies to hot water systems and Table 120.3-A already specifies the hot water systems to which it applies, this change to this Section clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(j)3 – The changes to this Section simplify and streamline the requirements that apply to insulation protection. Reference to being "rated for outdoor use" is removed, given that the regulations do not specify who this rating is to be performed by or how it is obtained. Specific reference to cellular foam insulation is removed as redundant with the general requirement that the insulation have some form of outer covering or coating that is water retardant and provides shielding from solar radiation. Specific reference to insulation thickness is removed as redundant, given that insulation that "qualifies as" a vapor retarder would, by definition, be a vapor retarder and would therefore already meet the preceding general requirement that a vapor retarder be present. Although the change removes the ability to be "rated for outdoor use" as a path for compliance, this does not have a material effect on the requirements as any product so rated would meet the more general requirement of being "suitable for outdoor service", making any such rating unneeded under the prior Section language. This change therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(k)1 – The change to the title of Section 150.0(k)1C clarifies that this Section's restrictions on recessed lighting apply specifically to recessed downlights in ceilings, and the changes to Section 150.0(k)1Cvi and 150.0(k)1H revises the marking requirements to maintain consistency with changes made to the marking requirements of Joint Appendix 8. These changes have no material effect apart from the changes made to Joint Appendix 8, which are described under the Joint Appendix section of this document; the changes in this Section therefore clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(k)2 – The change to this Section adds specificity to the references to Section 130.5 relating to Energy Management Control Systems, and corrects capitalization in subpart J. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(k)3Aiiib – The change to this Section corrects "astronomical" to "astronomical clock" for consistency with the use of this term elsewhere within the Standards. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(k)4, 5, and 6 – The changes to these Sections correct the numbering of the Sections to account for removal of preceding Sections in the Draft Express Terms (45-Day Language), and for Section 150.0(k)6 corrects capitalization and corrects the word "or" to the word "and" for consistency with changes made to Section 150.0(k)1A in the Draft Express Terms. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.0(m)1 – The changes to this Section correct the word "defined" to "designed", delete the word "directly" in reference to conditioned space, and require R4.2 for ducts located within both directly and indirectly conditioned spaces. Removing the word "directly" has the material effect of treating directly and indirectly conditioned spaces equivalently, and thus holding both to uniform insulation requirements. Internal discussions as well as with field professionals revealed that potential condensation problems may exist if uninsulated ducts are located in indirectly conditioned spaces, and that uninsulated ducts in directly conditioned spaces can create temperature gradients within and between rooms which may mean calling for additional heating or cooling to appropriately conditions the farthest locations served by the ducts (and creating uncomfortable temperatures in the nearest locations). Requiring duct insulation for duct located in conditioned space mitigates the potential for condensation to occur, and for temperature

differences to develop; requiring a level of insulation for both ducts is therefore necessary to ensure the correct performance of the HVAC system and prevent issues of condensation and temperature differences within and between conditioned spaces. The correction of the word "designed" clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(m)12C – The changes to this Section adds reference to ASHRAE 52.2 and updates references to Tables 150.0-B and C for consistency with their renumbering. The addition of reference to ASHRAE 52.2 is necessary to align with the most recent Appliance Regulations (Title 20) which require air filters to be rated by either test method; this change allows an equivalent alternate test procedure and in doing so improves 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 changes to the Table references clarify without materially altering the requirements in the Draft Express Terms, and are 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

Section 150.0(m)13 – The changes to this Section add titles to subsections, retitles an "Alternative" as an Exception for consistency, added an Exception for Executive Director approval to Subsection B, and merges the language formerly in Section 150.0(m)15 into this Section as Subsection C. The addition of an Exception for approval of alternate requirements for small-duct high-velocity equipment has the material effect of allowing proposals of alternate, equivalent requirements to the airflow rates in Section 150.0(m)13B to be considered and potentially approved by the Executive Director, and is necessary to avoid inadvertently prohibiting efficient small duct high velocity systems that are designed to operate at airflow rates different than those assumed by this Section. The remaining changes to this Section clarify without materially altering the requirements in the Draft Express Terms, and are 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

Section 150.0(m)14 – The change to this Section removes the Section entirely, given that the Section was reserved (unused). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(n) – The change to this Section corrects punctuation and grammar, and corrects the word "testing" to the word "listing": SRCC is better described as a listing agency than a testing agency, and the function of this language is to allow the Executive Director to approve other agencies that fulfil similar roles and functions to the SRCC. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.0(q) – The change to this Section adds an Exception for greenhouse or garden windows. This change has the material effect of allowing windows of these types, up to a specified size, to be installed without consideration of their U-factor provided that the windows are dual-glazed. This change is necessary to avoid inadvertently prohibiting these types of windows: as these windows have a three-dimensional shape that extends from the building, their greater surface area means that any U-factor calculated as a function of the size of the opening in the wall will be higher than for a flat window, and potentially unable to meet maximum U-factor requirements calculated for flat windows.

Table 150.0-A – The change to this Table corrects numbering within the Table, adds the words "ceiling" and "downlight" to recessed luminaires (now "ceiling recessed downlight luminaires") for consistency with the text of Section 150.0(k)1, and added two types of inseparable SSL luminaires to the first column of

the Table (outdoor and decorative). The addition of the SSL luminaires has the material effect of allowing integrated solid state lighting products that are designed for outdoor use, or that provide decorative rather than general lighting, to be considered high efficacy and thus be able to be installed in newly constructed buildings without needing to meet the requirements of Joint Appendix 8; the other changes have no material effect. The addition of two categories of SSL lighting is necessary to avoid prohibiting common categories of decorative indoor and outdoor lighting, and functional outdoor path lighting, from installation in regulated new construction, and the clarifying changes are 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.

UPDATES TO PART 6, SUBCHAPTER 8

Section 150.1(c)1A – The change to this Section adds a Note to clarify the interaction of the insulation requirements of this Section and the option to locate ducts within conditioned spaces (as opposed to the vented attic space). This Note merely explains the interaction of the regulations in this Section and Section 150.1(c)9B, and does not itself have any regulatory force or effect. This change therefore clarifies without materially altering the requirements in the Draft Express Terms, 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.

Section 150.1(c)1B – The changes to this Section correct punctuation and spacing: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Exception to Section 150.1(c)1D – The changes to this Exception remove references to R-values and restrict the Exception to calculated U-factors, and moves the phrase stating that an approved calculation method must consider the thermal effects of all elements of the assembly. These changes have the material effect of requiring that persons seeking to use a different calculation method to demonstrate compliance with Table 150.1-A must use a U-factor calculation, and are no longer allowed to propose an alternate calculation of an R-value instead. This change is necessary to ensure that proposed calculation methods are shown in a consistent way: U-factor and R-value numbers are reciprocals of each other, and therefore allowing both values creates a potential for confusion where each mathematical calculation can be expressed in two outwardly different ways.

Section 150.1(c)3A – The changes to this Section correct punctuation, spacing, and grammar: they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.1(c)7 –The changes to this Section make it clear that airflow is required independently from refrigerant charge: this is the case in the 2013 Standards but was not as explicit since this language was part of the Residential Reference Appendix. These changes move language from the Appendix into this Section and rephrase the Section both for clarity and to accommodate this move; they therefore clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.1(c)7 – The changes to the Exception to 150.1(c)7A rewrite the language of the Exception for clarity, and adds a provision that use of the Exception be recorded on the Certificate of Installation. The Exception allows the installing contractor to certify that the packaged HVAC system was not altered in the field and therefore does not need to perform he refrigerant charge verification, for HVAC systems that have been charged at the factory prior to being shipped. This exception existed previously, but lacked a method for documenting that the specific requirements of the Exception were met and followed. This change therefore has the material effect of requiring that the Certificate of Installation document when this

Exception is used, and therefore that its conditions are met; other changes made to enhance the clarity of the language do not have a material effect. The change is necessary both to ensure that compliance using this Exception is enforceable and 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.

Section 150.1(c)8 – The changes to this Section correct grammar and add a reference to the applicable portion of Reference Appendix (RA 4.4) for clarity. The specifications in the Residential Reference Appendix apply to Demand Recirculation Systems generally, whether referenced in this Section or not, and therefore these changes therefore clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.1(c)9B – The changes to this Section simplify its language to refer generically to conditioned space rather than to directly conditioned space and a list of indirectly conditioned spaces, adds reference to the duct insulation requirements in Table 150.1-A consistent with Section 150.1(c)9A and with equivalent treatment of directly and indirectly conditioned spaces, and replace a restatement of a combustion air requirement from the California Mechanical Code (Title 24, Part 4) with a note stating that there are requirements in Part 4 that may apply if gas heating equipment is installed. Submitted public comments revealed that fuel burning appliances other than direct vent may be installed within the dwelling and therefore that limiting the heating appliance to only direct vent was problematic. For this reason, the reference to Part 4 was to ensure that any installed fuel burning appliance has sufficient combustion air. As part 4 applies regardless of the specific language of this Section, this change clarifies without materially altering the requirements in the Draft Express Terms, 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. The simplification of reference to conditioned spaces and the addition of duct insulation requirements has the material effect of requiring compliance with duct insulation requirements when ducts are located in directly and indirectly conditioned spaces, and is necessary to ensure the correct performance of the HVAC system and prevent issues of condensation and temperature differences within and between conditioned spaces.

Section 150.1(c)10 – The changes to this Section simplify its language to refer generically to providing outdoor air, correct punctuation and grammar, and add reference to the certification requirement applicable to this equipment found in RA 3.7.4.2. As certification requirements already apply generally regardless of the specific reference to RA 3.7.4.2 added to this Section, these changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.1(c)12 – Revised the total airflow requirement in part A, and rephrased the vent requirement in part B for clarity. The change to the total airflow requirement has the material effect of requiring a slightly larger whole house fan than under the Draft Express Terms, specifically requiring that the fan provide 1.5 CFM of airflow per square foot of conditioned space rather than 1.2. This change is necessary to prevent undersizing of whole house fans such that their performance and efficiency benefits are diminished. The change to the vent requirement clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 150.1-A (including footnotes) – The changes to this Table revise entries for roof/ceiling insulation under Option A and Option B for Climate Zones 1 and 2, correct a wood-framed wall insulation requirement applicable to Climate Zone 6, revise the duct insulation requirements under Option C in four Climate Zones to be consistent with all other Climate Zones, replace "NA" with "NR" for consistency throughout the Table, expand Footnote 4 to improve its clarity, and corrects a cfm/square foot value in

footnote 10 to match the value specified in Section language. These changes correct entries to match values specified in the documents relied upon for the updates to these values generally: they are best understood as corrections to errors in this Table in the Draft Express Terms, where values had inadvertently not matched those proposed in the underlying studies and reports. None the less, these changes have the substantive effect of removing roof deck insulation requirements under Options A and B for Climate Zones 1 and 2, where they were found not to be cost effective; applying a radiant barrier in place of this requirement for Climate Zone 2; increasing the U-factor requirement for above-grade framed walls in Climate Zone 6 from 0.051 to 0.065 (matching Climate Zone 7); and reducing the duct insulation requirement for Climate Zones 11, 14, 15, and 16 from R-8 to R-6. All other changes are changes that clarify without materially altering the requirements of the Draft Express Terms. These changes are necessary to ensure the Table specifies correct values for all portions of all residential assemblies, remains consistent with specifications found in the Section language of Section 150.0, and 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.

UPDATES TO PART 6, SUBCHAPTER 9

Section 150.2(a) – The changes to this Section and its subsections correct grammar and punctuation, and update Section references for consistency with changes made to other Sections. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.2(b)1C – The changes to this Section integrate a previously parenthetical portion of the Section to improve clarity, and update a reference to Section 150.0(m). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.2(b)1D – The changes to this Section amend its language to improve grammar, and to clarify that the insulation requirements of Subsection i apply only to new ducts in unconditioned spaces while those of Subsection ii apply to all altered ductwork. In addition, the leakage requirement of Subsection iia was reduced from 6 percent to 5 percent to align with the updated mandatory requirements for newly constructed buildings. The change to the leakage requirement has the material effect of lowering the limit on duct leakage, and is necessary to align the requirements for alterations with those for newly constructed buildings and thus maintain consistency. The change to specify that part i applies solely to ducts in unconditioned space has the material effect of treating ducts in indirectly conditioned spaces as equivalent to ducts in directly conditioned spaces, and is necessary to maintain consistency with similar changes to treat directly and indirectly equivalently made in Sections 150.0 and 150.1. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.2(b)1E – The changes to this Section integrate a previously parenthetical portion of the Section to improve clarity, and amend Exception 2 to apply generally to duct systems less than 40 feet, rather than solely to those in unconditioned spaces. The change to incorporate the parenthetical language as an "included but not limited to" list clarifies without materially altering the requirements in the Draft Express Terms, 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. The change to Exception 2 has the material effect of allowing the Exception to apply to duct systems irrespective of their location in or transit through directly conditioned, indirectly conditioned, or unconditioned spaces. This change is necessary to simplify the application of the Exception and provide logical consistency in the treatment of ducts in conditioned versus unconditioned spaces.

Section 150.2(b)1F – This Section was rewritten for clarity and consistency, matching the rewrite of Section 150.1(c)7. The changes to this Section incorporate specifications previously located in the Reference Appendices and make it clear that airflow is required independently from refrigerant charge; this was the case in the previous standard but not as explicit since it was part of the Residential Reference Appendix. These changes move and rephrase existing requirements, and therefore they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Exception to Section 150.2(b)1Fiii – The changes to this Exception rewrite the language of the Exception for clarity and for consistency with changes made to a matching Exception in Section 150.1(c)7A, and add a matching provision that use of the Exception be recorded on the Certificate of Installation. The Exception allows the installing contractor to certify that the packaged HVAC system was not altered in the field and therefore does not need to perform he refrigerant charge verification, for HVAC systems that have been charged at the factory prior to being shipped. This exception existed previously, but lacked a method for documenting that the specific requirements of the Exception were met and followed. This change therefore has the material effect of requiring that the Certificate of Installation document when this Exception is used, and therefore that its conditions are met; other changes made to enhance the clarity of the language do not have a material effect. The change is necessary both to ensure that compliance using this Exception is enforceable and 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.

Section 150.2(b)1G – The changes to this Section add a new Subsection i to specify the circumstances when pipe insulation is required without using an Exception, renumber the other Subsections for consistency with this addition, and insert references to the sections of the Residential Appendix applicable to demand recirculation systems. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.2(b)1H – The changes to this Section remove Subsection i as redundant with Section 150.1(c)1A, update the section numbering consistent with this removal, and amend an R-value in the Exception to Section 150.2(b)1Hi considered to be equivalent to a cool roof in Climate Zones 10-15 – this latter change corrects an error in the Draft Express Terms where this value was raised by two (from four to six) instead of lowered by two (from four to two). The change to the R-value has the material effect of requiring less below-deck insulation in the noted climate zones, and is necessary for this R-value to be equivalent in performance to the requirements of the Section the Exception applies to. The other changes to this Section clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Section 150.1(b)2 – The change to this Section adds a note to address a common question regarding the Section, and added a phrase to Subsection B to clearly state that verification is only applicable when the related credit is taken. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Appendix 1-A – Updated the references to test procedures in this Appendix consistent with the updates made within Section 100.1, and updated an out-of-date address. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

UPDATES TO THE JOINT APPENDIX

JA 1 – Minor corrections were made throughout this Section to fix punctuation and grammatical issues; these changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 1 – The following lighting-related terms and their definitions have been added to this Section, for consistency with their Addition to Section 100.1 of the Standards:

ANSI C78.377

ANSI C79.1

IES LM-80

IES TM-21

Decorative Lamp

Inseparable Solid State Lighting (SSL) Luminaire

Light Emitting Diode (LED)

LED Light Engine

Omnidirectional lamp

In addition, references to ASHRAE, ASTM, and NFRC standards were updated to match the updates made to Section 100.1. As these definitions have been added to and updated in Section 100.1, their addition or update here clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – The definitions for "computer room" and "data center" were updated to clarify the relationship between computer rooms and data centers, remove redundancy, and to match updates made to these definitions in Section 100.1. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 1 – The definition of "daylit zone" was edited to remove a redundant phrase. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – The capitalization of definition of DUV was corrected for consistency with the other definitions in the Section. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – The definition of "ANSI/IES RP-16-10" was moved to locate it with other IES definitions rather than ANSI definitions. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – Amended the defined term "sales canopy" to "outdoor canopy" consistent with the use of the term in the Appendix. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – The definition of "covered process" was amended to use terminology consistent with the rest of the Standards. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 1 – The definition of "zone, critical" was amended to include the term "computer room" for consistency with the mention, in the definition, of data centers. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 2-2 – The changes to this Table update its list of zip codes to show the current zip codes within California. As these zip codes apply irrespective of the content of this Table, these changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 3.1 – The change to this Section replaces an explicit link to an Energy Commission webpage with a general reference to the Energy Commission's website. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 3.2 – The change to this Section corrects the numbering of the Tables within the Section. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 4.2 – The changes to this Section correct and improve its grammar; they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

Table 4.2.7, 4.3.1, 4.3.1(a), and 4.3.3 – The changes and additions to these Tables update the specified U-factor values and described wall and ceiling assemblies consistent with the updates to insulation requirements in Part 6, and provide additional U-factor values for assemblies that were not previously included in these Tables. These tables contain "pre-calculated" U-factor values based on aspects of the wall and ceiling assembly, and enable the use of the prescriptive compliance path for a larger variety of envelope configurations. All of the values are calculated using the CBECC-Com software required for compliance using the performance modeling compliance path, providing the U-factors that would result if the specified components were modeled in that software. This change has the material effect of allowing builders to determine the U-factors of their envelope assemblies via these tables rather than by modeling their buildings in the CBECC-Com software, thereby facilitating use of the prescriptive compliance path. This change is necessary to ensure that the prescriptive compliance path is available to the widest variety of buildings possible, and is not precluded for buildings using modern wall or ceiling assemblies.

JA 4.3 – The change to this Section corrects capitalization and punctuation; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table 4.4.3 – The changes to this Table remove an unused row and correct spelling. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 5.1 – The change to this Section amends its footnotes to improve clarity, updates reference to NEMA DC 3, and corrects the numbering of the footnotes. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 5.2.2 – The change to this Section corrects punctuation; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 5.3.1 – The changes to this Section clarify its phrasing, and add reference to IEEE Standard 802.3. This change has the substantive effect of allowing nonresidential, high-rise residential, and hotel-motel buildings to meet this Section's requirements using a wired Ethernet network compliant with IEEE Standard 802.3. This change is necessary to account for large commercial buildings where the location of the OCST system may be too remote to establish connections wirelessly.

JA 5.3.2 – The change to this Section edits the footnote to remove an unneeded and potentially confusing reference to a network gateway. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 6.1.6.1.2 – The change to this Section corrects punctuation; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 6.1.6.1.3 – The changes to this Section correct punctuation; they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 6.3 – The change to this Section corrects punctuation and adds specificity to the 54,000 BTU/hr threshold. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 6.3.1 – The changes to this Section correct punctuation; they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 6.3.3 – The changes to this Section correct grammar and punctuation; they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 6.3.4 – The changes to this Section correct punctuation and remove an unneeded link to the Energy Commission's website. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 8 – A significant number of edits were made throughout this Section to improve clarity and specificity, as follows:

> JA 8 – The change to the title of the Appendix replaces the term "Residential Luminaires with LED" with the phrase "High Efficacy", and corrects pluralization. This change has the material effect of generalizing the applicability of the Appendix to any light source able to meet its criteria rather than restricting it solely to LED lighting. This change is necessary for expanding the scope of this Appendix to be technology-neutral, consistent with the changes to Part 6 and the additional specifications added to the Appendix's subsections.
>
> JA 8.1 – The change to this Section adds language specifying that ballasts and drivers shall be included with light sources when they are a necessary component of their operation, and similarly light sources that cannot be separated from their luminaires shall be tested with their luminaires. This change has the material effect of requiring testing of light sources that rely on or otherwise require ballasts or drivers with their ballasts or drivers, and that are inseparable from their luminaires with their luminaires. This change is necessary to ensure that test conditions mirror actual installation conditions.
>
> JA 8.2 – The change to this Section removes an unnecessary specification of a test apparatus and a redundant mention of ISO/IEC 17011. As the test procedures referenced in the subsequent Sections specify the equipment needed for the test, and as the referenced ISO/IEC 17011 is specified earlier in the Section, these changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.
>
> JA 8.3 – The change to this Section consolidates the specification of sample size to occur once in this Section, where it had previously occurred repeatedly in each following Section. In doing so, sample size language was also removed from all subsections, and the sample size made uniform for all applications. This change has the material effect of making sample size more uniform, in some cases slightly increasing and in most cases slightly decreasing the number of lamps that must be included in the tested sample. This change is necessary to simplify and streamline the language of this Appendix, and in so doing 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.
>
> JA 8.3.1 – The change to this Section explicitly specifies that efficacy is determined at full light output where it was previously implied but not expressly stated, and corrects the reference of the IES test procedure for induction lamps to the correct test number (IES LM-66). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.
>
> JA 8.3.2 – The change to this Section explicitly specifies that power factor is determined at full output where it was previously implied but not expressly stated, and clarifies how values are to be

reported. This change has the material effect of specifying reporting of the minimum, rather than average, power factor for light sources that are not lamps, consistent with the smaller sample size for light sources other than lamps. This change is necessary to prevent confusion or conflict in reporting the values that result from performance of the test.

JA 8.3.3 – The change to this Section clarifies how values are to be reported. This change has the material effect of requiring reporting of average values for lamps and maximum values for light sources other than lamps. This change is necessary to prevent confusion or conflict in reporting the values that result from performance of the test.

JA 8.3.4 – The addition of this Section adds specific test procedures for determining color characteristics, and includes renumbering subsequent subsections to account for this added section. This change has the material effect of specifying the tests to be performed in determining a light source's correlated color temperature and color rendering index, and thereby requiring the performance of these tests; the specified tests are consistent with those specified for efficacy in Section JA 8.3.1. This change is necessary to remove ambiguity regarding determination of color characteristics and prevent gaming of color information: although the tests specified in JA 8.3.1 include procedures for determining color characteristics, the Appendix did not expressly state that these tests were to be used both for determining efficacy and color attributes and thus did not restrict reported color characteristic values to the values that result from these tests.

JA 8.3.5 – The changes to this Section add specifications applicable to decorative lamps and inseparable LED products, and clarify how values are to be reported. The change to add decorative lamps has the material effect of allowing these products to perform the ambient temperature test. This change is necessary to avoid inadvertently requiring all decorative products to perform the elevated temperature test, even when it would not be appropriate for the product.

The change to add "LED Light Engines" to item C has the material effect of treating light engines equivalently to lamps under this Section. This change is necessary to ensure appropriate testing and treatment of LED light engines used in assembled LED products.

The change to add "Inseparable SSL Luminaires" has the material effect of allowing use of the in-situ temperature when an entire luminaire is subject to testing, based on the light source being inseparable from the luminaire. This change is necessary to ensure that the test is representative of the actual conditions under which the light source will operate when installed.

The change to specify data reporting requirements has the material effect of requiring reporting of the ninth highest value out of ten for lamps, and minimum values for light sources other than lamps. This change is necessary to prevent confusion or conflict in reporting the values that result from performance of the test.

JA 8.3.6 – The changes to this Section correct terms and specificationsfor consistency with Section 8.3.5, including adding a prohibition of inseparable LED products, and clarify how values are to be reported. The change to prohibit inseparable SSL products has the material effect of requiring that inseparable SSLs perform the ambient temperature test in Section JA 8.3.5. This change is necessary to ensure inseparable SSLs perform the test most appropriate for their design.

The change to specify data reporting requirements has the material effect of requiring reporting of a calculated average of surviving units for lamps, and minimum values for light sources other than lamps. This change is necessary to prevent confusion or conflict in reporting the values that result from performance of the test.

JA 8.3.7 – The changes to this Section add an explicit procedure for determining dimming ability,

flicker, and audible noise; provide specifications for handling combinations of light elements, ballasts or drivers, and dimmers; provide additional direction regarding the reporting of data; and correct grammar. These changes have the material effect of specifying how minimum dimming must be calculated, and specifying that light sources are only required to be tested with a representative ballast or driver, transformer, or dimmer of each general technology they are compatible with and not with each specific product they could theoretically be installed with. This change is necessary to prevent ambiguity regarding minimum dimming level, and to prevent redundant testing of light sources.

JA 8.4 – All subsections of Section JA 8.4 were edited to add a reference back to the related test procedure in JA 8.3. These additions clarify without materially altering the requirements in the Draft Express Terms, and are 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. Additional changes in each subsection that are specific to each subsection's topic are described below.

JA 8.4.1 – The change to this Section specifies that efficacy is tested at full output as specified in JA 8.3.1. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 8.4.2 – The change to this Section corrects the word "operated" to the word "tested"; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

JA 8.4.4 – The change to this Section consolidates the color characteristics into a single Section, and adds criteria for inseparable SSL products, LED light engines, and GU-24 LED lamps. This change has the material effect of specifying a higher allowable color temperature for GU-24 LED products and products that do not have separable (and thus changeable) lamp elements; the other changes relocate but do not otherwise alter the requirements in the Draft Express Terms. This change is necessary to account for legacy GU-24 LED products that were permitted under the 2013 Standards and products that cannot be easily exchanged or fitted with lower color temperature lamps; the remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 8.4.5 – The change to this Section moves and consolidates the criteria for product lifespan into this Section; these provisions were originally embedded in the test procedure specifications referenced by JA 8.3.5 and 8.3.6 and expressly stated in JA 8.4.7. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 8.4.6 – The changes to this Section add specificity to the light levels at which compliance shall be demonstrated, and add specification of reduced flicker operation consistent with the longstanding reduced flicker operation requirement for dimmer controls. These changes have the material effect of requiring compliance at specified lighting levels, and requiring compliance with flicker requirements identical to those applicable to the dimmer controls the light sources are paired with for testing and will be paired with when installed. These changes are necessary to remove ambiguity regarding the light levels at which performance must be demonstrated, to ensure that products that have unacceptable levels of flicker are prevented from being considered compliant with flicker requirements, and to prevent conflicting with the requirements for the

dimmer controls that will control the light sources.

JA 8.5 – The change to this Section simplifies the marking requirements for light sources complying with this Section from explicit statements of their characteristics to a condensed "JA8-2016" or "JA8-2016-E" compliance mark. This change has the material effect of requiring less printing of information on compliant products, and is necessary to ensure that the marking requirement is achievable for luminaires within small size categories, does not preclude the display of other compliance marks or product information, and is not more costly than necessary to demonstrate compliance.

JA 8.6, including associated Table – The changes to this Section simplify and clarify the data reporting requirements, and specify a data retention and provision period. The changes have the material effect of ensuring that each performance requirement in JA 8.4 has an associated data item that is reported to the Energy Commission, requiring retention of records for a minimum of two years, and requiring provision of retained records upon request. These changes are necessary to ensure records are kept by submitters for an appropriate amount of time following submittal, provided to the Energy Commission if or when necessary, and to ensure that any data required to be reported for compliance closely aligns with the characteristics that compliant products are required to possess.

JA 10 – A significant number of edits were made throughout this Section to improve clarity and specificity, as follows:

JA 10.1 – The changes to this Section add the terms "light sources" and "transformers" consistent with their inclusion in JA 8, correct the word "above" to the word "below" as it relates to cutoff frequency requirements, and use the term "signal processing" in place of a general description of signal filtration. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

JA 10.2 – The change to this Section adds specificity regarding combinations of lamps, ballasts and drivers, transformers, and controls, consistent with the changes to JA 8.3.7. These changes have the material effect of specifying that light sources are only required to be tested with a representative ballast or driver, transformer, or dimmer of each general technology they are compatible with and not with each specific product they could theoretically be installed with. This change is necessary to prevent redundant testing of light sources.

JA 10.3 – The change to this Section removes unneeded specificity regarding the equipment used to perform the test, and instead specifies the general level of equipment performance needed to successfully perform the test. This change has the material effect of allowing any equipment able to perform the test to do so. This change is necessary to avoid inadvertently restricting equipment that is fully capable of performing the required test.

JA 10.4 – The changes to this Section replace the percent sign with the word "percent" where they occur, and remove requirements to perform testing at 80% and 50% power levels. These changes have the substantive effect of requiring testing only at 100% and 20% of light output, consistent with the requirements of JA 8.4.6, and no longer requiring testing at 80% and 50% of light output. The change is needed to avoid performing unneeded testing at conditions that are not held against a performance standard.

JA 10.5 – The changes to this Section add induction lighting to the list of light sources with specified tests consistent with JA 8.2, reduces the test period from two seconds to one second, and adds specificity regarding when a light source is considered stabilized. These changes have the material effect of requiring the recording of half as much data, and removing ambiguity

regarding how induction lights are handled or at what point a light source can be considered stabilized. These changes are necessary to avoid requiring handling and manipulation of excess data in verifying compliance with JA 8, and 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.

JA 10.6 – The changes to this Section remove reference to a "CEC Flicker Data Analysis Tool" and to the two test conditions removed from JA 10.4, and remove prior requirements for a one-second window using at least half of the two seconds of recorded data consistent with reducing the test duration in JA 10.5. The removal of reference to a "CEC Flicker Data Analysis Tool" has the material effect of instead requiring testers to perform a requisite Fourier transform on the data themselves, using appropriate tools or software, rather than requiring the use of a tool published by the Energy Commission for this purpose; the remaining changes simply align the language of this Section with substantive changes made to prior Sections and do not, themselves, have any material effect. These changes are necessary to avoid placing an unnecessary restriction on the use of common tools able to conduct Fourier analysis, and 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.

JA 10.7, including associated Table –The changes to this Section simplify and clarify the data reporting requirements, remove unneeded data format specifications, remove reference to values generated by testing at 80% and 50% of light output consistent with the changes to Section JA 8.4.6 and JA 10.4, and specify a data retention and reporting period matching the period defined for Section JA 8.6. The changes have the material effect of reducing the total number of data fields required, removing unneeded specificity in data file formatting, requiring retention of records for a minimum of two years, and requiring provision of retained records upon request. These changes are necessary to ensure records are kept by submitters for an appropriate amount of time following submittal, are provided to the Energy Commission if or when needed, and to ensure that data required to be reported for compliance matches what the JA 10 test generates and what is required to demonstrate compliance with JA 8.

UPDATES TO THE RESIDENTIAL APPENDIX

RA 1.2.1 – The change to this Section corrects a specified temperature value to the value specified in Part 6. As Part 6 already specifies that Standard Charge Verification Procedure shall be performed unless the outdoor temperature is below 55 degrees Fahrenheit, this change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 1.2.3 – The change to this Section corrects a section reference for consistency with changes in Section numbering caused by other edits to the Appendix. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table RA 2-1 – The changes to this Table simplify its language by removing language that is redundant with RA3.1.4.3.8 and Section 150.1(c).9.A, and correct section references to account for changes in numbering caused by other changes to the Standards and this Appendix. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 2.4.4 – The change to this Section corrects grammar by replacing the phrase "been verified of charge" with the phrase "had their charge verified". This change clarifies without materially altering the

requirements in the Draft Express Terms, 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.

Table RA 3.1-1 – The change to this Table corrects section references for consistency with changes in Section numbering caused by other edits to the Standards. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.1.4.1.3 – The changes to this Section clarify its phrasing by making the title of the Section and its contents more closely match each other. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.1.4.2.3 – The change to this Section corrects a section reference for consistency with changes in Section numbering caused by other edits to the Appendix. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

Table RA 3.1-2 – The changes to this Table correct the grammar of two entries, and aligns their phrasing to match the phrasing used elsewhere in the Standards. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.1.4.3.8 – The changes to this Section simplify its language by removing redundant language. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.1.4.4 – The change to this Section corrects a section reference for consistency with changes in Section numbering caused by other edits to the Standards. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.4.1.6 – The changes to this Section correct grammar and simplify its language by removing redundant language. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.2.1 – The change to this Section updates a section reference consistent with the movement of specifications relating to airflow from RA 3.2 to Section 150.1(c)7 and 150.2(b)1F. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to preserve 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.

RA 3.2.1.1(b) – The change to this Section removes an unneeded section reference. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.2.1.1(g) – The change to this Section corrects a section reference for consistency with changes in Section numbering caused by other edits to the Appendix. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.2.1.2 – The changes to this Section remove a redundant section reference and correct grammar, including correcting the use of the term "special case" to the term "alternative" for consistency with the rest of the Appendix. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.2.2 – The change to this Section updates a section reference consistent with the movement of specifications relating to airflow from RA 3.2 to Section 150.1(c)7 and 150.2(b)1F. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to preserve 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.

RA 3.2.3 – The change to this Section updates a section reference consistent with the movement of specifications relating to airflow from RA 3.2 to Section 150.1(c)7 and 150.2(b)1F. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to preserve 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.

RA 3.2.4 – The language in this Section was moved to Section RA 3.3.3.1; this change is described in an entry for that Section.

RA 3.3.3.1 – The change to this Section simplifies its language by removing an unneeded reference to multi-zone systems that is redundant with the specifications in Section 150.0(m). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.3.3.1.5 – The addition of this Section moves language formerly in RA 3.2.4 into Section 3.3.3.1 for organizational consistency, and edits the language for clarity. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.3.3.3 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Appendix. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.3.3.4.3 – The change to this Section simplifies its language by removing an unneeded reference to multi-zone systems that is redundant with the specifications in Section 150.0(m). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.4.1 – Replaced term "Charge Indicator Display" with term "Fault Indicator Display" where it occurs throughout this Section and its subsections. This change has no effect on the regulatory requirements relating to indicating system charge, and is made to avoid implying that a display used to indicate system

charge is prohibited from indicating other faults or other information about the performance or operation of the system. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.4.2.3 – The change to this Section adds section references to direct readers to the Sections applicable to each of the noted procedures. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.1 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.3 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.4 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.4.2.9 – The change to this Section corrects a typographical error by inserting a space. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.5.5 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.6 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.6.2.9 – The change to this Section corrects a typographical error by inserting a space. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.5.7 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.5.7.2.7 – The change to this Section corrects a typographical error by inserting a space. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.5.8 – The changes to this Section corrects section references for consistency with changes in Section numbering caused by other edits to the Standards (specifically to Section 110.7). These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.6.5 – The changes to this Section correct grammar; they clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 3.6.7 – The change to this Section adds a sentence to explicitly state that a recirculation pump may be external or integral to a water heater, and corrects numbering. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 3.6.8 – The change to this Section adds a sentence to explicitly state that a recirculation pump may be external or integral to a water heater, and corrects numbering. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.1 and 4.2 – The change to this Section corrects a typographical error by separating the body text of Section RA 4.1 from the title of Section 4.2, and corrects the numbering of all following Sections to account for the change. The change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.3.1 – The change to this Section removes a Section relating to ice storage systems, and corrects the numbering of all following Sections to account for the change. Staff determined that these systems were not being installed within California, and thus removed this HERS testing protocol as unnecessary and unused. This change has the material effect of reducing the number of test procedures that HERS Raters are required to know and be able to perform. This change is therefore necessary to avoid training and equipment costs related to a test that, in practice, will not be used by the HERS rater.

RA 4.3.1.1 – The change to this Section replaces the term "Charge Indicator Display" with term "Fault Indicator Display", consistent with the change to RA 3.4.1. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.4.4 – The change to this Section corrects punctuation; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA Table 4.4.5 – The change to this Table corrects punctuation; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.4.7 – The change to this Section adds a sentence to explicitly state that a recirculation pump may be external or integral to a water heater, and corrects numbering. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.4.9(f) – The change to this Section corrects numbering; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.4.10(f) – The change to this Section corrects numbering; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

RA 4.4.17 – The Section numbering of this Section and subsequent Sections is corrected to account for removal of Sections proposed in the original Draft Express Terms. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

RA 4.4.20 – The change to this Section corrects punctuation and grammar, and corrects the word "testing" to the word "listing" consistent with an identical correction made to Section 150.0(n). This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

UPDATES TO THE NONRESIDENTIAL APPENDIX

NA 6.1 – The changes to this Section correct grammar and punctuation, and correct one instance of the word "should" to the word "shall" for consistency with prior requirements within the same Section. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

NA 6.5.1 – The changes to this Section correct and improve the grammar and phrasing of its last paragraph. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

NA 6.5.3 – The changes to this Section correct and improve its grammar and phrasing. These changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

NA 7.4.1.2 – The change to this Section replaces outdated links to an NFRC web page with more general directions to contact NFRC. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.4.2.2 – The change to this Section removes an outdated link to an NFRC web page. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.4.3.2 – The change to this Section removes an outdated link to an NFRC web page. This change clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.5.4.1 – The change to this Section corrects grammar; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.5.15 – The change to this Section corrects section numbering; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.1 – The change to this Section corrects capitalization in the Section title; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.1.2 – The change to this Section adds a clause to provide more explicit direction regarding sampling. This change has the material effect of establishing that one tested photocontrol can represent no more than five additional photocontrols, thus requiring that a minimum of one sixth of installed photocontrols be tested even when sampling is used. This change is necessary to prevent a tested photocontrol from representing an unreasonable number of additional controls, and gaming of the use of sampling to avoid performing testing.

NA 7.6.1.2.1 – The change to this Section adds a clause to provide more explicit direction regarding verification of lighting for which a power factor adjustment for daylight dimming plus off behavior is claimed. As this Section does not apply any new requirements not already specified in the referenced Section 140.6(a)2H, this change clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.2 – The change to this Section corrects capitalization in the Section title; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.2.3 – The change to this Section adds a clause to provide more explicit direction regarding sampling. This change has the material effect of establishing that one tested occupancy sensor can represent no more than seven additional occupancy sensors, thus requiring that a minimum of one eighth of installed sensors be tested even when sampling is used. This change is necessary to prevent a tested occupancy sensor from representing an unreasonable number of additional sensors, and gaming of the use of sampling to avoid performing testing.

NA 7.6.3 – The change to this Section corrects capitalization in the Section title; it clarifies without

materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.3.1 – The change to this Section updates a section reference; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.6.3.2 – The change to this Section adds a clause to provide more explicit direction regarding sampling, update references to Section 130.1, and improve grammar and terminology. The added sampling clause has the material effect of establishing that one tested enclosed space can represent no more than seven additional enclosed spaces, thus requiring that a minimum of one eighth of enclosed spaces be tested even when sampling is used. This change is necessary to prevent a tested space from representing an unreasonable number of additional spaces, and gaming of the use of sampling to avoid performing testing. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are 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.

NA 7.7 – The change to this Section updates a section reference; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.7.6.1 – The change to this Section adds a clause to provide more explicit direction regarding verification of lighting for which a power factor adjustment for daylight dimming plus off behavior is claimed. As this Section does not apply any new requirements not already specified in the referenced Section 140.6(a)2H, this change clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.7.6.2 – The change to this Section corrects the grammar of Section title; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.7.6.2.2 – The change to this Section corrects spelling; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.8.2 – The change to this Section adds a sampling method consistent with the other Sections of NA 7. This change has the material effect of allowing sampling when performing tests of outdoor motion sensors, following the same general specifications as for sampling of indoor occupancy sensors. This change is necessary to ensure uniform requirements for testing of lighting controls, and to avoid requiring redundant testing.

NA 7.8.8 – The change to this Section corrects section numbering and layout; it clarifies without materially altering the requirements in the Draft Express Terms, 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.

NA 7.14 – The changes to this Section correct grammar and punctuation; they clarify without materially

altering the requirements in the Draft Express Terms, and are 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.

NA 7.15.2 – The change to this Section removes the word "above", as the presence of the word is in error: Section 120.6(g)1 specifies that an escalator "shall automatically slow to the minimum permitted speed", and the purpose of the test in Section NA 7.15.2(d) is to demonstrate compliance with this standard. Including the word "above" would allow an escalator or moving walkway that does not slow all the way to the minimum permitted speed (that is, whose speed remains above the minimum speed) to none the less pass the test. This change has the material effect of requiring that escalators and moving walkways demonstrate compliance with the minimum speed requirement before passing the test, and is necessary to ensure that the test is successful in verifying whether the requirements of Section 120.6(g)1 are met.

2. Update to the Economic Impact Assessment

The Economic Impact Assessment identified in the ISOR remains accurate in describing the changes proposed in the Final Express Terms. No updates are necessary.

3. Additional Technical, theoretical, and empirical studies, reports, and similar documents relied upon

Pursuant to the requirements of Government Code section 11346.2(b)(3), this section of the FSOR 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" that was identified after the publication of the ISOR. All of these documents have been filed and formally noticed 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

Nonresidential	
Document Number	Report Title
(none; supplement)	Staff Supplement to 2016-NR-ASHRAE1-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-ASHRAE2-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-ENV2-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-HVAC1-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-HVAC2-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-LTG1-F (April 2015)

(none; supplement)	Staff Supplement to 2016-NR-LTG2-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-LTG3-F (April 2015)
(none; supplement)	Staff Supplement to 2016-NR-LTG4-F (April 2015)
(none; staff analysis)	Supporting Nonresidential Energy Impacts (Y. Zhang, July 2015)
(none; staff analysis)	Vintage Lighting Savings (M. Shirakh, July 2015)
(none; staff analysis)	AT Commissioning Costs (G. Thomas, June 2015)

Residential	
Document Number	Report Title
TN #75325	*High Color Rendering Can Enable Better Vision without Requiring More Power; LEUKOS: The Journal of the Illuminating Engineering* *Society of North America*, University of California Davis, 26 Feb 2015
TN #75594	*Report – New Home Cost v. Price Study*, PG&E, April 2015
(none; presentation)	*Next Generation Construction: Advanced Residential Water Heating*, PG&E, Jan 28, 2015
(none; federal publication)	*Assessing the Energy Savings of Tankless Water Heater Retrofits in Public Housing*, R. Ries, R. Walters, and D. Dwiantoro, January 2013
TN #74627 and TN #75515 (duplicate)	Residential Instantaneous Water Heaters (updated February 2015)
(none; supplement)	Staff Supplement to 2016-RES-DHW1-F (April 2015)
(none; supplement)	Staff Supplement to 2016-RES-ENV1-F (April 2015)
(none; supplement)	Staff Supplement to 2016-RES-ENV2-F (April 2015)
(none; supplement)	Staff Supplement to 2016-RES-HVAC1-F (April 2015)

(none; supplement)	Staff Supplement to 2016-RES-LTG1-F (April 2015)
(none; federal publication)	ENERGY STAR® Program Requirements Product Specification for Residential Refrigerators and Freezers Eligibility Criteria Version 5.0
(none; federal publication)	ENERGY STAR® Program Requirements Product Specification for Residential Dishwashers Eligibility Criteria Version 6.0

4. The reasons why mandating the use of specific technologies or equipment is required

The Standards mandate the use of specific technologies and equipment to assure that buildings always meet minimum, cost-effective efficiency requirements whether the prescriptive method (pursuant to Sections 140.0 and 150.1(c)) or the performance method (pursuant to Sections 140.1 and 150.1(b)) of compliance is used. If these proven, simple, highly cost-effective, long-lasting energy saving technologies and equipment were not mandatory, they could be "traded off" against measures that have not been documented to save energy as persistently, simply, or cost-effectively. (Note also that although some measures and equipment appear in the "prescriptive" compliance method, none of those are mandatory. That is because the prescriptive compliance method is a voluntary alternative to the performance compliance method. Moreover, there are several different "packages" of measures and equipment in the prescriptive compliance method, which further demonstrates the voluntary nature of the prescriptive compliance method.)

5. Consideration of reasonable alternatives, including those that would lessen any adverse impact on small business (Government Code section 11346.9(a)(4) & (5))

Pursuant to the requirements of Government Code section 11346.9(a)(4), this section of the FSOR contains "[a] determination with supporting information that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed, would be as effective and less burdensome to affected private persons than the adopted regulation, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law." Per Government Code section 11346.9(a)(5), this section must also contain "[a]n explanation setting forth the reasons for rejecting any proposed alternatives that would lessen the adverse economic impact on small businesses." In doing so, the Commission is "not required to artificially construct alternatives or describe unreasonable alternatives." (Gov. Code, § 11346.2(b)(4)(C).)

As stated in the ISOR, 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. The Commission therefore does not consider the "do nothing" alternative of abandoning, in part or in full, the updates proposed by the Draft Express Terms, or any alternative that would completely eliminate feasible and cost effective efficiency requirements either currently in effect or proposed by the Draft Express Terms, to be a reasonable alternative. The Commission considered proposed alternatives to specific provisions of the Standards received among the public comments submitted for the Draft Express Terms, and substantively incorporated those alternatives where staff found that the proposed alternative would be effective in carrying out the purpose for which the regulation is proposed, or would be as effective and less burdensome to affected private persons than the adopted regulation. The reasons for accepting or rejecting any alternative proposed as part of a public comment are stated in the response to the comment within the Final Response to Comments at the end of this FSOR.

In considering alternatives to the Nonresidential Lighting Alterations requirements in Sections 141.0(b)2I-L, staff reviewed numerous proposed alternatives that purported to "be more cost effective to affected private persons and equally effective in implementing the statutory policy [of the Commission]." The language in the Final Express Terms represents a balancing of the need to achieve feasible and cost effective energy savings in lighting alteration projects, and the need to consider, and where possible lessen, the adverse economic impact on businesses, and in particular small businesses, based on consideration of these proposed alternatives. The adopted language provides compliance options that allow costs of installing new wiring and costs of performing lighting density calculations to be avoided, while achieving energy savings at least equal to what is required under the existing Standards.

6. Facts, evidence, documents, testimony, or other evidence of no significant adverse economic impact on business

The estimation of impacts on business stated in the ISOR remains accurate in describing the changes proposed in the Final Express Terms.

7. Duplication or conflicts with federal regulations

The final 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.

B. Determination as to whether adoption, amendment, or repeal of the regulation imposes a mandate on local agencies or school districts
(Government Code section 11346.9(a)(2))

The proposed modifications to the standards will not impose new mandates on local agencies. Existing law already obligates local building departments to serve as enforcement agencies for the Standards.[2] Existing law also already requires compliance with the Standards as they apply to school buildings, and all other buildings, owned by local agencies.[3] While the proposed Standards add requirements for schools and other building types owned by local agencies, those requirements are the same as those applicable to all nonresidential buildings regardless of owner. Moreover, the proposed Standards recognize the unique characteristics of relocatable public school buildings, and they establish procedures to facilitate compliance by relocatables. Finally, the Standards for schools, and for all other buildings, are cost effective, and they will thereby reduce the costs of building and operating school buildings.

C. Objections and Recommendations, and the Energy Commission's Responses
(Government Code section 11346.9(a)(3))

This discussion is presented in the spreadsheets labeled Response to Comments.

D. Consideration of reasonable alternatives, including those that would lessen any adverse impact on small business
(Government Code section 11346.9(a)(4) & (5))

This consideration appears in section II.A.6. (beginning on page 54 above).

E. Documents referenced in the proposed building energy efficiency standards

All of these documents, which are incorporated by reference in the Parts 1 and 6 Standards, are in the

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[2] Pub. Resources Code §§ 25402, subd. (a)-(b), 25402.1.

[3] California Code of Regulations, Title 24, Part I, Administrative Regulations of Department of School Administration.

record of the Energy Commission's rulemaking proceeding. In addition, they were made available to the public upon request directly from the Energy Commission, or were reasonably available to the affected public from a commonly known or specified source. (See OAL Regulations, California Code of Regulations, title 1, section 20(c)(2).).They were listed in the Initial Statement of Reasons, and no additional documents were referenced in the 15-Day Language.

Each one of the documents incorporated by reference is of such length, or is subject to copyright restrictions, that it would be cumbersome, unduly expensive, or otherwise impractical to expressly publish it as part of the Standards. (See OAL Regulations, California Code of Regulations, title 1, section 20(c)(2).)