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INITIAL 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 (2019 CALIFORNIA ENERGY CODE)**

DOCKET NUMBER 17-BSTD-02

(The State agency shall draft the regulations in plain, straightforward language, avoiding technical terms as much as possible and using a coherent and easily readable style. The agency shall draft the regulation in plain English. A notation shall follow the express terms of each regulation listing the specific statutes authorizing the adoption and listing specific statutes being implemented, interpreted, or made specific. (PART 1 – ADMINISTRATIVE CODE))

LEGEND FOR EXPRESS TERMS

1. New amendments: All such language appears underlined.
2. Repealed text: All such language appears in ~~strikeout~~.

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I. INTRODUCTION

This Initial Statement of Reasons (“ISOR”) describes the purposes, rationales, and necessity of the California Energy Commission’s proposed amendments to its energy efficiency standards for buildings, which would go into effect on January 1, 2020, if adopted by the Energy Commission and approved by the California Building Standards Commission.¹ These standards are in the California Code of Regulations, Title 24, Part 1, Chapter 10, and Part 6 (also known as the California Energy Code). This ISOR fulfills the requirements of California’s Administrative Procedure Act (see Government Code section 11340 et seq.).

The Energy Commission welcomes comments on the ISOR and on the proposed building standards that the ISOR describes. Please see the accompanying Notice of Proposed Action (“NOPA”), also dated January 19, 2017, for instructions on how to submit comments electronically, on paper, and orally at Energy Commission hearings.

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

In 1975 the Department of Housing and Community Development adopted the state’s first energy conservation standards for buildings, under the State Housing Law authority, which required basic levels of insulation. Also in that year the Energy Commission began operations, under the Warren-Alquist Act (Public Resources Code section 25000 et seq.) That Act gives specific directives to the Energy Commission regarding what the standards are to address, what criteria are to be met in developing standards, and what implementation tools, aids, and technical assistance are to be provided. (Public Resources Code sections 25402(a)-(b), 25402.1, - 25402.8.) The most important requirement is that the standards save building owners more money in reduced bills for electricity and natural gas than any additional construction costs that the standards impose.

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

The Energy Commission’s building energy efficiency standards are contained in two parts of Title 24 of the California Code of Regulations. Administrative regulations, such as how the standards’ requirements are integrated with local governments’ building permit processes, are in Part 1, Chapter 10, of Title 24, and the substantive requirements for building construction are in Part 6 of Title 24. In addition, voluntary, or “reach” guidelines for sustainable building practices that are more protective of the environment than the minimum standards are in Part 11 of Title 24, the California Green Building Standards. The Energy Commission is responsible for the Energy

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.

Chapters (separate chapters are published for residential and nonresidential buildings) of the California Green Building Standards. This document concerns proposed regulations in Part 6 and Part 1, Chapter 10 only.

B. How the Standards Work

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

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

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

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

Subchapter 2 contains mandatory requirements for all buildings.

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

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

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

Subchapter 5 sets the performance (energy budget) and prescriptive (package of measures) compliance approaches for new nonresidential, high-rise residential, and hotel/motel buildings.

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

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

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

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

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

C. Summary of the Changes Proposed in This Rulemaking Proceeding

The following summary of the proposed changes is duplicated from the Notice of Proposed Action:

Overview

The 2019 Standards focus on three key areas: proposing new requirements for installation of solar photovoltaics for newly constructed low-rise residential buildings; updating current ventilation and Indoor Air Quality (IAQ) requirements, including references to ASHRAE 62.1 and 62.2; and extending Title 24 Part 6 to apply to healthcare facilities. The 2019 standards also propose several smaller improvements in energy efficiency, such as efficiency standards for laboratory fume hoods, that are described in greater detail below.

In addition to updating the Standards in Title 24 Parts 1 and 6, the Energy Commission is also proposing updates to the CALGreen energy efficiency provisions in Title 24, Part 11, in a separate, parallel rulemaking.

The following is a list of the specific proposals currently included in the Draft Express Terms. A detailed list of all proposed changes, with descriptions of each change, is located in the Initial Statement of Reasons released concurrently with this notice.

Residential

The proposed changes to the residential sections of the Standards include prescriptive options reflecting updates to building technologies and best practices. By incorporating these improvements, these Standards narrow the gap between current residential construction and what will be required in 2020 to ensure that all newly constructed residential buildings achieve zero net energy.

The proposed changes include the following:

- For solar:
 - Adding new prescriptive requirements for installing solar photovoltaic systems in newly constructed residential buildings, including exceptions to address conditions where meeting the solar photovoltaic systems requirements are not feasible or cost effective, and specifying use of an Energy Design Rating in the performance approach to compliance to support solar photovoltaic requirements. This includes adding Joint Appendix 11 and 12 to support solar photovoltaic and battery storage systems installed to comply with Part 6.
 - Adding a performance standards exception allowing community shared solar electric generation or battery storage systems to serve as a full or partial option for the onsite solar photovoltaic systems requirements, and adding an administrative process in Part 1 for Commission approval of compliance options for community shared systems that

provide equal or greater energy saving benefits to buildings that would otherwise have onsite solar PV systems, in a manner that is both valid and enforceable.

- Correcting existing language regarding energy budgets and adding definitions regarding Energy Design Ratings and Additionality, particularly with regards to incorporating consideration of on-site renewable energy generation into current modeling of energy budgets and energy efficiency.
- For ventilation:
 - References to ASHRAE 62.2 have been updated to incorporate the current version by reference. The current version moves high-rise multifamily buildings from 62.1 to 62.2, which is a significant change from prior versions.
 - Amendments to the current version of ASHRAE 62.2 are proposed as found to be appropriate to ensure efficiency and indoor air quality.
 - Increasing air filter filtration requirements to a Minimum Efficiency Reporting Value (MERV) of 13, necessary for filtering out the smallest category of potentially harmful particulates. This change includes requiring that certain return grills accommodate a two inch filter depth, to ensure that MERV 13 filters can be installed with little or no impact on overall system performance.
 - Extending air filtration requirements to apply to supply-only ventilation systems and the supply side of balanced ventilation systems.
 - Changes to multifamily ventilation include specifying that dwelling units may either use balanced ventilation or verify leakage rates with a blower door test.
 - Extending HERS requirements to include verifying HVI certification of kitchen range hoods.
 - Updating HERS procedures specified in the Residential Appendix where needed to support the changes in Part 6.
- For attics, increasing the prescriptive R-value for below roof deck insulation from R-13 to R-19.
- For walls:
 - Increasing prescriptive R-value requirements from R19 fill and R5 continuous insulation to R21 fill with R5 continuous insulation, reflecting an overall decrease in the performance U-factor for the assembly from 0.051 to 0.048.
 - Adding QII to the prescriptive requirements for newly constructed buildings.
- For fenestration:
 - Updating the definitions of “door” and “glazed door” to match National Fenestration Rating Council (NFRC) definitions. This lowers the threshold for a door to be considered a glazed door from 50% glazing to 25% glazing.

- Updating the prescriptive U-factor for windows from 0.32 to 0.30, and updated the prescriptive Solar Heat Gain Coefficient (SHGC) required in Climate Zones 2 and 5 - 15 from 0.25 to 0.23.
- For lighting, revising JA8 to align testing requirements with current federal, state and ENERGY STAR test procedures, and to allow use of the NEMA 77 test standard for flicker. For NEMA 77, a Pst and SVM value of 1.0 or lower is necessary to ensure tested lighting would not exceed the existing limit of 30% depth of flicker for frequencies below a 200Hz cutoff, save for a potential negligible increase (<5%) at frequencies above 150Hz. In addition, path lights, step lights, and lighting internal to drawers, cabinetry, and closets other than walk-in closets have new options for compliance.
- For water heating:
 - The specifications for compact distribution have been revised
 - New specifications for Drain Water Heat Recovery have been added.
 - Adding an option for prescriptive compliance using a heat pump water heater.
- For furnaces:
 - Updating minimum fan efficacy requirements to 45 cfm per watt.
 - Adding options for prescriptive compliance using one or more heat pumps.
- For HVAC
 - Adding airflow requirements specific to Small Duct High Velocity (SHDV) systems. This resolves an issue of flow rates for standard ducting being applied to SHDV systems.
- Adding addition and alteration requirements that are specific to creating Accessory Dwelling Units.

Nonresidential

The proposed changes include the following:

- Extending the Scope of Part 6 to healthcare facilities, and incorporating several Exceptions to ensure appropriate application of efficiency standards.
- For ventilation:
 - Incorporate the Natural Ventilation and Exhaust Ventilation Procedures of the 2016 ASHRAE 62.1.
 - Updating the ventilation rate table to list the ventilation rate for more spaces.
 - New requirements for ventilation air that can be used for recirculation and transfer air.
 - Updating filtration requirements to a minimum MERV 13, necessary for filtering out the smallest category of potentially harmful particulates.
- For lighting:
 - Updating prescriptive indoor and outdoor lighting power allowance values to assume the use of LED lighting, and added new Power Adjustment Factors for several daylighting devices.

- Reducing wattage thresholds for Exceptions to outdoor lighting controls to account for lower wattage LED fixtures.
- Updating the procedure for determining installed lighting power to allow the efficiency of installed lamps to be considered, and to create a more comprehensive framework for evaluating modular lighting (including track lighting).
- Adding occupancy sensing requirements for restrooms.
- Merging and standardizing the prescriptive alteration requirements for lighting controls, and limiting the projects that can proceed without determining the square footage of the affected spaces.
- Adding requirements for laboratory fume hoods to use efficient fans and incorporate automatic sash closure.
- For HVAC:
 - Updating requirements in several areas to maintain alignment with ASHRAE 90.1:
 - Fan system power requirements
 - Equipment efficiency requirements
 - Transfer air for exhaust air makeup
 - Demand control ventilation requirements for classrooms
 - Occupant sensor ventilation control requirements (with amended setpoints)
 - Waterside economizer requirements (with amended minimum efficiency requirements)
 - Expanded the Economizer Fault Detection and Diagnostics requirement to all systems over 4.5 tons of cooling that are equipped with an air economizer.
 - Amended the sizing calculations and equipment selection criteria to make it applicable to healthcare facilities.
 - Expanded the water economizer requirement to also be applicable to system that do not utilize a fan.
 - New requirements for water economizer operation and design to limit the impact of pumps.
 - New prescriptive efficiency requirements for cooling towers
 - New condenser efficiency and system control requirements for adiabatic condensers serving refrigerated warehouses and supermarkets
- Acceptance Tests
 - Nonresidential Appendix 2 – New procedures where added for high-rise residential dwelling unit ventilation and dwelling unit envelope leakage.

- Nonresidential Appendix 7 – New Acceptance Test were added for occupancy zone control, adiabatic condensers, laboratory and factory exhaust, and automatic closing fume hood sashes.

Standards Cleanup

The proposed changes to the Standards also include changes throughout the regulations to clarify, simplify, and streamline the existing language and requirements. The most significant of these changes are the following:

- Acceptance Test Training and Certification – The changes to Title 24 Part 1, Section 10-103.1 and 10-103.2 add requirements for ATTCPs to disclose when an ATT or ATE has been decertified, and include in their application the conditions and procedure that applies to folks seeking to regain certification. Smaller changes have also been made to standardize the content of amendment applications and to adjust the on-site audit requirements that apply to mechanical ATTCPs.
- Lighting – Sections 130.0, 130.1, 130.2, and 150.0(k) have been rewritten for clarity, in addition to the changes noted previously. A new Section 130.1(f) has been added to clarify the expected interactions of the lighting controls required by Section 130.1.
- Alternative Calculation Method Approval Manual – The changes to the Alternative Calculation Method manual adopted as appendices to the Standards permit the use of other simulation engines that produce results identical to the Energy Commission’s CBECC software.
- Pipe Insulation – Requirements for pipe insulation have been harmonized with the Plumbing Code, an ambiguity regarding insulation of heat pump lines has been corrected, and the requirements for protecting insulation have been standardized between residential and nonresidential piping.
- Demand Responsive Controls – Requirements throughout Part 6 for demand responsive thermostats and lighting controls have been consolidated into one location in Part 6. In addition, OpenADR 2.0 is specified for the requirement to include an open communications protocol.
- Computer Rooms – incorporated an approved compliance option allowing the use of pumped refrigerant economizing technology
- Joint Appendix 1 – Definitions that are redundant with the definitions in Part 6 have been removed.
- Joint Appendix 2 – This Appendix has been amended to allow use of GIS software tools in determining climate zone, and to move the zip code list into a document that can be updated between code revisions.
- Joint Appendix 5 – This Appendix has been removed: the incorporation by reference of OpenADR 2.0a and 2.0b have made the specifications in this Appendix, which were largely based on OpenADR 1.1, redundant.
- Joint Appendix 7 – This Appendix has been augmented to more clearly specify the requirements applicable to data registries and external data sources and to do so at a greater level of detail.

- Residential and Nonresidential Appendices – The sections relating to Third Party Quality Control Programs (TCQCPs) have been revised for clarity and enforceability.
- Nonresidential Appendix 1 – An alternative procedure was added for field verification and diagnostic testing of nonresidential duct leakage.

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

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

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

The Legislature has found that

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

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

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

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

(Pub. Resources Code, § 25007.)

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

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

- Reduced energy costs for consumers and businesses.

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

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

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

B. The Specific Purpose, Rationale, and Necessity of Each Adoption, Amendment, or Repeal

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

ARTICLE 1 – ENERGY BUILDING REGULATIONS

Section 10-102 – The purpose of the changes to this Section are to update the definitions of Acceptance Test Technician, Acceptance Test Employer, and Acceptance Test Technician Certification Provider to merge and reduce the overall number of definitions, add specificity, and create consistent language and references between definitions. Specifically, rather than separately defining a “lighting ATT” and a “mechanical ATT” using nearly identical definitions, these definitions simply note that some ATTs are approved to test mechanical systems and some are approved to test lighting systems. This same principle was applied to the terms “ATE and “ATTCP”. The merging of these definitions is a nonsubstantive change. These changes are necessary to improve consistency and specificity in the regulatory language, reduce redundancy, and reduce risk of confusion; they are therefore necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, and to avoid any potential confusion or cost that could result from referring to an outdated test procedure.

Section 10-102 – Separately from the above, the purpose of adding the definition for “additionality” is to support the proposed addition of Section 10-115 by providing clarity and specificity to how the term is used in that Section. The substantive effects of adding Section 10-115 are described in relation to that Section; the change here is necessary to ensure the text of Section 10-115 has the intended reading and regulatory effect.

Section 10-102 – Separately from the above, the purpose of the change to the definition of “NFRC 203” is to update the publication year to reference the most current version of the document, thereby maintaining the currency of our requirements. This change is necessary to maintain currency with an external standard, and therefore necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections

11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, and to avoid any potential confusion or cost that could result from referring to an outdated test procedure.

Section 10-103(a)3 – The purpose of the changes to this Section and its subsections is to renumber and add headings to subsections as appropriate. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 10-103(a)5 – The purpose of the changes to this Section and its subsections is to add headings to two subsections. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 10-103(b)3 – The purpose of the change to this Section is to correct a reference to Part 6 Section 150.0(k). This clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 10-103.1 – The purpose of the changes to this Section and its subsections are to standardize the use of the terms ATT, ATE and ATTCP throughout the Section, improve the overall clarity of the Section, standardize the format of amendments, incorporate QA into annual reporting, and add specifications relating to the decertification of ATTs and ATEs. When Home Energy Rating System (HERS) Providers were required to decertify a rater, that rater could apply to another HERS Provider without addressing the issue that resulted in their decertification in the first place. There are several ATTs that are certified by multiple ATTCPs. To be clear, no instances of decertified ATTs applying to other ATTCPs have been reported; nor have there been any reports of an ATT certified under multiple ATTCPs being decertified under one and still performing acceptance testing under the other. However, given that these issues have arisen with the HERS raters, and that the ATTCP program is patterned off of the HERS program, staff believes that it is prudent to protect the Energy Commission's ATTCP program goals from these types of activities; in doing so, staff also seek to ensure that loss of certification status can be remedied where appropriate. To support this, annual reports now must include a summary of QA activities, and application amendments that request nonsubstantive changes must include the same replacement sections as application amendments that request substantive amendments. These changes are necessary to ensure appropriate accountability by requiring reporting and disclosure of QA actions and results, prevent evasion of QA procedures by ATTs and ATEs via reapplication, and at the same time ensure that ATTs and ATEs are not inappropriately barred from remedying a QA action.

Section 103.1(b) – The purpose of the change to this Section, separate from standardizing the use of the terms ATT and ATE, is to address an unlikely circumstance of the number of certified ATTs shrinking to the point of being incapable of serving California after these programs have grown large enough, and the number of technicians numerous enough, to meet associated thresholds in this Section. This change is necessary to avoid a risk of harm to California's building industry due to the physical unavailability of ATTs, should their numbers unexpectedly decline.

Section 10-103.2 – The purpose of the changes to this Section and its subsections are to standardize the use of the terms ATT, ATE and ATTCP throughout the Section, improve the overall clarity of the Section, standardize the format of amendments, incorporate QA into annual reporting, streamline onsite auditing requirements, and add specifications relating to the decertification of ATTs and ATEs; in doing so, staff also seek to ensure that loss of certification status can be remedied where appropriate. These changes have the material effect of requiring

ATTCPs to show when a previously certified ATT or ATE has been decertified, and specify in their application the conditions under which a decertified ATT or ATE may seek to regain certification status. When Home Energy Rating System (HERS) Providers were required to decertify a rater, that rater could apply to another HERS Provider without addressing the issue that resulted in their decertification in the first place. There are several ATTs that are certified by multiple ATTCPs. To be clear, no instances of decertified ATTs applying to other ATTCPs have been reported; nor have there been any reports of an ATT certified under multiple ATTCPs being decertified under one and still performing acceptance testing under the other. However, given that these issues have arisen with the HERS raters, and that the ATTCP program is patterned off of the HERS program, staff believes that it is prudent to protect the Energy Commission's ATTCP program goals from these types of activities; in doing so, staff also seek to ensure that loss of certification status can be remedied where appropriate. To support this, annual reports now must include a summary of QA activities, and application amendments that request nonsubstantive changes must include the same replacement sections as application amendments that request substantive amendments. These changes are necessary to ensure appropriate accountability by requiring reporting and disclosure of QA actions and results, prevent evasion of QA procedures by ATTs and ATEs via reapplication, and at the same time ensure that ATTs and ATEs are not inappropriately barred from remedying a QA action.

Section 103.2(b) – The purpose of the change to this Section, separate from standardizing the use of the terms ATT and ATE, is to address an unlikely circumstance of the number of certified ATTs shrinking to the point of being incapable of serving California after these programs have grown large enough, and the number of technicians numerous enough, to meet associated thresholds in this Section. This change is necessary to avoid a risk of harm to California's building industry due to the physical unavailability of ATTs, should their numbers unexpectedly decline.

Section 130.2(c)3F2 – The purpose of the change to this Section is to allow onsite QA requirements to be able to be met by conducting a shadow audit, in order to minimize the time on the job site necessary for performing this QA. This change is necessary to address an issue specific to mechanical acceptance testing arising from the time required to re-perform mechanical acceptance tests, as identified by stakeholders during the pre-rulemaking period.

Section 10-106 – The purpose of the changes in this Section are to more closely align the Section language with the statutory language in Public Resources Code Section 25402.1(h)2, which specifies in part that “the city or county [shall file] the basis of its determination that the standards are cost effective with the commission” and that “[t]he determination that the standards are cost effective shall be adopted by the governing body of the city or county at a public meeting.” As these requirements exist in statute, stating them more clearly in this Section does not have a substantive effect. These changes are necessary to ensure that this Section represents the requirements of the Public Resources Code as accurately as possible.

Section 10-109 – The purpose of the change in this section is to delete the term “Data Input Software” (in four places) and substitute a new term “External Digital Data Sources”. The change is necessary in order to mirror the change made to this term in Reference Joint Appendix JA7. The new term is needed in order to more accurately describe the broader range of digital technology alternatives that have become available and may be used to provide the required data input to Data Registries required for compliance with Title 24, Part 6.

Section 10-110 – The purpose of the changes in this Section are to give the Executive Director the ability to establish shorter public review periods for applications submitted under 10-104, 10-106, 10-108 and 10-109, when found to be appropriate. Review periods of 15, 30, and 45 days more closely match expected or required review periods for various governmental functions, whereas 60 days is normally only specified for highly sensitive, complex, or potentially controversial subjects. This change benefits local agencies submitting applications under 10-106, which have requested shorter review periods and whose applications rarely receive public

commentary. This change is necessary to ensure that overly long public comment periods do not place an undue burden on applicants, while also preserving the ability to assign longer public comment periods where the public interested would be served.

Section 10-111(a)1A – The purpose of the change in this Section is to add language specifying that temporary labels shall show the values specified in Section 10-111(a)1B, and shall not show alternate values. This change is necessary to ensure that temporary labels accurately communicate performance values resulting from product testing, or accurately portray that performance has not been verified via the specified testing and default performance values are assumed, and thereby prevent misleading labeling of fenestration products.

Section 10-111(a)2 – The purpose of the change to this Section is to correct grammar; it clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

Section 10-113 – The purpose of the change to this Section is to replace “certification” with “rating”, which more accurately describes the function performed by the Cool Roof Rating Council. This change does not materially alter the requirements of the Section or the function of the certification or rating program: the State’s interest is in ensuring that the performance of heat-rejecting roofing products is accurately determined and accurately communicated, which is accomplished by rating the product and communicating that rating. Certification, meaning that someone holds responsibility for the accuracy of the rating, is implicit; similarly, the previous use of “certify” made implicit that the product rating was what the certifier was ultimately responsible for. This change is necessary to improve the accuracy of the code’s language and thereby improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 10-115 – The purpose of this change is to add a new Section to Part 1 that establishes an administrative process through which the Energy Commission would consider approval of applications by any entity of community shared solar electric generation or battery storage system to serve as a compliance option for either partial or full compliance with requirements that would otherwise apply for onsite solar electric generation or battery storage for low-rise residential buildings. Community shared solar or battery storage systems that meet the requirements of this section (including subsections) would be able to be considered under the performance approach, as specified by the EXCEPTION to Section 150.1(b) in Part 6. This section addresses the Energy Commission policy conclusions in the 2015 (pp. 42-43) and 2013 (pp. 6, 38-40) Integrated Energy Policy Reports (IEPRs) regarding the need for “development entitlements” for off-site renewable energy resources, such as community based renewable energy generation, to serve as an option for builders to use to meet Standards requirements for what would otherwise be onsite solar energy generation. These subsections contain specifications and requirements that ensure that approved community systems are verifiable and enforceable by enforcement agencies, and that they provide equivalent energy performance and durability as the onsite systems that would otherwise be required, and provide dedicated building energy savings benefits to the residential buildings for which the options are used. Applicants for approval of the community systems are accountable to all parties who relied on these systems in place of onsite systems, and for recordkeeping to demonstrate compliance with the requirements of these subsections for the period of time that onsite systems would otherwise have provided.

TITLE 24, PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

Subchapter 1 – All Occupancies—General Provisions

100.0(a)1 – The purpose of the change to this Section is to extend the scope of Title 24, Part 6, to include Occupancy Group I buildings. Occupancy Group I buildings have been incorrectly excluded from the scope of the standards since the early 1980s, and this change is necessary to correct that oversight.

Exception 3 to Section 100.0(a)1 - The purpose of adding this Exception is to exclude Occupancy Group I-3 and I-4 from the scope. While there is ample evidence that the identified code sections will be effective for Occupancy Group I-2, staff found that the analysis conducted for prior standards are not as readily applicable to I-3 and I-4 occupancies. This Exception is therefore necessary to prevent applying existing standards to these occupancies ahead of additional analysis.

100.0(a)3.B. – The purpose of this change is to simplify the description of buildings regulated by Part 6. The definition of conditioned space already uses the terms mechanical heating or mechanical cooling and wood heating, the latter being the form of non-mechanical heating. Therefore this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

100.0(a)3.C – The purpose of this change is to simplify the description of buildings regulated by Part 6. The definition of conditioned space already uses the terms mechanical heating or mechanical cooling and wood heating, the latter being the form of non-mechanical heating. Therefore this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

100.0(e)1 – The purpose of the change to this Section is to update Section numbering consistent with the proposed addition of Sections 110.11 and 110.12. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

100.0(e)2 – The purpose of the change to this Section is to update Section numbering consistent with the proposed addition of Sections 110.11 and 110.12. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

100.0(e)2.B.ii.a.(ii) – The purpose of this change is to list all the prescriptive sections. Since 140.9 is a prescriptive section it was necessary to make this change for specificity. Therefore this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

100.0(e)2.D.ii.b.(ii) – The purpose of this change was to eliminate the conflict with 100.0(a)3C in that a low rise residential building heated with non-mechanical heat are under the scope of Part 6. Also, with the proposed requirement of on photovoltaic panels, this exception could have been a loophole for low rise residential buildings to not have to comply with Part 6. Therefore this change is necessary to eliminate a potential loophole.

Table 100.0-A – The purpose of the changes to this Table are to maintain its accuracy with regards to the changes proposed for the other Sections of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

The following definitions in Section 100.1 have been updated:

ADIABATIC PAD – This change was necessary to explicitly describe the Standards use of the term Adiabatic Pad within the scope of the new requirements. The new requirements for adiabatic condensers serving refrigerated warehouses and commercial refrigeration for retail stores uses the term adiabatic pad: the adiabatic pad is one of the key components of the condenser that make the system adiabatic, therefore a definition is needed to explicitly describe the type of condenser within the scope of the new requirements. This change is therefore necessary to provide the level of specificity needed by the proposed Standards.

AIR FILTER – This change was necessary to explicitly describe the Standards use of the term Air Filter within the scope of the new requirements. New requirements for residential and nonresidential ventilation use the term air filter, and while this is a common and generally understood term, there is a risk of ambiguity regarding the scope and application of the new requirements if the term is not expressly defined. This change is therefore necessary to avoid discussions of whether specific products are or are not air filters, and to provide the level of specificity needed by the proposed Standards.

ALTERATION – The purpose of the change to this definition is to add a parenthetical reference guiding readers to a newly proposed, related definition. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

ALTERED COMPONENT – The purpose of the change to this definition is to remove redundant and potentially confusing language. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

ANNUNCIATED – The purpose of removing this definition is to match the removal of the term where it occurred in Section 130.1(a). Because this term is no longer used within Part 6, this change is necessary to prevent confusion and to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

ANSI/AMCA STANDARD 500-D – The purpose of this change is to define the test method referenced in the Standards. This test method has been referenced in several code cycles without being defined in this Section, and this change corrects this oversight. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

ANSI Z9.5: The purpose of adding this definition is to specify the complete title and version of the test procedure, commonly abbreviated to "ANSI Z9.5". This change is necessary to support its incorporation by reference into Section language.

AHRI 550/590 – The purpose of this change is to update the reference to the new version of the test method. The new version includes Addendum I. This change is necessary to stay current with the changes to the rating test method for Water Chilling Packages.

AHRI 680 – The purpose of this change is to update the reference to the new version of the test method. The Draft Express Terms include new minimum efficiency requirements for air filters using this test as one of the acceptable rating methods. This change is necessary to stay current with the changes to the rating test method for air filters.

AIR, INFILTRATION – The purpose of this change is to group all the terms referencing a type of “air” designation for ventilation in one spot in the definition section. These definitions, except for the definition for “available transfer air”, were defined by 2016 Standards but were not listed together. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

AIR, MAKEUP – The purpose of this change is to group all the terms referencing a type of “air” designation for ventilation in one spot in the definition section. These definitions, except for the definition for “available transfer air”, were defined by 2016 Standards but were not listed together. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

AIR, REPLACEMENT – The purpose of this change is to group all the terms referencing a type of “air” designation for ventilation in one spot in the definition section. These definitions, except for the definition for “available transfer air”, were defined by 2016 Standards but were not listed together. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

AIR, SUPPLY – The purpose of this change is to group all the terms referencing a type of “air” designation for ventilation in one spot in the definition section. These definitions, except for the definition for “available transfer air”, were defined by 2016 Standards but were not listed together. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

AIR, TRANSFER – The purpose of this change is to group all the terms referencing a type of “air” designation for ventilation in one spot in the definition section. These definitions, except for the definition for “available transfer air”, were defined by 2016 Standards but were not listed together. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

AIR, AVAILABLE TRANSFER – The purpose of this change is to define the term available transfer air, which is used in the new requirement for exhaust air makeup. The new requirement sets limits on the amount of conditioned air provided to a space that is exhaust driven. Under certain situations the amount of conditioned air provided is not sufficient resulting in a need for transfer air from an adjacent space. This change was necessary to explicitly describe the Standards use of the term available transfer air. This change is necessary for clarity.

ASHRAE STANDARD 52.2 – The purpose of this change is to update the reference to the new version of the test method. The Draft Express Terms include new minimum efficiency requirements for air filters using this test as one of the acceptable rating methods. This change is necessary to stay current with the changes to the rating test method for air filters.

ASHRAE STANDARD 62.1 – The purpose of this change is to define the Ventilation Standard that is referenced extensively in the Express Terms. This Standard is referenced for the Natural Ventilation Procedure, Exhaust Procedure as well as the Air Classification and Recirculation limits. Therefore this change is necessary to clearly identify what version of the ventilation standard we are referencing.

ASHRAE STANDARD 62.2 – The purpose of the change is to update to the current version of ASHRAE 62.2 (2016 version including published addenda b, d, l, q) to be referenced by Title 24, Part 6. The change is needed in order to align with industry standard practices, and model codes.

ASTM D6083 – The purpose of this change is to remove ASTM D6083 from the Standards. This change is necessary as this test procedure is no longer referenced within the Standards: ASTM has withdrawn this test procedure with no replacement.

ASTM D6848 – The purpose of this change is to remove ASTM D6848 from the Standards. This change is necessary as this test procedure is no longer referenced within the Standards: ASTM has withdrawn this test procedure with no replacement.

ASTM E903 – The purpose of adding this definition is to specify the complete title and version of the test procedure, commonly abbreviated to "ASTM E903". This change is necessary to support its incorporation by reference into Section language.

ASTM E1175 – The purpose of adding this definition is to specify the complete title and version of the test procedure, commonly abbreviated to "ASTM E1175". This change is necessary to support its incorporation by reference into Section language.

BATTERY SYSTEM, STATIONARY STORAGE – The purpose of adding this definition is to specifically define the battery systems that are useful to buildings and impact the building's TDV energy use. This change is necessary to avoid ambiguity in discussions of battery storage systems proposed for addition to Part 6.

CASCADE REFRIGERATION SYSTEM – The purpose of this change is to define the term Cascade Refrigeration System which is one of the new system types being regulated by Part 6. This change is necessary to ensure clarity by explicitly describing the Standards use of the term within the scope of the new requirements.

CODES, CBC – The purpose of this change is to accurately refer to the other Parts of California's Building Codes. This change is necessary to support the Sections of Part 6 that make reference to the other Parts of California's Building Standards Code.

CODES, CEC – The purpose of this change is to accurately refer to the other Parts of California's Building Codes. This change is necessary to support the Sections of Part 6 that make reference to the other Parts of California's Building Standards Code.

CODES, CMC – The purpose of this change is to accurately refer to the other Parts of California's Building Codes. This change is necessary to support the Sections of Part 6 that make reference to the other Parts of California's Building Standards Code.

CODES, CPC – The purpose of this change is to accurately refer to the other Parts of California's Building Codes. This change is necessary to support the Sections of Part 6 that make reference to the other Parts of California's Building Standards Code.

COMMISSION – The purpose of this change is to add the common, modern name for the California Energy Commission alongside the formal statutory name of the "California State Energy Resources Conservation and Development Commission". This change is necessary to ensure the name that the majority of stakeholders and members of the public are familiar with is found here, and to clearly state that these are the same entity. This is a non-substantive change.

COMPLEX MECHANICAL SYSTEMS – The purpose of the change to this definition is to correct internal numbering to be more consistent, and to insure correct repetition of the defined term. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

CONDENSER – The purpose of this change is to define the term condenser. Prior to the 2019 Standards, the requirements for refrigerated warehouses and commercial refrigeration systems did not include multiple condenser types. As new requirements are proposed that pertain to multiple condenser types, this change is necessary to clearly distinguish between the various types.

CONDENSER, ADIABATIC – The purpose of this change is to define the term Adiabatic Condenser which is one of the new system types being regulated by Part 6. This change was necessary to explicitly describe the Standards use of the term and provide technical specificity regarding the equipment that is within the scope of the new requirements.

DRY MODE; PRE-COOL MODE – The purpose of the addition of these definitions is to describe the two modes that an adiabatic condenser can be operated in: a "pre-cool" mode that applies evaporative precooling to incoming air, and a "dry" mode that does not use evaporative precooling. As the proposed efficiency standards for adiabatic condensers are applicable specifically to its performance in the dry mode, not its performance in the pre-cool mode, this change is necessary to clearly and specifically define each mode.

CONDITIONED SPACE; CONDITIONED SPACE, DIRECTLY; CONDITIONED SPACE, INDIRECTLY – The purpose of the changes to these definitions are to remove unnecessary language and improve phrasing. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. These are a non-substantive changes.

CTI ATC-106 – The purpose of adding this definition is to specify the complete title and version of the test procedure, commonly abbreviated to "CTI ATC-106". This change is necessary to support its incorporation by reference into Section language.

DEMAND FLEXIBILITY MEASURE – The purpose of adding this definition is to create an umbrella term for the various ways in which a building's energy use can be controlled to be responsive to the conditions of the grid. This change is necessary to clearly provide a conceptual grouping for several measures relating to demand responsiveness and demand management.

DEMAND RESPONSE SIGNAL – The purpose of this change is to clarify and simplify the definition. The previous definition unnecessarily excluded some signals sent by entities other than those listed. The new definition clarifies that any signal designed to convey the specified demand response information meets the definition. This change is necessary to avoid interfering in the

evolution of demand response programs by inadvertently excluding certain types of middle entities.

DEMAND RESPONSIVE CONTROL – The purpose of this change is to clarify and simplify the definition. The term “a kind of” is colloquial and inappropriate for regulatory language. In addition, the added word “automatic” is a defining aspect of this type of control and is separately defined in section 100.1(b). The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. These are a non-substantive changes.

DOMESTIC WATER HEATING SYSTEMS – The purpose of adding this definition is to capture a more common term for residential water heating. This change is necessary to clearly state that the term “service water heating”, where used in Part 6, includes domestic water heating.

DOOR – The purpose of the changes made to this definition is to reduce the threshold of glazed doors from 50% to 25%. This change is necessary to align with NFRC definitions relating to doors and glazed doors. This change is necessary to provide clarity and better align with the NFRC definitions.

DOOR AREA – The purpose of this change is to add a definition for “door area”. This change is necessary to provide clarity and better align with the NFRC definitions.

ENERGY BUDGET – The purpose of revisions to this definition is to clarify the meaning of this term and that it is expressed in terms of Energy Design Rating (EDR) for newly constructed, low-rise residential buildings. The revised definition is needed to improve accuracy and clarify the use of EDR as an energy budget.

ENERGY DESIGN RATING (EDR) – The purpose of adding these definitions is to clarify the meaning of these terms for use in showing compliance with the 2019 Standards. These definitions include:

- Energy Design Rating
- Energy Design Rating, Energy Efficiency
- Energy Design Rating, Solar Electric Generation and Design Flexibility
- Energy Design Rating, Total
- Solar Electric Generation and Design Flexibility.

These new definitions are needed for clarification and understanding of these new terms.

ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) – The purpose of the change to this definition is to clarify the definition, remove an unnecessary list of examples in the definition, and remove constraints that are no longer consistent with the use of this term. The added word “automatic” is a defining aspect of this type of control system and is separately defined in section 100.1(b). Changing from “designed to regulate” to the active “that regulates” clarifies that the system must not simply be designed for the specified operations, but it must actually be capable of performing the specified operations. Deleting the list of example energy consuming systems simplifies the definition without changing it. Finally, it is the intent to consolidate various references in the code to automatic energy and building control systems under the “EMCS” term since this is consistent with general and industry practice, and by removing the constraints on the types of loads monitored (“environmental and system”) and operations adjusted (“HVAC”) this term can be used to refer any such system.

FACTORY – This change is necessary to describe the building or spaces within a building required to comply with the new exhaust ventilation requirements. The new requirements are only applicable to laboratories and buildings or spaces of factory group F as described by the California Building Code. This definition is from the California Building Code and is necessary to be included in Part 6 for clarity.

CLERESTORY GLAZING – The purpose of adding this definition is to include a key term consistent with the proposed addition of clerestory glazing as a power adjustment factor in Section 140.6. This change is necessary to ensure clarity and specificity where this new measure is proposed.

GLAZED DOOR – The purpose of the changes made to this definition is to reduce the threshold for glazed doors from 50% to 25%. This change is necessary to provide clarity and better align with the NFRC definitions.

FENESTRATION ALTERATION – The purpose of adding this definition is to move and clarify definition language and remove an appearance of a repeated definition. The term “alteration” is defined generally, and was also defined specifically in relation to fenestration, which made it appear that the term “alteration” had two definitions in Section 100.1. This addition provides that same definitional language as defining the term “fenestration alteration”, distinct from the definition of “alteration” on its own. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

FENESTRATION AREA – The purpose of the changes made to this definition is to reduce redundancy and provide clarity. This change is necessary to eliminate the confusion caused by having two definitions for fenestration area (one for nonresidential and one for residential) and to use simpler and more comprehensive language.

HORIZONTAL SLATS – The purpose of adding this definition is to include a key term consistent with the proposed addition of horizontal slats as a power adjustment factor in Section 140.6. This change is necessary to ensure clarity and specificity where this new measure is proposed.

LIGHT SHELF – The purpose of adding this definition is to include a key term consistent with the proposed addition of light shelves as a power adjustment factor in Section 140.6. This change is necessary to ensure clarity and specificity where this new measure is proposed.

SKYLIGHT ROOF RATIO (SRR) – The purpose of adding this definition is to define the elements that are used to calculate the skylight roof ratio, and to provide support for use of an acronym in place of the full term. This change is necessary to support and provide clarity to the provisions of Part 6 that relate to skylights.

VERTICAL FENESTRATION – The purpose of adding this definition is to create an inclusive term for all windows and other building penetrations and openings that act like windows, and to clarify that the use of the term is intended to exclude skylights (which are not typically installed vertically) and doors (which are subject to separate requirements). This change is necessary to clearly categorize the types of fenestration that are subject to Part 6 requirements.

WINDOW HEAD HEIGHT – The purpose of the change to this definition is to use the new term “vertical fenestration” in order to ensure appropriate application of window requirements. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

WINDOW WALL RATIO (WWR) – The purpose of the change to this definition is to support use of an acronym in place of the full term. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

GAS COOLER – The purpose of this change is to define the term Gas Cooler which is one of the new system types being regulated by Part 6. This change was necessary to explicitly describe the Standards use of the term within the scope of the new requirements. This change is necessary for clarity.

HABITABLE SPACE; HABITABLE STORY – The purpose of the changes to these definitions is to simplify phrasing, ensure consistency between the definitions, and create consistency between these terms and with the terms relating to occupancy by using the phrase “human occupancy” in the definition of habitable space. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

HEALTHCARE FACILITY –The purpose of adding this definition to Part 6 is to specifically and accurately define when a building or space can be considered a healthcare facility. It is necessary because the scope of the code has expanded to include Occupancy Group I-2, and many facilities in that occupancy group require a number of special exceptions in order to protect health and safety. The definition allows the energy code to defer to the California Department of Public Health, which issues the specified licenses, with respect to which facilities should be eligible for the exceptions. This definition was developed under close coordination with the Office of Statewide Health Planning and Development (OSHPD) and the healthcare industry.

HEAT CAPACITY (HC) – The purpose of the change to this definition is to remove the term “thermal capacity” as an alternate term for “heat capacity”. This change is necessary to alleviate confusion within the industry over use of the term “thermal capacity”, and to simplify language by using one term instead of two. This is a non-substantive change.

LIGHTING – Compact Fluorescent Lamp – The purpose of the change to this definition is to align the definition to a matching definition in the Title 20 Appliance Efficiency Standards. This change is necessary to create consistency between applicable regulations.

LIGHTING – Lamp – The purpose of the change to this definition is to provide a clearer distinction between types of lighting and address a recurring question from stakeholders. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

LIGHTING – LED Retrofit Kit – The purpose of adding this definition is to provide clarification for a class of products that exist between removable lamps and fully integrated luminaires. This change is necessary to provide clear direction to manufacturers and installers of these products regarding the applicability of Part 6 requirements.

LIGHTING – Non-integrated LED lamp – The purpose of the change to this definition is to update its verbiage consistent with a general update to the latest version of ANSI/IES RP-16. This change is necessary to ensure consistency with current ANSI and IES lighting standards.

LIGHTING – Integrated LED lamp – The purpose of the change to this definition is to update its verbiage consistent with a general update to the latest version of ANSI/IES RP-16. This change is

necessary to ensure consistency with current ANSI and IES lighting standards.

LIGHTING – Narrow Band Spectrum – The purpose of adding this definition is to recognize a specific class of lighting products with distinct features. This change is necessary to facilitate consideration of requirements that account for, or are tailored to, this specific subset of lighting products.

LIGHTING – Ornamental Lighting – The purpose of the change to this definition is to change a wattage value consistent with proposed revisions to later Section language that propose wattage values consistent with typical LED performance. This change is necessary to ensure the definition remains in agreement with the use of the term in later Sections.

LIGHTING – Solid State Lighting (SSL) – The purpose of adding this definition is to clarify that solid state lighting includes both LEDs and OLEDs, and is not limited solely to LED lighting. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

LIGHTING – Driver – The purpose of adding this definition is to specify the functions of circuitry that define it as a driver and separate it from other functions that the same circuitry may also perform. This change is necessary as there is not always a clear physical break or boundary between a driver and other circuitry, making it necessary to define a driver in terms of

LIGHTING CONTROLS – Astronomical Time-Switch Control – The purpose of the change to this definition is to eliminate and unnecessary nesting of lighting control definitions. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

LIGHTING CONTROLS – Automatic Scheduling Control – The purpose of the change to this definition is to clarify phrasing and to recognize partial-on and partial-off behavior by specifying “reduce or turn off”. This change is necessary to resolve a conflict with Part 6 requirements relating to partial-on and partial-off lighting behavior.

LIGHTING CONTROLS – Dimmer – The purpose of the change to this definition is to clarify phrasing and account for digital control strategies by specifying “used by or delivered to”. Dimming controls for incandescent lighting reduced power consumption and light output by reducing the electricity delivered to the luminaire or lamp, however solid state lighting is more likely to provide the same benefit by using pulse width modulation, by turning off some of the individual LED elements within the luminaire, or via a combination of strategies enabled by its digital nature. This change is therefore necessary to prevent a reading of this definition to mean that a device that uses these advanced strategies is not a dimmer because it does not restrict the electrical power available to the controlled device.

LIGHTING CONTROLS – Motion Sensor; Occupant Sensor; Partial-ON Occupant or Motion Sensor; Partial-OFF Occupant or Motion Sensor – The purpose of the changes to these definitions are to improve phrasing and to properly harmonize definitions for occupant and motion sensors with those for partial-on and partial-off behavior. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

LOW-RISE RESIDENTIAL BUILDING – The purpose of the changes to this definition are to correct punctuation and to add the word “habitable” for consistency with the definition of “high-rise residential building”.

MAKEUP AIR – The change to this definition strikes and re-inserts the definition in order to place it in correct alphabetical order. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

MECHANICAL COOLING – The purpose of this change was to remove possible confusion of what is consider “depletable sources” given the new photovoltaic requirement for low rise residential buildings. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

MECHANICAL HEATING – The purpose of this change was to remove possible confusion of what is consider “depletable sources” given the new photovoltaic requirement for low rise residential buildings. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

NATURAL GAS AVAILABILITY – The purpose of the addition of this definition is to consolidate in a definition the repeated descriptions used in multiple Sections of the code where natural gas availability or presence is discussed, and in doing so ensure consistency between Sections. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

NEEA – The purpose of adding this definition is to specify the meaning of an acronym used in relation to heat pump water heaters. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

NEEA ADVANCED WATER HEATER SPECIFICATION – The purpose of adding this definition is to specify the complete title and version of the specification. This change is necessary to support its incorporation by reference into Section language.

NFRC 100 – The purpose of removing one occurrence of the NFRC 100 definition is to eliminate redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NFRC 200 – The purpose of removing one occurrence of the NFRC 200 definition is to eliminate redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NFRC 202 – The purpose of removing one occurrence of the NFRC 202 definition is to eliminate

redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NFRC 203 – The purpose of removing one occurrence of the NFRC 203 definition is to eliminate redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NFRC 303 – The purpose of removing one occurrence of the NFRC 303 definition is to eliminate redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NFRC 400 – The purpose of removing one occurrence of the NFRC 400 definition is to eliminate redundancy: this definition occurs twice in this Section with identical language. Removing one of the two occurrences is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NONRESIDENTIAL BUILDING OCCUPANCY TYPES – The purpose of the changes to the definitions of nonresidential building occupancy types is to more closely align with the terms used in ASHRAE 90.1, and to be consistent in use of the word “area”. The definitions proposed to be added, removed, or amended for this purpose are as follows:

- Audience Seating Area
- Auditorium Area
- Auto Repair / Maintenance Area
- Beauty Salon Area
- Civic Meeting Place Area
- Classroom, Lecture, Training, Vocational Area
- Commercial and Industrial Storage Area
 - Warehouse
 - Shipping & Handling
- Convention, Conference, Multipurpose and Meeting Area
- Copy Room
- Corridor Area
- Dining Area
 - Bar/Lounge and Fine Dining: Bar/Lounge
 - Fine Dining
 - Cafeteria/Fast Food
 - Family Dining
- Electrical/Mechanical/Telephone Room
- Exercise/Fitness Center and Gymnasium Area
- Exhibit, Museum Area
- Grocery Sales Area
- Kitchen/Food Preparation Area

- Laundry Area
- Lobby, Hotel
- Main Entry Lobby
- Locker Room
- Lounge/Breakroom or Waiting Area
- Medical and Clinical Care Area
- Multipurpose Room
- Museum
 - Exhibit/Display
 - Restoration Room
- Open Area
- Parking Garage Areas
 - Parking Zone
 - Daylight Adaptation Zone
- Pharmacy Area
- Retail Sales Areas
 - Grocery Sales
 - Retail Merchandise Sales
 - Fitting Room
- Playing Area for Sports Arena
- Scientific Laboratory Area
- Theater Area
 - Motion Picture Theater
 - Performance Theater
- Transportation Function Areas
 - Baggage Area
- Ticketing Area
- Vocational Area
- Waiting Area
- Wholesale Showroom

These changes are necessary to avoid unnecessary confusion for builders, installers, and other persons that work with both our Standards and ASHRAE 90.1, and to maintain consistency between Part 6 and ASHRAE 90.1.

In addition to the above, the purpose of adding the following nonresidential function area definitions relating to healthcare facilities is to ensure adequate specificity as healthcare facilities are added to the Scope of Part 6:

- Healthcare Facilities
 - Exam/Treatment Room
 - Imaging Room
 - Medical Supply Room
 - Nursery
 - Nurse's Station
 - Operating Room
 - Patient Room
 - Physical Therapy Room

- Recovery Room

The changes to these definitions are necessary to ensure appropriate categorization of spaces within healthcare facilities in service of determining lighting power allowances.

NONRESIDENTIAL FUNCTION AREAS – The purpose of the changes to the definitions of nonresidential building occupancy types is to more closely align with the terms used in ASHRAE 90.1, and to remove unnecessary and redundant specification of a 90% threshold already stated in Exception 2 to Section 100.0(f). The following definitions are proposed to be added, removed, or amended for this purpose are as follows:

- Auditorium Building
- Assembly Building
- Classroom Building
- Commercial and Industrial Storage Building
- Financial Institution Building
- General Commercial and Industrial Work Building
- Industrial/Manufacturing Facility Building
- Grocery Store Building
- Gymnasium Building
- Library Building
- Office Building
- Parking Garage Building
- Religious Facility Building
- Restaurant Building
- Retail Store Building
- School Building
- Sports Arena Building
- Motion Picture Theater Building
- Performance Arts Theater Building
- Theater Building

These changes are necessary to avoid unnecessary confusion for builders, installers, and other persons that work with both our Standards and ASHRAE 90.1, and to maintain consistency between Part 6 and ASHRAE 90.1.

In addition to the above, the definition for “Medical Buildings and Clinic Buildings” is proposed to be deleted. The purpose of removing the definition for “Medical Buildings and Clinic Buildings” is to reflect the update to use the term “healthcare facility” throughout Part 6, consistent with the inclusion of Occupancy Group I buildings in the Scope of Part 6. This change is necessary to remove a definition for a term that will no longer be used in Part 6.

OCCUPANCY; OCCUPANCY, HUMAN; OCCUPANCY GROUP; OCCUPANCY TYPE – The purpose of adding these definitions is to ensure that the terms that use the word “occupancy” have a consistent meaning where found in Part 6, that there is internal consistency among these terms, and that their meaning is also consistent with their use in the other Parts of Title 24. This change is necessary to eliminate a risk of ambiguity or inconsistency in either the use or meaning of these terms.

OCCUPIABLE SPACE – The purpose of the change to this definition is to harmonize it with the

definitions for human occupancy and habitable space, and to more clearly express the distinction between “occupiable” and “habitable” space. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

OCCUPIED STANDBY MODE – New requirements for occupancy sensor ventilation control use the term occupied standby mode. The purpose of this change is to describe the conditions when the zone is considered to be in standby mode. This change was necessary to explicitly describe the Standards use of the term within the scope of the new requirements. This change is necessary for clarity.

OPENADR 2.0a – The purpose of this change is to define a new term used in the code. It is necessary since the code is changing from requiring an unspecified open source demand response communication protocol to specifically requiring that all demand responsive devices possess capabilities consistent with an OpenADR 2.0a or 2.0b Virtual End Node (VEN).

OPENADR 2.0b – The purpose of this change is to define a new term used in the code. It is necessary since the code is changing from requiring an unspecified open source demand response communication protocol to specifically requiring that all demand responsive devices possess capabilities consistent with an OpenADR 2.0a or 2.0b Virtual End Node (VEN).

OSHPD – This acronym is used in various sections of the Standards. The purpose of this change is to define the acronym. This change is necessary for clarity.

PROCESS, COVERED – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

PROCESS, EXEMPT – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

PROCESS LOAD – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change

PROCESS LOAD, COVERED – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered

process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change

PROCESS LOAD, EXEMPT – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

PROCESS SPACE – The purpose of the change to this definition is to clarify its interaction with other definitions relating to commercial and industrial processes and associated loads. The previous definition of covered process, exempt process, process load, covered process load, exempt process load and process space was a source of constant confusion among users of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

PROPOSED DESIGN BUILDING – The purpose of the change to this Section is to refocus the term and its definition on the “proposed design building” itself, thereby making the definition clearer and more straightforward while also shortening the defined phrase. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

REPLACEMENT AIR – The purpose of this change is to consolidate all definitions that pertain to “air” in the context of ventilation. This definition was not deleted but rather it was moved under “air” in the beginning of this section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

SUPPLY AIR – The purpose of this change is to consolidate all definitions that pertain to “air” in the context of ventilation. This definition was not deleted but rather it was moved under “air” in the beginning of this section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

TRANSFER AIR – The purpose of this change is to consolidate all definitions that pertain to “air” in the context of ventilation. This definition was not deleted but rather it was moved under “air” in the beginning of this section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

INFILTRATION AIR – The purpose of this change is to consolidate all definitions that pertain to “air” in the context of ventilation. This definition was not deleted but rather it was moved under

“air” in the beginning of this section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

SIDELIT DAYLIT ZONE, PRIMARY – The purpose of this change is to move a definition located in Section 130.1(d) into the Definition section, consistent with the rest of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

SIDELIT DAYLIT ZONE, SECONDARY – The purpose of this change is to move a definition located in Section 130.1(d) into the Definition section, consistent with the rest of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

SKYLIT DAYLIT ZONE – The purpose of this change is to move a definition located in Section 130.1(d) into the Definition section, consistent with the rest of Part 6. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

SOLAR ELECTRIC GENERATION SYSTEM or PHOTOVOLTAIC SYSTEM – The purpose of adding this definition is to clearly state the scope of equipment referred to when these terms are used. This addition is necessary to ensure clarity and specificity where new measures relating to installation of solar photovoltaics are proposed.

SPANDREL – The purpose of removing this definition is that it occurs twice; the proposal is to delete one of the two occurrences and retain the other. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

STANDARD DESIGN BUILDING – The purpose of the change to this definition is to harmonize its language with clarifying changes proposed for the definition of “proposed design building”. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

THERMAL MASS – The purpose of the change to this definition is to improve clarity and readability. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

TRANSCRITICAL CO2 REFRIGERATION SYSTEM – The purpose of this change is to define the term Transcritical CO2 Refrigeration System which is one of the new system types being regulated by Part 6. This change was necessary to explicitly describe the Standards use of the term within the scope of the new requirements. This change is necessary for clarity.

TRANSFER AIR – The purpose of this change is to consolidate all definitions that pertain to “air” in the context of ventilation. This definition was not deleted but rather it was moved under “air” in the beginning of this section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This is a non-substantive change.

UNIT INTERIOR MASS CAPACITY – The purpose of this change is to remove the definition for “Unit Interior Mass Capacity”. This change is necessary as the term is no longer used within the Standards.

VIRTUAL END NODE (VEN) – The purpose of adding this definition to Part 6 is to incorporate a term used in the OpenADR 2.0a and 2.0b documents that are incorporated by reference into requirements for demand responsive equipment. This addition is necessary because the code is changing from requiring an unspecified open source demand response communication protocol to specifically requiring that all demand responsive devices have the ability either contain or communicate with an OpenADR 2.0a or 2.0b Virtual End Node (VEN). The concept of a VEN is integral to the OpenADR communication protocol, and represents the software or hardware interface that accepts demand response control signals.

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

Section 110.0 – The purpose of the changes to this Section are to update Section number references to account for the proposed addition of two new Sections (110.11 and 110.12). The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.2(c) – The purpose of the changes to this Section is to remove the word “unitary” as an unnecessary term, and to add a missing hyphen to the term “non-central” where it is used in the Exception to this Section. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table 110.2-A – The purpose of the changes to this Table are to simplify the title of the Table by removing the unnecessary terms “Electrically Operated” and “Unitary”, and to remove reference to federal standards that ceased to be effective on January 1, 2016. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table 110.2-B – The purpose of the changes to this Table are to simplify the title of the Table by removing the unnecessary terms “Unitary” and “Applied”, and to remove reference to federal standards that ceased to be effective on January 1, 2016. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table 110.2-E – The purpose of the changes to this Table are to update the efficiency values specified for Single Package Vertical Air Conditioners (SPVACs) and Single Package Vertical Heat Pumps (SPVHPs) to the current, applicable minimum values from ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants

State and local governments the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2016 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Table 110.2-G – The purpose of the changes to this Table are to update the efficiency values specified for Heat Rejection Equipment to the current, applicable minimum values from ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)(2)Section 6316(b)2) grants State and local governments the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2016 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Table 110.2-H – The purpose of the changes to this Table are to update the efficiency values specified for Electrically Operated Variable Refrigerant Flow (VRF) Air Conditioners to the current, applicable minimum values from ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)(2)Section 6316(b)2) grants State and local governments the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2016 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Table 110.2-I – The purpose of the changes to this Table are to update the efficiency values specified for Electrically Operated Variable Refrigerant Flow Air to Air and Applied Heat Pumps to the current, applicable minimum values from ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)(2)Section 6316(b)2) grants State and local governments the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that as long as the building codes do not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2016 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Table 110.2-J – The purpose of the change to this Table is to reference the applicable federal laws in place of referencing standards referred to within the applicable federal laws, and thereby minimize the risk that a change in federal law would render the Table inaccurate. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.3(a) – The purpose of the change in this Section is to add reference to the portion of the plumbing code applicable to healthcare facilities. Previously, healthcare facilities were not within the Scope of Title 24 Part 6, and Table 3, Chapter 50 of the ASHRAE Handbook, HVAC Applications was applicable to all of the building types subject to this Section. This change is necessary to avoid inaccurately stating the requirements for temperature controls applicable to healthcare facilities now that they are added to the Scope of Title 24, Part 6.

Section 110.3(c)1 – The purpose of the change in this Section is to add an Exception to ensure harmonization with California's Plumbing Code, now that healthcare facilities are within the Scope of Title 24, Part 6. This change is necessary to prevent conflict between the Plumbing Code and the Energy Code.

Section 110.3(c)2 – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since infection control in healthcare hot water distribution lines requires maintenance of higher temperatures than in other buildings. In addition, the measure may not be cost effective when applied to a healthcare facility since they operate continuously. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both

Section 110.3(c)3 – The purpose of the change in this Section is to harmonize a value with California Plumbing Code Section 407.3, which specifies a limit of 120 degrees, not 110 degrees. This change is necessary to remove an unnecessary difference between the Plumbing Code and the Energy Code and ensure consistency between Codes.

Section 110.3(c)5 - The purpose of the change to this Section is to insert a comma into the Section title for consistency. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.3(c)5 - The purpose of the change to this Section is to insert reference to the California Public Resources Code, to inform the reader of the regulatory language that this Section's requirement is statutory in nature. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.4 – The purpose of the change to this Section is to correct grammar, specifically with regards to inconsistent use of the word “and”. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.5 – The purpose of the change to this Section is to add fireplaces to the list of equipment where a continuously burning pilot light is prohibited. This change is necessary for consistency in the treatment of gas-fired equipment, and to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 110.6(a)2, 3 & 4 – The purpose of the changes made to this Section is to reduce the allowable square footage from 1,000 square feet to 200 square feet for the site-built fenestration exception. Over the last several years the CMA has become more widely available and utilized around the country. These changes are necessary in order to encourage users to use the Computer Modeling Approach (CMA) and ensure accurate evaluation of fenestration products.

Section 110.6(a)4 – The purpose of the change in this Section is to amend the term “tubular skylight” to the term “tubular daylighting device”, to more accurately characterize these devices and remove conflict with the definition of “skylight”. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.8(a) – The purpose of the change in this Section is to use “all” in place of “any”, and in so doing more clearly state that any and all insulation is subject to the requirements of this

Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.8(i) – The purpose of the change in this Section is to insert the word “solar” and in doing so correct the use of the term “aged solar reflectance”. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.9(a) and (b) – The purpose of the changes in this Section are to move lighting control specifications present in California Code of Regulations Title 20, and referred to here, to be present in this Section. Regulatory language for lighting controls subject to manufacturer certification were moved from this Section into the Title 20 Appliance Efficiency Regulations in order to facilitate certification, however this created a circumstance where these regulations could be updated outside of the triennial cycle of the Building Code and cause immediate changes to the requirements of this Section. In addition, the maturation of modern lighting controls has diminished the value of manufacturer certification – advanced nonresidential lighting controls are subject to acceptance testing to confirm correct installation, configuration, and operation, while simple residential controls are now digital devices that are fairly foolproof. Thus, moving this language back into Section 110.9 is necessary to prevent out-of-cycle changes to the requirements of Part 6 and to facilitate reconsideration of manufacturer certification requirements.

Section 110.9(c) and (d) – The purpose of the changes to these Sections are to remove certification requirements for track lighting integral current limiters and supplementary overcurrent protection panels. Staff has observed diminished value in requiring certification of track lighting integral current limiters and supplementary overcurrent protection panels, in particular due to advanced modular lighting systems based on solid state lighting technology. Solid state lighting systems are also limited by drivers and similar power transformers that set a limit on the total power draw of the modular system. Lastly, staff is proposing in Section 130.0 to recognize the value of installed, efficient lamps and to no longer rate the power of a system based solely on its maximum potential power draw. For these reasons, staff are proposing to remove requirements that manufacturers of these devices certify basic model information to the Energy Commission or apply special labeling to their products. These changes are necessary to reduce costs associated with product certification and streamline regulatory compliance.

Section 110.9(e) and (f) – The purpose of removing these Sections is to remove language that is fully redundant with the requirements of Section 150.0(k) and Joint Appendix 8. Section 110.9(e) only serves to refer to Section 150.0(k) and JA8, and the location of these requirements in Section 150.0(k) already ensures that it only applies to residential lighting. JA8 also subsumes the requirements specified in Section 110.9(f) by including technology neutral standards for efficacy and rated life. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

110.10(a)1 – The purpose of the change to this Section is to specify that solar ready zone requirements for single family residences are applicable only to residences that do not have a solar photovoltaic system installed. This removes the need for an Exception relating to installed solar photovoltaic systems, and is consistent with new prescriptive requirements for installing these systems. This change is necessary because solar zone requirements are redundant for buildings that have a photovoltaic system installed.

110.10(a)2 – The purpose of the change to this Section is to specify that solar ready zone

requirements for low-rise multifamily buildings are applicable only to residences that do not have a solar photovoltaic system installed. This removes the need for an Exception relating to installed solar photovoltaic systems, and is consistent with new prescriptive requirements for installing these systems. This change is necessary because solar zone requirements are redundant for buildings that have a photovoltaic system installed.

110.10(a)3 – The purpose of the change to this Section is to correct punctuation of the word “multifamily”. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

110.10(a)4 – The purpose of the change to this Section is to remove unneeded phrasing and to exclude healthcare facilities. The purpose of excluding healthcare facilities from the scope of this Section is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to conflict with health and safety requirements that determine the power management strategies employed by such facilities. Future code cycles may remove this exclusion based on more detailed analysis, partial exceptions tailored specifically for healthcare. Removal of the unneeded phrase “all other” clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

110.10(b)1 – The purpose of the change to this Section is to add the phrase “Solar Zone” to its heading, consistent with the title of its parent Section (110.10(b)). The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 1 to Section 110.10(b)1A – The purpose of removing this Exception (and renumbering the subsequent Exceptions) is for consistency with the change to Section 110.10(a)1 to incorporate this scoping directly in Section language rather than in a later Exception. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 4 (now 3) to Section 110.10(b)1A – The purpose of the change to this Exception is to remove an ambiguity regarding the climate zone specification; staff finds that consideration of Wildland-Urban Interface Fire Areas is not necessary to restrict based on climate zone, even if whole house fans are more beneficial in some climate zones and less beneficial in others. This change is necessary to clarify and simplify the Exception and streamline its application.

Exception 5 (now 4) to Section 110.10(b)1A – The purpose of the change to this Exception is to align angle requirements with those proposed for the new prescriptive requirements for installation of solar photovoltaic systems. This change is necessary to ensure consistency between Sections.

Exception 6 (now 5) to Section 110.10(b)1A – The purpose of the change to this Section is to change references to Joint Appendix 5 to references to Section 110.12, consistent with the proposed amendment to consolidate demand response requirements in that Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 7 (now 6) to Section 110.10(b)1A – The purpose of the changes to this Section are to change references to Joint Appendix 5 to references to Section 110.12, consistent with the proposed amendment to consolidate demand response requirements in that Section, and to allow an additional option for the installation of a SAE J1772 Level 2 Electric Vehicle Supply Equipment (EVSE) as a part of the appliance package option for qualifying for this Exception. The addition of the EVSE is necessary to provide additional flexibility for builders pursuing this Exception. The change of reference from JA5 to Section 110.12 clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 4 to 110.10(b)1B: The proposed language update thermostat reference to JA5 to Section 110.12(a). The change is necessary because JA5 requirements have been moved to 110.12(a).

Exception 4B to 110.10(b)1B The proposed language allow an additional option to qualify for this exception by meeting the CalGreen Tier 1 requirement for electric vehicle charging spaces. The purpose of this change is to add flexibility without changing the stringency of the current requirements.

110.10(b)1B – The purpose of the change to this Section is to clarify that the solar zone requirement is applicable to mixed occupancy buildings. This change is necessary to remove ambiguity on whether mixed occupancy needs to have a separate solar zone for each occupancy of the mixed building.

Exception 4B to 110.10(b)1B – The purpose of the change to this Section is to allow an additional option for meeting the CalGreen Tier 1 requirement for electric vehicle charging spaces as a part of the appliance package option for qualifying for this Exception. The addition of the electric vehicle charging spaces option is necessary to provide flexibility for builders pursuing this Exception.

110.10(c)2 – The purpose of the change to this Section is to clarify that the plumbing pathways requirement is applicable to single family residences and multifamily central water heating systems. This requirement in this Section is not intended to apply to multifamily units that have individual water heaters in the unit; this change is therefore necessary to be consistent with the intent of the original CASE report.

Section 110.11 – The purpose of the change in this Section is to correct punctuation by inserting a missing hyphen into the term “non-ventilated”. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 110.12 – The purpose of the addition of this Section is to consolidate all of the demand response / demand management requirements stated in several locations in Part 6 into a single location, to specify compatibility with OpenADR 2.0a or 2.0b, and to ensure that healthcare facilities are excluded from the scope of Part 6’s demand response and demand management requirements. Consolidating the demand response and demand management requirements clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Specifying OpenADR 2.0 makes specific a prior requirement to incorporate “at least one standards-based messaging protocol” for nonresidential devices, and a prior requirement to incorporate either OpenADR2.0 or SEP 1.1 for residential devices. This change has the

substantive effect of specifying a default communications protocol common to all demand responsive equipment, residential and nonresidential, and is necessary to ensure that the demand responsive and demand managing abilities of buildings are not made unavailable if a proprietary communications format is deprecated or if support for the format ceases.

The purpose of excluding healthcare facilities from the scope of this Section is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to conflict with health and safety requirements that determine the power management strategies employed by such facilities. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare.

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

Section 120.1 – The purpose of the change to the title of this section is to reflect the new requirements intended to address indoor air quality. This is also in alignment with the titles of the reference document for most of these requirements, ASHRAE 62.1 and ASHRAE 62.2. This change is necessary to properly describe the contents of this extensive revision.

Section 120.1(a) – The purpose of this change is to clearly outline the scope of this section as it pertains to healthcare facilities as well as the expectation for the designer to identify the ventilation rate and designed distribution system to be on the construction documentation as described by Section 10-103 of Part 1. The latter being an existing requirement that needed clarification. This change is necessary to inform users of Part 6 of the ventilation requirements for healthcare facilities were not within the scope of this section and to clearly state the expectation that the construction documentation must contain the ventilation rate and air distribution system design.

Section 120.1(b) – The purpose of the extensive changes to these Sections are to include more current and more detailed requirements relating to Indoor Air Quality (IAQ), including filtration, updating the incorporation-by-reference of ASHRAE 62.2. The specific changes proposed for this Section include:

Section 120.1(b)1 – The purpose of the changes to this section and its subsections are to indoor air quality by increasing the air filtration particle size efficiency requirement from MERV6 to MERV13, and to specify 2-inch depth filters for improved filter airflow, otherwise allow for 1-inch depth filters if 0.1 inch w.c. pressure drop and 150 ft per minute face velocity for the filter is used for the design. Two more ventilation system types, supply ventilation systems and the supply side of balanced ventilation systems, are required to have air filtration though the filters are not required to be labeled. The term space conditioning systems was added to clarify that systems with thermal conditioning components are called space conditioning systems. The exception for evaporative coolers was moved to the end of section 1 for clarity.

There are tight relationships and interactions between building insulation and air tightness requirements, ventilation requirements, and indoor air quality, so much so that the Energy Commission is directed in statute to consider the impacts of building standards on indoor air pollution problems: it is inappropriate to consider energy efficiency measures alone, as indoor air quality could be impacted, and it is also inappropriate to consider indoor air quality alone as some approaches to indoor air quality can waste energy. Federal and State law directs the Energy Commission to either directly incorporate or to exceed requirements in national model energy codes (such as ASHRAE 62.1, 62.2, and 90.1), and all nationally recognized model codes address both

energy efficiency and indoor air quality. Staff therefore considered both proposed and existing building standards in light of new information about the effects of indoor particulate pollutants as a part of its consideration of new and amended standards for 2019, noting that filters meeting current MERV 6 and 8 requirements are only moderately effective at filtering out airborne particulates (PM₁₀) and are unable to capture or filter out fine particulates (PM_{2.5}).

Increasing ventilation rates increases energy use, both directly via increased fan use and indirectly via loss of conditioned air, whereas increased filtration can occur at a negligible impact on the performance of HVAC equipment and with no loss of conditioned air. In addition, research has shown that California outdoor air is mostly in non-attainment for fine and ultra-fine particles which can be brought into the home by ventilation, creating a feedback loop that substantially increases the amount of ventilation needed to improve indoor concentrations of PM₁₀ and PM_{2.5}. Staff therefore found increasing filtration requirements to be more energy efficient at addressing these issues than increasing ventilation rates.

Staff identified a MERV rating of 13 as being effective at filtering out fine particulate matter (PM_{2.5}) while also being available in a one inch form factor with a negligible effect on pressure drop compared to an average filter with the currently required MERV rating of six.

Staff further identified a need to ensure that HVAC systems are designed to accommodate higher MERV filters so that occupants with a need or desire for improved filtration that meet this need by installing such a filter are not inadvertently harming the energy efficiency, lifespan, or overall performance of their system by doing so. Staff found that when higher MERV filters are installed by occupants, they can potentially increase system pressure drop and reduce system energy efficiency – while some 1” MERV 13 filters exist that have comparable pressure drop to 1” MERV 6 filters, this was not true for all MERV 13 filters nor for filters at higher MERV ratings. Staff found that the industry already produces filters with greater surface area specifically to address pressure drop: by increasing filter depth and number of pleats, the total surface area of the filter is increased and the effects on system pressure decreased. Staff found that filters with the same pressure effects as a one-inch MERV 6 filter and higher MERV ratings are broadly available at a two-inch filter depth, increasing the breadth and depth of selections available to consumers.

In addition to the above, staff notes that individuals that are not able to meet their air filtration and IAQ needs via their HVAC system would be likely to use a supplementary or stand-alone (i.e., portable) air purifier, with an associated increase in energy use. Providing the ability to install high MERV filters into the building’s HVAC system avoids this unnecessary use of energy.

For these reasons, staff is proposing to raise the requirement for the initial filter installed for HVAC equipment to a MERV of 13, and to require that systems be able to accommodate a two-inch filter so that selection of higher (13 and above) MERV replacement filters does not decrease equipment efficiency. These changes are necessary to ensure that consideration and adoption of envelope requirements is not impeded by indoor air quality concerns, to ensure that selection of higher MERV replacement filters does not impede system energy efficiency, lifespan, or performance, and to avoid increases in energy use that would result from increased use of supplementary or stand-alone (i.e., portable) air filtration and purification devices.

Section 120.1(b)2A - The purpose of the changes in this section are to incorporate ASHRAE 62.2-2016 “Ventilation and Indoor Air Quality in Residential Buildings” by

reference, but with California amendments listed in the new amendments given in subsections 120.1(b)2Ai through vi as described below.

Section 120.1(b)2Ai – The purpose of this change is to specify the reliance of window operation is not a permissible method of providing ventilation to the dwelling unit. This requirement mirrors the same restriction that is currently in place for low-rise residential dwelling units. This change is necessary to ensure that mechanical ventilation is provided to the dwelling for compliance with the minimum ventilation air requirement.

Section 120.1(b)2Aii and Exception to Section 120.1(b)2Aii – The purpose of this change is to specify the use of continuous operation of central forced air systems air handlers for central fan integrated ventilation systems is not a permissible strategy of providing ventilation to the dwelling unit. Air handler fans consume a fair amount of energy and have been proven to be an energy intensive method of providing ventilation. Also, central integrated ventilation may not be effective for high-rise structures due to building pressure issues known as the stack effect, therefore not providing outside air to the dwelling. The purpose of this The Exception is to allow a design to be used if it is proven through the compliance option process that it can be achieved proper outside air flow in an energy efficient manner. These changes are necessary to ensure compliance with the minimum ventilation air requirement.

Section 120.1(b)2Aiii – The purpose of this change is to simplify the method for calculating the required mechanical ventilation airflow rate for horizontally attached single family dwelling units and horizontally attached dwelling units specified by ASHRAE62.2 by using a fixed default value based on a dwelling enclosure leakage rate of 2 air changes per hour at 50 Pa (0.2 inches water) (2ACH50). This was necessary in order to relieve the burden of mandatory field measurement of dwelling enclosure leakage for most dwellings.

Section 120.1(b)2Aiv – This subsection lists the amendments to ASHAE 62.2-2016, therefore the purpose of this change is to direct users of Part 6 to the filtration requirement of 120.1(b)1, which is more stringent than that of ASHRAE 62.2-2016. This change is necessary for consistency with 120.1(b)1.

Section 120.1(b)2Av – The purpose of this change is to specify the methods of mechanically ventilating high-rise dwellings; the reason for such specificity is because the effectiveness in delivering outside air to the dwelling unit differs between ventilation approaches. Broadly speaking, there are three ways to mechanically ventilate a space: you can supply air to the space, which adds new outside air and pressurizes the space; you can exhaust the air in the space, which depressurizes the space and causes air to be pulled into the dwelling from its surroundings; or you can balance supply and exhaust ventilation so that air is exchanged without creating a pressure differential. The proposed language recognizes that non-balanced ventilation approaches are potentially less effective than balanced ventilation at providing the intended benefits of ventilation to a multifamily dwelling sharing walls with other dwellings and indoor spaces, and therefore less energy efficient: because pressurizing a space means pushing depleted or polluted air into those adjacent spaces, and depressurizing a space means pulling depleted or polluted air in from adjacent spaces, if a non-balanced ventilation strategy is used there is a need to ensure that air exchange is with the outside and not with adjacent dwellings or indoor spaces, otherwise the energy used to move the air is wasted as indoor air quality is not improved.

Option one requires use of balanced ventilation systems that supply the same amount of outside air as they exhaust, thus minimizing any pressure differences between multifamily dwellings that could cause transfer of contaminated air between dwelling

units. Option 2 has a prerequisite requirement for the dwelling to be sealed to minimize leakage between adjacent dwelling units such that the enclosure leakage is less than 0.3 cubic feet per minutes at 50 Pa (0.2 inch water) per ft² of enclosure area as determined by a field test by a HERS Rater. If the enclosure complies with 0.3 cfm/ft² of enclosure surface area, when all dwelling units in the building utilize the same ventilation system type, the dwelling units may use supply ventilation, otherwise the dwelling units may use exhaust ventilation. This change is necessary to ensure that energy used for ventilation efficiently provides its intended benefit to indoor air quality and is not wasted on pulling or pushing depleted or polluted air back and forth between adjacent dwellings.

Section 120.1(b)2Avi – The purpose of this change is to require multifamily building central ventilation systems that serve multiple dwelling units to be balanced such that the airflow rate for every dwelling unit is greater than or equal to the rate specified by ASHRAE 62.2 section 4.1.1, but no more than 10 percent greater than the specified rate. The balancing means may include but are not be limited to constant air regulation devices, orifice plates, and variable speed central fans at the discretion of the system designer. The whole building pressure relationships between dwellings and other spaces is an extremely important characteristic that impacts the ventilation system ability to provide outside air to the space. This change is necessary to limit the impact of high differential pressures throughout the building, and avoid inadvertent impacts on indoor air quality.

Section 120.1(b)2B – The purpose of the change to this Section is to requires HERS verification of minimum airflow and the HVI certification status of the installed kitchen range hood to determine if the fan is rated in accordance with the specifications in ASHRAE 62.2. Field verification of minimum airflow was previously not a HERS verified measure under the 2016 Standards, however now that the 2019 Standards are regulating high-rise residential dwelling unit ventilation air similar to low-rise, the test methods must also be required for verification of minimum ventilation air. As for the kitchen range hood, the rating specifications were first adopted by reference to ASHRAE 62.2 in the 2008 version of CA Title 24, Part 6. This HERS verification intends to ensure compliance with the HVI ratings requirement in ASHRAE 62.2 which has generally been not well enforced. Indoor pollutants from cooking that is not adequately exhausted from a dwelling because of inadequate range hood performance have been identified by research as a significant danger to human health. These changes are necessary to ensure compliance with Part 6 requirements relating to residential range hoods, and for consistency with ASHRAE 62.2.

Section 120.1(c) - The purpose of the extensive changes to this Section is to include more current and more detailed requirements relating to Indoor Air Quality (IAQ), including filtration, expanding our current Table 120.1-A with more space types, and incorporating the Natural Ventilation Procedure and Exhaust Procedure of ASHRAE 62.1. The specific changes proposed for this Section include:

Section 120.1(c)1 - The purpose of the changes to this section and its subsections are to indoor air quality by increasing the air filtration particle size efficiency requirement from MERV6 to MERV13, and to specify 2-inch depth filters for improved filter airflow, otherwise allow for 1-inch depth filters if 0.1 inch w.c. pressure drop and 150 ft per minute face velocity for the filter is used for the design. Two more ventilation system types, supply ventilation systems and the supply side of balanced ventilation systems, are required to have air filtration though the filters are not required to be labeled. The term space conditioning systems was added to clarify that systems with thermal conditioning components are called space conditioning systems. The exception for evaporative coolers was moved to the end of section 1 for clarity.

There are tight relationships and interactions between building insulation and air

tightness requirements, ventilation requirements, and indoor air quality, so much so that the Energy Commission is directed in statute to consider the impacts of building standards on indoor air pollution problems: it is inappropriate to consider energy efficiency measures alone, as indoor air quality could be impacted, and it is also inappropriate to consider indoor air quality alone as some approaches to indoor air quality can waste energy. Federal and State law directs the Energy Commission to either directly incorporate or to exceed requirements in national model energy codes (such as ASHRAE 62.1, 62.2, and 90.1), and all nationally recognized model codes address both energy efficiency and indoor air quality. Staff therefore considered both proposed and existing building standards in light of new information about the effects of indoor particulate pollutants as a part of its consideration of new and amended standards for 2019, noting that filters meeting current MERV 6 and 8 requirements are only moderately effective at filtering out airborne particulates (PM10) and are unable to capture or filter out fine particulates (PM2.5).

Increasing ventilation rates increases energy use, both directly via increased fan use and indirectly via loss of conditioned air, whereas increased filtration can occur at a negligible impact on the performance of HVAC equipment and with no loss of conditioned air. In addition, research has shown that California outdoor air is mostly in non-attainment for fine and ultra-fine particles which can be brought into the home by ventilation, creating a feedback loop that substantially increases the amount of ventilation needed to improve indoor concentrations of PM10 and PM2.5. Staff therefore found increasing filtration requirements to be more energy efficient at addressing these issues than increasing ventilation rates.

Staff identified a MERV rating of 13 as being effective at filtering out fine particulate matter (PM2.5) while also being available in a one inch form factor with a negligible effect on pressure drop compared to an average filter with the currently required MERV rating of six.

Staff further identified a need to ensure that HVAC systems are designed to accommodate higher MERV filters so that occupants with a need or desire for improved filtration that meet this need by installing such a filter are not inadvertently harming the energy efficiency, lifespan, or overall performance of their system by doing so. Staff found that when higher MERV filters are installed by occupants, they can potentially increase system pressure drop and reduce system energy efficiency – while some 1” MERV 13 filters exist that have comparable pressure drop to 1” MERV 6 filters, this was not true for all MERV 13 filters nor for filters at higher MERV ratings. Staff found that the industry already produces filters with greater surface area specifically to address pressure drop: by increasing filter depth and number of pleats, the total surface area of the filter is increased and the effects on system pressure decreased. Staff found that filters with the same pressure effects as a one-inch MERV 6 filter and higher MERV ratings are broadly available at a two-inch filter depth, increasing the breadth and depth of selections available to consumers.

In addition to the above, staff notes that individuals that are not able to meet their air filtration and IAQ needs via their HVAC system would be likely to use a supplementary or stand-alone (i.e., portable) air purifier, with an associated increase in energy use. Providing the ability to install high MERV filters into the building’s HVAC system avoids this unnecessary use of energy.

For these reasons, staff is proposing to raise the requirement for the initial filter installed for HVAC equipment to a MERV of 13, and to require that systems be able to accommodate a two-inch filter so that selection of higher (13 and above) MERV replacement filters does not decrease equipment efficiency. These changes are

necessary to ensure that consideration and adoption of envelope requirements is not impeded by indoor air quality concerns, to ensure that selection of higher MERV replacement filters does not impede system energy efficiency, lifespan, or performance, and to avoid increases in energy use that would result from increased use of supplementary or stand-alone (i.e., portable) air filtration and purification devices.

Section 120.1(c)2 – The purpose of this change is to align with the Natural Ventilation Procedure of ASHRAE 62.1-2016, which includes assumptions for calculating spaces eligible to be naturally ventilated given their proximity to an operable opening to outdoors. The 2016 Standards allows for use of natural ventilation however, this procedure gives more detailed direction on how to calculate spaces that may be considered as naturally ventilated. This change is necessary to more accurately calculate space area and their proximity to outdoor openings for use of the natural ventilation procedure, consistent with Public Resources Code Section 25402.4.

Section 120.1(c)3 – The purpose of this change is to expand Table 120.1-A using the current ventilation rate calculations. The results of this change are to improve usability of Part 6 by giving users more direction of minimum ventilation rates per space type. Additionally, changes to the table identifies air classification per space type, which is referenced by Section 120.1(g) setting limits on transfer and recirculation of air based on air classification. This change is necessary in order to provide an improved level of granularity and specificity, and to reduce the need to perform calculations to determine minimum ventilation rates.

Section 120.1(c)4 – The purpose of this change is to expressly align with the Exhaust Ventilation procedure of ASHRAE 62.1-2016. The change is necessary to close a gap in Part 6's use of, and alignment to, ASHRAE 62.1.

These changes to 120.1(c) are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6, with the understanding that fine particulate pollutants are a health concern and that a MERV of 13 or above is necessary to effectively filter these particles out of indoor air. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

Sections 120.1(d)1-5 The purpose of these changes are to correct references to Sections that have changed citation numbers. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.1(d)3 – The purpose of the changes to this Section is to expand on the number of spaces having to comply with demand control ventilation as well as update all references to other Sections that have been re-numbered. Demand control ventilation has been a control requirement for spaces served by an air economizer, classified as high density and was either single zone or multi-zone with direct digital controls. The new requirement removes the qualifiers which results in more spaces becoming eligible for demand control ventilation. The analysis for this new requirement showed that it will save fan energy and cooling or heating energy by controlling the amount of air introduced to the space. This change is necessary to achieve those savings.

Section 120.1(d)5 – The purpose of this change is to remove the operating scheme for spaces that are required to comply with occupant sensor ventilation control. The new requirement for occupant controlled ventilation addresses the operating scheme in a different section rendering this scheme irrelevant. This change is necessary to avoid having overlapping and potentially conflicting requirements for occupancy control ventilation in certain spaces.

Section 120.1(e) and (f) - The purpose of these changes are to correct references to Sections that have changed citation numbers. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.1(g) – The purpose of this change is to add air classifications and recirculation limits for ventilation air. Currently the Standards do not give direction on these two concepts that may have a significant impact on indoor air quality; they are present in ASHRAE standards that are incorporated by reference, but are not directly stated in Part 6. The new requirement sets air classification based on Table 120.0-A and C. Based on the air class; the air can be transferred to other spaces in the building or must be exhaust. This change is necessary for designers to have direction on how to design the ventilation system.

Section 120.2(a) – The purpose of the change to this Section is to correct grammar, specifically to make consistent use of the word “and” in lists. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(b)4 – The purpose of the change to this this section is to correct a reference to requirements in Joint Appendix 5 (JA5) to instead refer to Section 110.12. This is necessary because JA5 has been revised, and the necessary requirements are now located in Section 110.12.

Exception to Section 120.2(b)3 – The purpose of the change to this Section is to add an Exception for systems serving healthcare facilities. This is necessary because the dead band may need to be smaller than 5°F in a healthcare facility.

Exception to Section 120.2(b)4 – The purpose of the change to this Section is to add an Exception for systems serving healthcare facilities. This is necessary because healthcare facilities are excepted from all demand management sections of the code in order to ensure the health and safety of patients.

Section 120.2(c) – The purpose of the changes to this Section are to update references to thermostat requirements to refer to 110.2(c) rather than 150.0(i). Section 150.0(i) itself only specifies compliance with Section 110.2(c), thus it improves the clarity of the requirement to refer directly to 110.2(c) rather than indirectly via 150.0(i). The changes therefore clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(e) – The purpose of the change is to establish occupancy sensing zone controls. This is a new requirement for the 2019 Standards and it uses the concept of occupied standby mode.

For space types identified as eligible to be in occupied standby mode according to the new Table 120.1-A and for which an occupancy sensor control is used to satisfy the lighting control requirement, the ventilation provided to the zone may be reduced to zero when the zone is unoccupied and within the system deadband. Changes to this section also include elimination of 2 exceptions, one being irrelevant due to Section 120.1(c)3 and 4 being deleted and the second being unnecessary since continuous operation is already exempted from 120.2(e)1,2 and 3.

The analysis for this new requirement showed energy savings. The analysis for this new requirement showed that it will save fan energy and cooling or heating energy by controlling the

amount of air introduced to the space. This change is necessary to achieve those savings. The changes to the exceptions were necessary to simplify verbiage. The change to the exception clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section 120.2(f) – The purpose of the change to the Exception to this Section is to simplify verbiage. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(g) – The purpose of the change to the Exception to this Section is to simplify verbiage. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(h) – The purpose of the change to this Section is to relocate its requirements to Section 110.12, as a part of consolidating all of the demand response and demand management requirements in a single Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(i) – The purpose of the changes to this Section is to extend existing Fault Detection and Diagnostic (FDD) requirements to mechanical cooling systems over 4.5 tons that incorporates an air economizer. Other changes to this section are to simplify phrasing, correct an error in Section numbering, and add an Exception to the requirement that FDD systems be certified to the California Energy Commission. In the analysis for this requirement to be extended to all cooling system types it was identified that certain FDD's have several people responsible for the operation of the FDD. The installing contractor, control contractor, FDD manufacturer or other may be responsible for the control algorithms and requiring certification of the control algorithms was not feasible, therefore the exception was necessary. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(j) – The purpose of the change to this Section is to update a Section reference to account for proposed amendments to Section 120.1. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.2(k) – The purpose of the change to this Section is to add an Exception for continuously operating equipment. Continuously operating equipment does not stop, and therefore requirements relating to stopping and restarting are unnecessary. This change is necessary to avoid applying this Section's requirement where it would serve no purpose and provide no benefit.

Exception 3 to Section 120.3 – The purpose of the change to Exception 3 to this Section is to remove the Exception as fully redundant with the list of applicable systems in Section 120.3(a). As none of the systems in Exception 3 are held to any requirements in this Section or its Subsections, this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria

of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.3(a) – The purpose of the changes to this Section are to clarify that the insulation requirements of Section 120.3 are minimum requirements, that the amount of insulation is based on normal operating temperatures and not temperatures that may theoretically occur under abnormal circumstances, and to clarify an ambiguity regarding refrigerant lines for heat pump space conditioning equipment when that equipment is operated exclusively in a heating mode. To the extent that the regulations could have been read as specifying an exact insulation amount, of requiring insulation based on temperatures other than normal operating temperatures, or of allowing refrigerant lines of heat pump equipment to be without insulation in certain circumstances, these changes would have the material effect of allowing additional insulation, requiring only the minimal insulation specified for normal operating temperatures, and requiring insulation of heat pump refrigerant lines, respectively. The change is necessary to preclude this unintended reading of this Section’s requirements.

Section 120.3(b) – The purpose of the changes to this Section are to standardize insulation protection requirements between residential and nonresidential buildings, clarify that if the outer surface of the insulation provides the required protection that an additional cover is not needed, and to make nonsubstantive improvements to the grammar of the Section’s language. The changes have the substantive effect of prohibiting use of adhesive tape as a Class I or Class II vapor retarder, and of requiring that pipe insulation buried below grade be installed in a water proof and non-crushable casing or sleeve. To the extent that the regulations could have been understood as requiring a separate cover when the insulation either is itself or integrates a surface layer that provides the required level of protection against water and sunlight, the changes also have the substantive effect of removing the requirement for a separate and redundant cover, and are necessary to avoid requiring installation of redundant coverings. These changes are otherwise necessary to ensure that pipe insulation is installed with protective features that ensure and preserve its long-term performance, and to create consistency between residential and nonresidential requirements.

Section 120.3(c); Table 120.2-A – The purpose of the changes to this Section and associated Table are to clarify that the insulation requirements of Section 120.3 are minimum requirements, and to provide equivalent R-values so as to support flexibility in the use of materials with differing thermal properties. As the R-values are calculated according to the equation already specified in this Section, the addition of these values does not have a substantive effect. To the extent that the regulations could have been read as specifying an exact insulation amount, these changes would have the material effect of allowing additional insulation to be installed, and are necessary to preclude this unintended reading. These changes otherwise clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.4 – The purpose of the change to this Section is to add an Exception for systems serving healthcare facilities. This change is necessary to appropriately recognize and incorporate reference to the Mechanical Code Sections that apply to healthcare facilities, and prevent any conflict between these requirements and those of Section 120.4.

Section 120.4(a) – The purpose of the changes to this Section are to remove unnecessary verbiage, including a parenthetical statement that has no regulatory effect. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.5 – The purpose of this exception is to exempt licensed healthcare facilities from

compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as potentially not cost effective when applied to a healthcare facility. Licensed healthcare facilities are permitted and built under the close supervision and continuous inspection of the Office of Statewide Health Planning and Development (OSHPD), and the requirements of this section would likely duplicate existing testing and certification requirements under OSHPD. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 120.5(a) – The purpose of this change is to add a reference to a new Acceptance Test for verifying occupant sensors and ventilation controls comply with the intent of the new Occupant Sensing Zone Control requirement of Section 120.2(e)3. This change is necessary to trigger Acceptance Testing which is vital in ensuring the ventilation controls scheme correctly delivers or reduces ventilation to the zone, which has both energy savings and indoor air quality implications.

Section 120.6(a)4 – The purpose of the changes to this Section are to incorporate appropriate standards for adiabatic condenser equipment, thereby allowing their use under Part 6 and broadening the options for energy efficient equipment available to California builders. Establishing efficiency standards for adiabatic equipment is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402, and to prevent Part 6 from inadvertently fully restricting the use of such equipment in California.

Section 120.6(b) – The purpose of the changes to this Section are to appropriately scope the application of this Section only to equipment not otherwise subject to State or federal appliance efficiency requirements, and to incorporate adiabatic equipment consistent with the change proposed for 120.6(a)4. Establishing efficiency standards for adiabatic equipment is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402, and to prevent Part 6 from inadvertently fully restricting the use of such equipment in California. Harmonizing with State and federal appliance efficiency standards is necessary to prevent inadvertent conflict between requirements, and to avoid preemption by federal appliance regulations.

Section 120.6(e) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as both having the potential to interfere with the primary health and safety responsibilities of healthcare facilities due to stringent specifications on medical gas distribution systems, and potentially not cost effective when applied to a healthcare facility. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 120.6(f) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since occupancy sensors could fail to detect unconscious patients left alone in an elevator, potentially harming such a patient. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 120.6(f)1 – The purpose of the change to this Section is to add an Exception clarifying that signal and display lighting internal to elevators are not intended to be included in calculations of lighting power density. To the extent the regulations could have been understood to require including this lighting in calculations of lighting power density, this change has the substantive

effect of allowing this lighting to be omitted from such calculations, and this change is necessary to prevent inappropriate inclusion of this energy in lighting calculations. This change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.7(a)3 – The changes to this Section improve grammar by breaking up a run-on sentence into several separate sentences. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.7(c)3 – The changes to this Section insert the term “on grade” in order to clarify that only heated slab floors in contact with the ground are required to be insulated. Heated slab floors on higher floors of a building are not exposed to exterior temperatures, thus removing the need for insulation. This change has the substantive effect of preventing this Section from requiring insulation where its benefit would be negligible, and is necessary to prevent requiring insulation where the cost of installation is unlikely to be offset by its energy demand benefits.

Section 120.8 – The purpose of the change to this Section's title is to correct punctuation. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 120.8(g) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with the functional performance testing portion of building commissioning. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as potentially not cost effective when applied to a healthcare facility. Licensed healthcare facilities are permitted and built under the close supervision and continuous inspection of the Office of Statewide Health Planning and Development (OSHPD), and the requirements of this section would likely duplicate existing testing and certification requirements under OSHPD. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

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

Section 130.0(b) – The purpose of the changes to this Section are to correct grammar and improve phrasing. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c) – The purpose of the changes to this Section are to redraft the language of the Section to improve clarity and streamline its application to various lighting designs and equipment, as well as to include substantive changes to allow use of lamp efficiency in calculation of lighting power density and to extend provisions for track lighting to more generally cover modular lighting systems and equipment. The substantive changes are necessary to ensure the Standards encompass modern, modular LED systems and to allow the use of energy efficient lamps for compliance. Specific changes for each Subsection are as follows:

Section 130.0(c)1 – The purpose of the change to this Section is to remove its heading. This

change is necessary for consistency with the other Subsections to Section 130.1(c), which do not have headings.

Section 130.0(c)2 – The purpose of the change to this Section is to allow consideration of lamp wattage in recessed screw-base sockets when the lamps populating those sockets comply with Joint Appendix 8. This change is necessary to provide flexibility to lighting designers.

Section 130.0(c)3, 4, and 5 (removed) – The purpose of removing these Sections, and renumbering subsequent Sections, is to remove language that is specific to a presumed use of incandescent lamps where a socket exists that could accommodate such lamps. As the other changes to this Section now evaluate the installed lamps, language relating to categorizing populated fixtures based on their sockets instead of the populating lamps is not necessary, and would conflict with those provisions. Removing these Sections is necessary to allow consideration of the efficiency of installed lamps, consistent with the other changes to this Section.

Section 130.0(c)6 (now 3) – The purpose of the change to this Section is to separate language pertaining to LED lighting into separate Sections (Section 130.0(c)4 and 5), retaining the language and requirements that pertain to ballasted light sources (i.e., fluorescents). This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(c)4 (new) – The purpose of adding this Section is to separate language pertaining to inseparable solid state lighting from that pertaining to fluorescent lighting and that pertaining to LED strip lighting, and to incorporate the UL 2108 test procedures that may be used to determine the rated power consumption of this type of lighting. Addition of the UL test procedure is necessary to ensure that the list of tests used in industry to rate power consumption is complete, and is applicable to all types of lighting that may be found in a nonresidential setting. The change to separate this provision into its own Section clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)5 (new) – The purpose of adding this Section is to provide language that is specific to LED tape lighting or strip lighting, and to incorporate the UL 2108 test procedures that may be used to determine the rated power consumption of this type of lighting. Addition of the UL test procedure is necessary to ensure that the list of tests used in industry to rate power consumption is complete, and is applicable to all types of lighting that may be found in a nonresidential setting. The change to separate this provision into its own Section clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)6 (previously 7) – The purpose of the change to this Section is to update this Section to apply to modular lighting systems generally and not solely to track-based systems, to allow recognition of installed lamps, and to merge in similar requirements for modular low-voltage systems stated in Section 130.0(c)8. This change is necessary to apply consistent requirements to modular lighting systems of several kinds, including LED systems with extremely varied form factors and other lighting that may not make use of a traditional track or busway, and to present requirements for modular lighting in a clear, consistent, and technology neutral manner.

Section 130.0(c)8 (removed) – The purpose of the removal of this Section is to simplify requirements for “low voltage” lighting systems, meaning systems where an upstream transformer lowers voltage and may also convert that voltage to direct current prior to delivery to the luminaires via the lighting circuit. The prior Subsections to Section 130.0(c) are proposed to be

amended to remove distinction between “line voltage” and “low voltage” systems, and thus cover these types of products equivalent to other lighting. This change is necessary to make the requirements of Section 130.0 more technology neutral and to ensure equivalent treatment of low-voltage lighting systems.

Section 130.0(c)9 (removed) – The purpose of the removal of this Section is to simplify requirements for LED lighting. Section 130.0(c)2 covers light fixtures populated with LED lamps, 4 and 5 cover integrated SSL fixtures and strip lighting, respectively, and 6 covers modular LED systems, making this Section redundant. This change is necessary to remove redundant language and prevent conflict between this Section and proposed new Sections relating to LED light sources.

Section 130.0(c)7 (previously 10) – The purpose of the change to this Section is to reduce redundancy in its phrasing and improve its clarity, and to add reference to UL 8750 to be complete in referencing UL tests that may apply to lighting that would be subject to this Section. Addition of the UL test procedure is necessary to ensure that the list of tests used in industry to rate power consumption is complete, and is applicable to all types of lighting that may be found in a nonresidential setting. The improvements to phrasing are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

The nonsubstantive improvements in clarity are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)2 – The purpose of the change is to modify the method of determining wattage of luminaires with lamp holders that do not contain permanently installed ballasts, drivers, or transformers. This change has the substantive effect of allowing either the rated wattage of the luminaire or wattage of installed lamps to be the wattage of the luminaire in calculations of installed lighting power.

Section 130.0(c)3 – The purpose of the change is to delete the subsection about luminaires and luminaire housing designed to accommodate trims or modular components that can convert a screw based luminaires to be fitted with a LED Light Engine. LED trim kits are now more efficacious than the legacy incandescent lamps and also have longer rated life. Also, the installation of a LED trim kit to a screw-based luminaire can convert the luminaire to be a long-lasting, energy efficient luminaire. This change has the substantive effect of allowing the use of LED lighting efficacy in calculations of installed lighting power. The change are necessary to ensure the Standards encompass modern, modular energy-efficient LED for compliance to the Standards.

The other purpose of the change is to move existing requirements about luminaires with permanently installed or remotely installed ballasts or drivers to this section, and to add a clarifying phrase “fluorescent, High Intensity Discharge (HID), and induction” to the term, “luminaires”. The change clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve the code’s compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)4 – The purpose of the change is to delete the subsection about screw-based adapters and this change has the substantive effect of allowing the installation of LED trim kits to

a screw-based luminaire. The change is necessary to ensure the Standards encompass modern, modular energy-efficient LED for compliance to the Standards.

The other purpose of the change is to add a new subsection about the method of determining wattage of inseparable solid state lighting (SSL) luminaires and SSLs that are not reliant on luminaires. This change has the substantive effect of allowing the use of LED lighting efficacy in calculations of installed lighting power. The change are necessary to ensure the Standards encompass modern, modular energy-efficient LED for compliance to the Standards.

Section 130.0(c)5 – The purpose of the change is to delete the subsection about luminaires and luminaire housing with incandescent screw base sockets and this change has the substantive effect of allowing the installation of modular LED lighting and other modular lighting technologies. The change are necessary to ensure the Standards encompass modern, modular energy-efficient LED for compliance to the Standards.

Another purpose of the change is to redraft the language of the Section to improve clarity and streamline application, and include substantive change to the allowed lighting power for lighting systems with lighting tracks, plug-in busways, line-voltage track lighting integral current limiters, track lighting supplementary overcurrent protection panels, drivers, power supplies, and transformers.

Section 130.0(c)5A – The purpose of the change is to update the lighting power allowed for track and plug-in busway to correspond to the similar lighting power allowed in ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)092) grants State and local government the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that the building codes do not exceed the minimum efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Another change is to move the requirement of accounting for wattages of all luminaires in the system to this section. The change clarify without materially altering the requirements in the Draft Express Terms and are necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)5B – The purpose of change to this Section is to add the lighting power allowed for lighting systems with line-voltage track lighting integral current limiter or track lighting supplementary overcurrent protection panel. This change has the substantive effect of referring to the manufacturer's documentation for the rated wattage or using a calculation method to determine wattage of the line-voltage track lighting integral current limiter or track lighting supplementary overcurrent protection panel. The change is necessary to improve clarity and streamline application of the two sections for the track lighting current limiter and overcurrent protection panel into one section.

Section 130.0(c)5C – The purpose of the change to this Section is to move the requirement for modular lighting system with transformer to this section. The other change is to add driver and power supply along with transformer as modular lighting systems can have driver or power supply for providing input power. The change clarifies without materially altering the requirements in the Draft Express Terms, and are necessary to improve the code's compliance with clarity and

consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)6 – The purpose of the change to this Section is to move the method of determining wattage for all other lighting to this section. The change clarifies without materially altering the requirements in the Draft Express Terms, and are necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)7 – The purpose of the change to this Section is to delete the subsection and include the requirements about line-voltage lighting track and plug-in busway and to move the requirements to other sections of the Standards. The change is necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)8 – The purpose of the change is to delete the subsection about luminaires and lighting systems with permanently installed or remotely installed transformers, to move the requirements to other sections of the Standards. The change is necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(c)9 – The purpose of the change is to delete the subsection about LED luminaires and LED Light Engine as the requirements for Solid State Lighting (SSL) luminaires, SSL and other SSL lighting are re-organized and re-drafted into other sections of the Standards. The change are necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(d) – The purpose of the change in this Section is to add reference to 130.1 and 130.2, as both of these Sections also include provisions that apply to lighting controls. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.0(e) – The purpose of the changes in this Section is to add reference to 130.1 and 130.2, as both of these Sections also include provisions that apply to lighting controls, and to correct the internal numbering of the Section. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1 – The purpose of the change to this Section is to add reference to Sections 110.9 and 130.0, as both Sections have provisions that relate to lighting controls. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(a) – The purpose of the changes to this Section are to improve the readability and enhance the clarity of the Section's language, to add healthcare facilities to an existing Exception relating to the location of controls, and to add a separate exception related to restrooms and bathrooms in healthcare facilities to Section 130.1(a)2. These changes to the Exceptions are

necessary to appropriately incorporate healthcare facilities into Part 6 and ensure controls are not required to be installed in inappropriate locations; each is described in more detail below. The remaining changes to the Section are not substantive; they clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(a)2, EXCEPTION 1 – The purpose of the change to this Exception is to include psychiatric and secure areas in healthcare facilities in areas where the controls may be located outside of the controlled area. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, and area lighting controls (light switches) must be located where only authorized users have access to them in these types of healthcare settings.

Section 130.1(a)2, EXCEPTION 2 – The purpose of adding this exception is to exempt single-occupant restrooms and bathing rooms in healthcare facilities from control location requirements. This exception is necessary because patient rooms in healthcare facilities are commonly designed with restrooms that double as bathing areas, and the area lighting controls (light switch) must be allowed to be placed in a safe, dry area but still within reach of the user or caregiver.

Section 130.1(b) – The purpose of the changes to this Section are to improve the readability and enhance the clarity of the Section's language, and to add two new Exceptions, one for restrooms and one for healthcare facilities. Note that the provisions in two of the Exceptions have been moved to Table 130.1-A, and the provisions relating to the interactions of multilevel controls with other controls have been moved to Section 130.1(f). The addition of the Exceptions for restrooms and healthcare facilities are described below. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 2 to Section 130.1(c) – The purpose of adding this Exception is to facilitate proposed occupant sensing requirements for restroom lighting. Recent advancements in occupant sensing technology have overcome prior concerns about detection of occupants in stalls, therefore staff are proposing to require occupant sensing rather than dimming in restrooms given that automatic shutoff of lighting while the restroom is unoccupied has a greater potential for energy savings than dimming of restroom lighting (which rarely if ever occurs). This change is necessary to support the proposed change to a more energy saving and cost effective baseline control strategy in restrooms.

Exception 3 to Section 130.1(c) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as duplicating, and potentially conflicting, with existing requirements for healthcare facilities contained in California Electrical Code 517. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 130.1(c) – The change to this Section adds an explanatory sentence to its header for consistency with the other Subsections of Section 130.1. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(c)2 – The change to this Section incorporates the two Exceptions directly into the Section, simplifying the language of the Section. The change clarifies without materially altering

the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(c)5 – The change to this Section adds restrooms to the areas required to have occupancy sensing controls. This change is responsive to advances in occupant sensing control technology that accurately determine occupancy even with the presence of restroom stalls, and is consistent with a finding that automatic shutoff in restrooms has a greater potential for energy savings than allowing restroom lighting to be dimmed. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception 1 to Section 130.1(c) – The purpose of this exception is to exempt licensed healthcare facilities from the requirement for Shut-OFF lighting controls (occupancy sensors). This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since occupancy sensors could fail to detect unconscious patients left alone, potentially harming such a patient. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Exception 2 to Section 130.1(c) – The purpose of the addition of this Exception is to harmonize the automatic shutoff requirements of Section 130.1(c) with the minimum egress illumination requirements of California Building Code Section 1008. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(d) – The purpose of the changes to this Section are to improve the readability and enhance the clarity of the Section's language, to amend a requirement that all photosensors be located in non-readily-accessible locations to instead require at least one photosensor in a non-readily-accessible location, and to add Exceptions to address circumstances where daylighting would be ineffectual or problematic. Note that the definitions for "Skylit Daylit Zone", "Primary Sidelit Daylit Zone", and "Secondary Sidelit Daylit Zone" were moved to Section 100.1, Definitions; their removal from this Section is a nonsubstantive change.

The proposed Section 130.1(d)4 specifies that at least one photosensor shall be located so that they are not readily accessible to unauthorized personnel, rather than all photosensors. This change is necessary to prevent inadvertently restricting or prohibiting lighting products that include an integrated photosensor, which is not the intent of the provision.

The proposed Exceptions 1 and 2 address circumstances where sunlight is blocked by an outside object, such that although the area is a daylit area, it will receive a significantly reduced amount of daylight. Adding Exceptions 1 and 2 is necessary to prevent daylighting controls from being installed where they would be ineffectual at saving energy.

The proposed Exception 6 addresses the need for uniform lighting in merchandise sales and wholesale showroom areas. The addition is necessary to address concerns regarding lighting gradients where merchandise is displayed in a sidelit daylit area.

The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(e) – The purpose of the change to this Section is to move demand response requirements into Section 110.12, consistent with the effort to consolidate all demand response requirements in a single Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.1(f) – The purpose of the change to add Section 130.1(f) is to consolidate and clarify the expected interactions between the controls required to be installed by Section 130.1. While the majority of the specifications in this Section are either relocated from the preceding Sections, or implied by the requirements of those Sections, this Section could be understood to have the substantive effect of applying additional specificity to the required interactions of these controls. The addition of this Section is necessary to ensure that the benefits of installed lighting controls are fully realized, to prevent control operation from becoming antagonistic, to prevent confusion on the part of the lighting system designer or installer, and to ensure complete control of the lighting system is available to building operators.

Table 130.1-A – The purpose of the change to this Table is to relocate Exceptions previously stated in Section 130.1(b), that are specific to the minimum control step requirements of this Table. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.2(a) – The purpose of striking this Section is to remove a requirement applicable to incandescent luminaires that is redundant with the requirements applicable to all lighting, irrespective of technology, stated in Section 130.2(c). The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.2(b), Table 130.2-A and B – The purpose of the change to this Section and its associated Tables is to remove language that is redundant with the requirements of the referenced Section of Part 11, and to rely solely on the lumen threshold and remove the wattage threshold. The change to remove the wattage threshold is necessary to account for LED technology and ensure technology neutrality in this Section’s application. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.2(c) – The purpose of the changes to this Section are to improve the readability and enhance the clarity of the Section’s language, to reduce stated wattage thresholds to account for low-wattage LED lighting, and to remove specific reference to Outdoor Sales Frontage, Building Façade, Ornamental Hardscape, and Outdoor Dining lighting where compliance with general requirements would also cause this lighting to comply with its more specific requirements, making the specific requirements redundant with the general requirements. The term “automatic scheduling control” is used in place of the prior term “part-night control”, and its required behavior is specified in the Section rather than in a separate definition. The changes have the substantive effect of lowering the threshold for separately control from 1500 watts to 800 watts, and the minimum wattage threshold for pole-mounted luminaires from 75 watts to 50 watts. The changes otherwise clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 3 to Section 130.2(c)3 – The purpose of adding this Exception is to account for circumstances where a tree or other obstruction would thwart the operation of motion sensors. This change is necessary to avoid requiring installation of sensors in locations where they are physically unable to function.

Section 130.3 – The purpose of this exception is to exempt licensed healthcare facilities from compliance with sign lighting controls requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since sign lighting in a healthcare setting is necessary for directing emergency response in potentially in situations where delay or confusion could harm patients. In addition, the measure may not be cost effective when applied to a healthcare facility since they operate continuously. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 130.3(a)1 – The purpose of the change to this Section is to exclude exit sign lighting from requirements for sign lighting to be controlled by time-switch controls. This change is necessary to prevent time-switch controls from shutting off exit sign illumination while occupants are still present in the building.

Section 130.3(a)3 – The purpose of the change to this Section is to move demand response requirements into Section 110.12, consistent with the effort to consolidate all demand response requirements in a single Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.4 – The purpose of the change to this Section is to ensure consistency with inspection requirements for healthcare facilities overseen by the California Office of Statewide Health Planning and Development. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 130.5(a) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as duplicating, and potentially conflicting, with existing requirements for healthcare facilities contained in California Electrical Code 517. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both

Section 130.5(b) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as duplicating, and potentially conflicting, with existing requirements for healthcare facilities contained in California Electrical Code 517. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 130.5(d) – Exception 2 – The purpose of this exception is to exempt licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as either having the potential to interfere with the primary health and safety responsibilities of healthcare facilities, since controlled receptacles could accidentally be

used for medical equipment that could then be shut off in a way that could harm patients. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 130.5(e) – The purpose of the change to this Section is to move demand response requirements into Section 110.12, consistent with the effort to consolidate all demand response requirements in a single Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

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

Section 140.0 – The purpose of the change to this Section is to update the reference to Section 110.0 to refer to the final Subsection of Section 110, which is now 110.12. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.1 – The purpose of the change to this Section is to correct two issues of terminology: there is now a single ACM Approval Manual applicable to both residential and nonresidential software, and the language in Section 140.1(a) is corrected to match its Title. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.2 – The change to this Section is to improve the simplicity and clarity of the Section by removing unnecessarily specific references to the remainder of the Subsections of Section 140. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.3 – The purpose of the change to this Section is to add reference to Subsection (d), consistent with the addition of this new Subsection. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.3(a)1 – The purpose of the change to this Section is to remove unnecessary verbiage from two Exceptions. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.3(a)3 – The purpose of the change to this Section is to specify that windows in demising walls are only subject to insulation requirements when they occur between conditioned and unconditioned spaces, and are not subject to solar heat gain requirements. This change is necessary to ensure that windows not subject to temperature differentials or solar exposure are not required to incorporate thermal features that will not provide benefits.

Section 140.3(a)5 – The purpose of the changes to this Section and its Subsections are to improve phrasing and terminology use, including using “windows” and “glazing” in place of “fenestration” given that the Section is specific in applying to “vertical windows” and not other

types of fenestration. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.3(a)6 – The purpose of the changes to this Section and its Subsections are to improve phrasing and terminology use, including using “glazing” in place of “skylights” where the term is used in relation to chromogenic glazing. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table 140.3-B – The purpose of the change to this Table is to add appropriate values for plastic curb-mounted skylights and tubular daylighting devices. This change is necessary to allow prescriptive installation of this equipment under Part 6, rather than requiring performance modeling.

Section 140.3(d), Table 140.3-D, Equation 140.3-D – The purpose of the addition of this Section and its associated Table and Equation is to provide power adjustment factors (PAFs) to daylighting equipment that has the effect of reducing electrical lighting loads by increasing use of natural light. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 140.3(d)1 – The purpose of the change to this Section is to add a new subsection of performance requirements for clerestories as one type of qualified daylighting devices allowed for power adjustable factors for indoor lighting. Installation of clerestory has an effect of increase in head height and an increase of the daylit zone. The installation of clerestory coupled with automatic daylighting controls serving the associated daylit zones can provide energy savings which in turn can improve the state's economic and environmental health.

Section 140.3(d)2 – The purpose of the change to this Section is to add a new subsection of performance requirements for interior and exterior horizontal slats as one type of qualified daylighting devices allowed for power adjustable factors for indoor lighting. Installation of clerestory has an effect of increase in head height and an increase of the daylit zone. The installation of interior and exterior horizontal slats coupled with automatic daylighting controls serving the associated daylit zones can provide energy savings which in turn can improve the state's economic and environmental health.

Section 140.3(d)3 – The purpose of the change to this Section is to add a new subsection of performance requirements for interior and exterior light shelves as one type of qualified daylighting devices allowed for power adjustable factors for indoor lighting. Installation of clerestory has an effect of increase in head height and an increase of the daylit zone. The installation of interior and exterior light shelves coupled with automatic daylighting controls serving the associated daylit zones can provide energy savings which in turn can improve the state's economic and environmental health.

Section 140.4 – The purpose of the change to this Section is to correct reference to the final Subsection of the Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.4(a) and (b) – The purpose of the changes to these Sections are to correctly address healthcare facilities following their inclusion into the Scope of Part 6, to remove redundant reference to use of approved software, and to make nonsubstantive improvements to clarity. As

healthcare facilities are already held to the requirements of the California Mechanical Code noted for this Section, and the Section does not require installation of the “smallest size” equipment as it does for other building types, this Section does not impose alternate requirements for determining mechanical load and only serves to require that such calculations be performed. Such calculations are necessary to determine the level of ventilation required, and thus the minimum size of equipment needed to achieve that level of ventilation. The changes to improve clarity, including removal of the “Methodology” Subsection, clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.4(c) – The purpose of the change is to set new fan power limits for fan systems over 5 horsepower. The new requirement is in direct alignment with the fan power limits of ASHRAE 90.1-2016, which according to the analysis, results in energy savings due to higher efficiency fan systems. This change is necessary to achieve those savings.

Section 140.4(d) – The purpose of the changes to this Section are to incorporate Exception 1 directly into Section language and, in so doing, improve the clarity of this Section’s requirements. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 5 to Section 140.4(d) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with space-conditioning zone control design requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.4(e)1, Table 140.4-C– The purpose of this change is to extend the economizing requirement to mechanical cooling systems that do not incorporate a fan system. These chilled water systems that do not use an indoor fan still benefit from water economizing as shown in the analysis. Table 140.4-C lists the system capacities where water economizing is feasible. Another change to this section is to eliminate reference to a calculation method approved by the Commission, which already detailed by Section 140.4(b). The changes to incorporate chilled water cooling systems and chilled water economizing are necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 140.4(e)1 and 2, Tables 140.4-D through F The purpose of the changes to these sections is to correct section references and consolidate all the air economizer requirements into a single section. Adding an exception for intrinsically “economizing” systems is necessary to prevent installation of economizing equipment in circumstances where it will provide no added benefit. Correcting Section numbering clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.4-(e)3 - The purpose of the change to this Section is to add specifications for chilled water economizing to eliminate or highly reduce the impact to the pumping power for an added heat exchanger and piping of a water economizer, to add an Exception to systems that are designed to operate at 100 percent outside air at all times and thus are effectively “economizing”

at all times, and to correct Section numbering. The changes chilled water economizing are necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 140.4(f) – The purpose of the change to this Section is to remove an example that is not intended to be regulatory, and thereby remove a risk of confusion. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 1 to Section 140.4(f) – The purpose of the change to this Exception is to align with the change to Section 140.4(d) that moved its Exception 1 into the Section language and renumbered its Exception 2 to Exception 1. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 4 to Section 140.4(f) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with supply air temperature reset control requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirement necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Exception 5 to Section 140.4(g) – The purpose of the change to this Exception is to avoid duplication with an added definition for “natural gas availability” that contains these specifications. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 6 to Section 140.4(g) – The purpose of adding this Exception is to exempt emergency backup systems from the prohibition on electric resistance space heating. This change is necessary to avoid prohibiting, based on efficiency, equipment that by definition will only see use for an extremely limited amount of hours, and will be used during emergency situations where the ability to operate on electric resistance may provide specific benefits.

Section 140.4(h) – The purpose of the changes to this Section are to add an efficiency requirement for cooling towers, with appropriate exceptions, and to absorb the “Scope” Subsection upward into Section 140.4(h) for consistency with the organization of other Sections of Part 6. The rationale for the specific prescriptive efficiency requirements proposed for cooling towers is a reduction in energy consumption due to a more efficient tower's ability to reject heat. The changes to add prescriptive efficiency requirements for cooling towers are necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402. The changes to Section organization and numbering clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 3 to Section 140.4(j) – The purpose of the changes to this Section's Exceptions are to remove an Exception that is fully redundant with the portion of Part 1 that it references, and to add an Exception found to be necessary for healthcare facilities. Part 1 Section 10-109 lays out a general framework for determining “alternate component packages” that applies to the entirety of

Part 6, and thus reference to this Section is not needed as an Exception to Section 140.4(j). Removing this Exception is necessary to prevent confusion; it also clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. For the added Exception for healthcare facilities, the purpose is to exempt licensed healthcare facilities from the limitation on air-cooled chillers for chilled water plants. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as either having the potential to interfere with the primary health and safety responsibilities of healthcare facilities, or the potential to not be cost effective when applied to a healthcare facility. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.4(k)4 - The purpose of this exception is to exempt licensed healthcare facilities from compliance with the chilled and hot water temperature reset controls requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but healthcare facilities have specific hot and chilled water needs to support health and safety, and this requirement has been identified as either having the potential to interfere with the health and safety of patients. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.4(l) – The purpose of the changes to this Section is to appropriately refer to and incorporate the duct sealing requirements applicable to healthcare facilities, consistent with the incorporation of healthcare facilities into the Scope of Part 6. As these requirements are already applicable to healthcare facilities, the changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.4(m) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with the fan control requirements of this section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Table 140.4-D – The purpose of the change to this Table is to update its numbering, consistent with changes to prior Tables. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 3 to Section 140.4(n) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with mechanical conditioning system shut-off requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

EXCEPTION 4 to Section 140.4(n) – The purpose of this change is to exclude high-rise

residential dwelling units from having to comply with mechanical system shut off controls. The analysis for this particular requirement did not include residential spaces rather it focused on commercial spaces as being applicable for this control scheme. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.4(o) – The purpose of the addition of this Section is to limit the conditioned supply air delivered to spaces with mechanical exhaust, with appropriate Exceptions to the proposed limits. This particular requirement is completely design focused and informs designers of the proper way of providing air for exhaust air makeup. Limiting the delivery of conditioned supply air to spaces with mechanical exhaust is necessary to prevent waste of conditioned air, and thus waste of the energy used to condition that air, i.e., it is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception 5 to Section 140.4(o) – The purpose of this exception is to exempt licensed healthcare facilities from compliance with conditioned supply air mechanical exhaust limitations. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.5 – The purpose of the change to this Section is to add an Exception to solar fraction requirements for buildings of eight stories or greater. This change is necessary to prevent solar fraction requirements from applying to buildings where the ratio of roof area to building size makes the required solar fraction technically infeasible.

Section 140.6 – The purpose of the change to this Section is to clearly state in the immediate Section the “use it or lose it” nature of prescriptive lighting allowances. While this is reflected in the language within the Subsections of this Section, it is easily overlooked and not clearly highlighted. The change to state this here clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6: The purpose of the change to the Section and Subsections is to rename the lighting power from “Actual Indoor Lighting Power” to “Adjusted Indoor Lighting Power” to clarify that installed indoor lighting power could be de-rated for power adjustment factors and tailored method lighting mounting height adjustment factor, and ensure appropriate distinction between Section 130.0, which determines the lighting power represented by the proposed equipment, and 140.6 which applies further adjustments to this amount. The change is necessary to improve the code's compliance with the clarify 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(a) The purpose of the change to the referenced section is to renumber it where it is appropriate. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

EXCEPTION to Section 140.6(a): The purpose of the change is to remove the lighting wattage allowance for portable lighting in office areas in the form of exception to Section 140.6(a) as the

portable lighting power is provided as additional lighting power in the updated and modified Table 140.6-C. This Exception to Section 140.6(a) is no longer needed in this form of an Exception to Section 140.6(a). This change is necessary to clarify the Standards.

Section 140.6(a)3: The purpose of the change to the section is to delete “density” from the phrase, “actual indoor lighting power density”, as it is “actual indoor lighting power” in comparison to “the watts” and density is not a correct comparison to watt. This change is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(a)3E: The purpose of the change to the section is to add “coolers” as part of the phrase, “walk-in coolers or freezers” as there are walk-in coolers in addition to walk-in freezers. This change is necessary to maintain consistency between Title 24 Part 6 and Title 20.

Section 140.6(a)3F: The purpose of the change to the section is to modify the existing term, “medical and clinical buildings” to the new term, “office buildings with medical and clinical areas and healthcare facilities”. This change to add healthcare facilities for lighting wattage excluded corresponds to the new healthcare facility-specific measure for the 2019 code cycle. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resource Code Section 25402.

Section 140.6(a)3V: The purpose of the change is to add a subsection for the lighting connected to life safety power or critical branch power in healthcare facilities. This change to add healthcare facilities for lighting wattage excluded corresponds to the new healthcare facility-specific measure for the 2019 code cycle. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resource Code Section 25402.

Section 140.6(a)4: The purpose of the change is to add “Adjustment” to the heading to better differentiate it from a similar heading in Section 130.0(c), and make it clear to the reader that this Section provides a further adjustment to the luminaire power determined in that Section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(a)4A: The purpose of the change is to number the subsection. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(a)4B: The purpose of the change is to add a new subsection for additional lighting power allowed for qualifying small aperture tunable-white and dim-to-warm luminaires. This additional lighting power enable the use of qualifying small aperture tunable-white and dim-to-warm luminaires as the efficacy of white-tunable and dim-to-warm LED luminaire products is usually lower than that of fixed-white LED luminaires at this time. This change is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(a)4C: The purpose of the change is to add a new subsection for tailored method wall display lighting and floor display lighting. This requirement about calculation of actual lighting power for wall display lighting and floor display lighting corresponds to the lighting power allowance in Section 140.6(c)3G and H. The change clarifies the Standards and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)2A: The purpose of the change is to add a new provision that allow selection of a reasonably equivalent type for areas not defined in Table 140.6-C. This change is to align with a similar requirement of ASHRAE 90.1-2016. Federal law (Title 42 of the United States Code, Section 6316(b)(2)) grants State and local governments the ability to adopt ASHRAE 90.1-2016 efficiency requirements into the local building codes given that the building codes does not exceed the minimum energy efficiency requirements of ASHRAE 90.1-2016 and the building codes do not take effect prior to the effective date of the applicable minimum energy efficiency requirements of ASHRAE 90.1-2016. This change is necessary to maintain alignment with ASHRAE 90.1, consistent with the above law.

Section 140.6(c)2E The purpose of the change to the section is to update the lighting power allowance for multi-tenant area. This change corresponds to the update of the lighting power allowance for in Table 140.6-C. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)2F The purpose of the change to the section is to clarify "each primary area" and "primary area" as "each primary function area", in order to use consistent language in referring to primary function areas. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)2G: The purpose of the change to the section and the subsections is to clarify the new additional use-it-or-lose lighting power for qualifying lighting applications are tabulated in Table 140.6-C. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)2Gvi: The purpose of the change is to modify the subsection as the lighting power information is in the Qualifying Lighting System column of Table 140.6-C in lieu of the footnotes. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)2Gvii: The purpose of the change to the subsection is to update the additional lighting power allowance for videoconferencing studio lighting. This change corresponds to the update of the lighting power allowance for videoconferencing studio lighting in Table 140.6-C. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3A The purpose of the change to the subsection is to delete the primary function area reference to IES allowance listed in Section 140.6(c)3H as the subsection specifying the IES references is removed from the Standards. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3B: The purpose of the changes to this Section is to renumber the subsection as appropriate. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16..

This other change is to move the general lighting requirement to Section 140.6(a)4C. This change

is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16..

Section 140.6(c)3C: The purpose of the change is to add the section number and the change clarifies the Standards and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16..

Section 140.6(c)3E: The purpose of the change is to add "lighting" to the section as appropriate. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16..

Section 140.6(c)3F(existing): The purpose of the change to delete this Subsection is to remove a restriction that is generally redundant with the definition of "general lighting" and that is unnecessarily technology specific: although these types of lighting are most commonly used for wall, floor, and display lighting, there are scenarios with use of directional light sources as general illumination sources. The change has the substantive effect of allowing the use of these technologies for providing general lighting, and is necessary both to ensure that the provisions of Part 6 are technology neutral to the greatest extent possible and to avoid unnecessarily restricting approaches to the design of general lighting systems.

Section 140.6(c)3H (existing): The purpose of the change to delete the existing Section 140.6(c)3H about provisions on how to determine specific primary function areas not listed in Table 140.6-D. A new provision that allow selection of a reasonably equivalent type is specified in Section 140.6(c)2A that covers where the provisions of this Section would have applied. Because of the proposed changes to Section 140.6(c)2A, the changes here clarify the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3F: The purpose of the change to the section and subsections is to modify the term from "IES Illumination values" to "General Illumination Level" to correspond to changes in Table 140.6-D. The change clarifies the Standards and is necessary to improve the code's compliance with the consistency of California Government Code Sections 11349 and 11349.1, and Chapter1, Article 2 of the California Code of Regulations.

The other proposed change is to modify by adding "General" to the terms in the subsection so that it is "General Lighting" and "General Illuminance Level". This change corresponds to changes in Table 140.6-D. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3G: The purpose of the change is to renumber the subsections as there are subsection being deleted and new subsections added. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Gi: The purpose of the change is to delete the subsection as the reference to Section 140.6(c)3H is no longer there. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Giib: The purpose of the change is to clarify the accent lighting permitted as accent luminaires can also be luminaires providing directional display light. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Giii: The purpose of the change is to clarify the permanent full height interior partitions qualification requirement for the use of additional lighting power for wall display lighting. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Giv: The purpose of the change is to clarify the subsection requirement on how to use the mounting height adjustment factor for wall display lighting luminaires mounted above certain height. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Gv: The purpose of the change is to clarify the subsection requirement on how to determine the allowed power for wall display lighting. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Gvi: The purpose of the change is to add a new subsection to clarify that lighting integral to display cases can be served and qualified as wall display lighting provided the display case is attached or adjacent to a wall. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3H: The purpose of the change is to renumber the subsections as there are subsection being deleted and new subsections added. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hi: The purpose of the change is to delete the subsection as the reference to Section 140.6(c)3H is no longer there. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hii: The purpose of the change is to add a new subsection to clarify that lighting integral to display cases that are not attached or adjacent to a wall should be counted as floor display case lighting. The other change is to update the subsection number to correspond changes in the section and subsection numbering as appropriate. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hiv: The purpose of the change is to clarify the qualifying floor display lighting. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hv: The purpose of the change is to clarify the qualifying task lighting. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hvii: The purpose of the change to the subsection is to delete the allowance of using IES and Table 140.6-D for determination of additional lighting power for a combination of floor display lighting and task lighting. This corresponds to the change in Section 140.6(c)2A and is aligned with ASHRAE 90.1-2016 which allows one to choose a reasonably equivalent type to the primary function area in the standard and design to that LPD. The change also clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hviii: The purpose of the change is to clarify the subsection requirement on how to use the mounting height adjustment factor for floor display lighting luminaires mounted above certain height. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Hix: The purpose of the change is to clarify the subsection requirement on how to determine the allowed power for floor display lighting. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3I: The purpose of the change is to renumber the subsections as there are subsection being deleted and new subsections added. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Ii: The purpose of the change is to delete the subsection as the reference to Section 140.6(c)3H is no longer there. The change clarifies the Standards and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Iiv: The purpose of the change is to clarify the subsection requirement on how to determine the allowed power for ornamental/special effects lighting. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3J: The purpose of the change is to renumber the subsections as there are subsection being deleted and new subsections added. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.6(c)3Ji: The purpose of the change is to delete the subsection as the reference to Section 140.6(c)3H is no longer there. They clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.7 – The purpose of the change to the Section title is to add the word “Prescriptive” for consistency with the rest of the Subsections to Section 140. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table 140.7-A and B – The purpose of the changes to these Tables are to update outdoor lighting power allowance values using a baseline assumption of the use of LED lighting technologies. The rationale for the proposed lighting power allowance values proposed is present in the documents relied upon noted below. Updating these values is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 140.8 – The purpose of the change to the Section title is to add the word “Prescriptive” for consistency with the rest of the Subsections to Section 140. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 140.9(a)1A – The purpose of this change is to require computer rooms that incorporate an air economizer to comply with the Fault Detection and Diagnostics (FDD) requirement which is otherwise not applicable to covered processes. Air economizers serving a computer room suffer from the same operational deficiencies as air economizers serving other space types and would equally benefit from having on board FDD. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception 5 to Section 140.9(a)1 – The purpose of adding this Exception is to allow the use of refrigerant-based economizers to satisfy requirements for economizing, in climate zones where this equipment will provide the same or superior energy benefits as use of traditional economizing technologies. The use of pumped refrigerant economizers was approved by the Commission during the 2013 Standards cycle as a compliance option. This change is necessary to allow additional approaches to economizing, and is therefore is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception to Section 140.9(a) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with the prescriptive requirements for computer rooms. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to conflict with health and safety requirements for technology and computer rooms in healthcare facilities, set by the Office of Statewide Health Planning and Development. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.9(b)2Biiid.ii. – The purpose of the change to this Section is to add specificity regarding the referenced ventilation rate requirements in Section 120.1 (and specifically 120.1(c)3). The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception to Section 140.9(b) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with commercial kitchen exhaust requirements. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part

6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

Section 140.9(c)3 – The purpose of the proposed regulation is to add new requirements for laboratory and process exhaust fan system power consumption. These systems must now comply with ANSI Z9.5-2012 discharge requirements and one of three methods of reducing fan system power. Systems must comply with an exhaust system power demand limit, or control the exhaust volume flow rate based on either site wind conditions or exhaust contaminant concentration. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

140.9(c)4: The purpose of the proposed regulation is to add new requirements for laboratory fume hoods. Laboratory fume hoods are now required to install automatic sash closure systems. These systems save energy by automatically closing the fume hood sash when occupancy is not detected for up to 5 min. This change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception to Section 140.9(c) - The purpose of this exception is to exempt licensed healthcare facilities from compliance with prescriptive requirements for laboratory ventilation. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but this section has been identified as having the potential to interfere with the primary health and safety responsibilities of healthcare facilities since healthcare facilities have strict ventilation design requirements necessary for infection control. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both.

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

Section 141.0 – The purpose of this exception is to exempt alterations and repairs to licensed healthcare facilities from compliance with this code section. This exception is necessary because licensed healthcare facilities are being brought into the scope of Title 24, Part 6, for the first time, but applying the alterations and repairs requirements in this section to licensed healthcare facilities has been identified as potentially not cost effective. Future code cycles may remove this exception based on more detailed analysis, partial exceptions tailored specifically for healthcare, or both

Section 141.0(a) – The purpose of the changes to this Section are to clarify that the commissioning requirements of Section 120.8 do not apply to additions. To the extent 120.8 could have been read as applying to additions to existing buildings, this change has the substantive effect of limiting commissioning requirements to newly constructed buildings, and is necessary to avoid requiring discussions of extant building systems as though they were still being designed (and not yet built). The change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b) – The purpose of the change to this Section is to improve grammar and clarify phrasing. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations,

Title 1, Section 16.

Section 141.0(b)1 – The purpose of the change to this Section is to simplify its title. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2A – The purpose of the change to this Section is to correct grammar, and to add a note providing additional explanation of the distinction between an alteration and a repair. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2Biib – The purpose of the change to this Section is to simplify phrasing: the thermal mass being referred to will necessarily exist over a roof membrane, making the additional specificity unnecessary. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2Biiciii – The purpose of the change to this Section is to correct a spelling error. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2D – The purpose of the change to this Section is to reference Section 1404(l)1, consistent with the amendments done in that section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2E – The purpose of the changes to this Section is to reference Section 110.12 and 140.4(l)1, consistent with adding that Section to consolidate all requirements relating to demand responsive controls and the to accommodate changes to duct leakage. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 1 to Section 141.0(b)2Eii – The purpose of the change to this Exception is to correct a typographical error in a reference to Section 140.4. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 141.0(b)2I, J, and K; Table 141.0-E – The purpose of the changes to these Sections are to merge the Sections and eliminate unnecessary distinctions between different types of alterations to a building's indoor lighting system, to standardize requirements for lighting system alterations both internally to each prior type and across types, to limit an existing Exception for spaces with no more than two luminaires, and to impose limits on when calculations of area square footage can be avoided in favor of calculating existing, installed lighting wattage.

Staff undertook extensive discussions with stakeholders on the impacts of the three current options for lighting alterations. This change separates out the alternative means of calculating the

allowed power for the space from the specification of required controls by standardizing the requirements for two of the three options. Bi-level lighting requirements are removed from the option to install up to a percent of the space's allowed lighting power, and the percent limit is reduced from 85% to 80% to account for this change. Projects using the percent reduction to the existing lighting to determine allowed lighting power now must install partial-ON controls in additional circumstances; staff notes that this is also necessary to ensure compliance with California Building Code Section 1008 to provide means of egress illumination. Lastly, to ensure consistency across spaces, the prior "split" reduction to existing lighting of 35% in the majority of space types and 50% in four specific spaces is merged into a required 40% reduction in power.

Separately, the option to forego determining lighting power allowances using square footage is proposed to be subject to limits of overall square footage of the building or tenant space, and of being available only for luminaire-for-luminaire alterations and not for larger remodeling projects or more extensive lighting system revamps. This would ensure that projects where detailed plans with square foot information for each space is available make use of those plans rather than basing compliance on the existing lighting, which can vary significantly between buildings. As there is no longer a difference in controls required for projects installing a reduced total lighting power, the substantive effect of limiting this determination method is expected to be minimal.

The exception for spaces with two luminaires was found to exempt larger spaces than was intended: the exception was drafted with an assumption of luminaires using fluorescent lamps, however LED luminaires are available in several form factors that light significantly larger spaces than fluorescent luminaires. For this reason, reduction of this exception to applying to spaces with a single luminaire was necessary to preserve its intent.

These changes are necessary to standardize requirements for controls across project types, and not hinge control requirements on the type of analysis conducted to determine appropriate lighting power allowances. The changes also greatly simplify and clarify the regulatory language, and harmonize the language of the Section with that of its parent Section (Section 141.0(b)2).

Section 141.0(b)3 – The purpose of the changes to this Section are to improve phrasing and overall clarity, in part by breaking Subsection B into two Subsections and renumbering accordingly. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 4 to Section 141.0(b)3 – The purpose of this change is to exclude altered space conditioning systems from the Fault Detection and Diagnostic (FDD) requirements of Section 120.2(i). The new requirement for FDDs widened the scope of qualifying systems. The impact and implementation of FDD for existing buildings was not part of the analysis, therefore this exception is necessary to avoid unintended consequences. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 2 to Section 141.0(b)3A – The purpose of adding this Exception is to create consistency between prescriptive and performance requirements for space conditioning equipment, and specifically the Exception to Section 141.0(b)2. This change is necessary to ensure equivalency between prescriptive and performance-based compliance approaches.

Section 141.1 – The purpose of the change to this Section is to apply the proposed standards for laboratory fume hoods in additions and alterations only for projects of sufficient size to guarantee cost effectiveness. This change is necessary to avoid a risk that the increased marginal costs of meeting this requirement as part of an addition or alteration may not be fully offset by benefits if

the scope of the project is small.

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

Section 150.0(c)2 – The purpose of the change to this Section is to correct a typographical error by removing an extra period. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(c)2 – The purpose of the change to this Section is to update reference to Tables 150.1-A and reference to Table 150.1-B consistent with changes in Section 150.1. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(d) – The purpose of the change to this Section is to move the term “wood framed” from the end of the Section to its title and start for clarity, and to update reference to Tables 150.1-A and reference to Table 150.1-B consistent with changes in Section 150.1. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(j)2A – The purpose of the changes in this Section are to align the requirements of this Section with that of Section 609.11 of the Plumbing Code. Section 609.11 of the Plumbing Code requires minimum insulation for all hot water piping based on pipe thickness. The requirements of Part 6 applied a minimum insulation requirement of one inch to several pipes that are below one inch in diameter, and also applied a one-inch insulation requirement to the first five feet of cold water piping from the hot water storage tank. These changes preserve these differences while otherwise deferring to the Plumbing Code. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(j)2B and C – The purpose of the changes to this Section are to standardize insulation protection requirements between residential and nonresidential piping, and to refer to a single Section for all requirements. The requirement for a non-crushable casing or sleeve for buried hot water piping has been moved to Section 120.3(c). Piping leading to and from a solar water heater are clarified here as being treated identically to piping leading to and from a more traditional water heater and subject to matching insulation requirements. The correction noted for heat pumps performing space heating noted for Section 120.3(c) is also captured here by referring to “space conditioning systems” in place of “cooling systems”. To the extent that solar water heating piping and refrigerant piping for heat pumps could have been understood to not require insulation, this change has the substantive effect of requiring pipe insulation for solar water heater piping identical to insulation for other types of water heater piping, and of requiring insulation for refrigerant lines for heat pumps operating exclusively in a heating mode identical to heat pumps able to operate in both heating and cooling modes; the change is necessary to preclude this unintended reading. In addition, the substantive changes noted for Section 120.3 are also applicable here. This change is necessary to create standardization between insulation requirements for residential and nonresidential buildings, and among different building systems that make use of piping.

Exception 2 to Section 150.0(j)2 – The purpose of this change is to remove an Exception that is fully redundant with the language of the Section. Section 150.0(j)2 already states the types of piping to which it applies, and does not state or imply that it applies to process loads, gas piping,

cold domestic water piping, condensate drains, roof drains, vents, or waste piping. This Exception is therefore unnecessary and serves only to erroneously imply that this piping would be subject to 150.0(j)2 but for the language of the Exception. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 3 and 4 to Section 150.0(j)2 – The purpose of the changes to these Exceptions is to renumber them following removal of Exception 2, and to correct spelling. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Exception 5 to Section 150.0(j)2 – The purpose of the change to this Exception is to clarify when cavity insulation can be considered to provide the same benefit as the pipe insulation otherwise required by Section 150.0(j)2. This both reduces the amount of insulation required to meet this Exception and expands its application to crawlspace and wall insulation as well as attic insulation. Because insulation requirements in Section 150.0(j)2 are stated in terms of inches, not R-value or U-factor, the amount of insulation necessary to qualify for this Exception was set to an identical one inch value, but also amended to specify that the insulation must completely surround the pipe rather than being “on top of piping”. This has the substantive effect of expanding the application of this Exception consistent with its intent of recognizing when cavity insulation is also insulating piping. This change is necessary to prevent installation of redundant layers of insulation where their value would be minimal

Note for Section 150.0(j)2 – The purpose of this change is to remove a note that did not possess regulatory effect and was found to cause confusion. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(j)3 – The purpose of the change to this Section is to move these requirements into Section 120.3(b), in order to standardize requirements between residential and nonresidential requirements for protecting pipe insulation. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)1A – The purpose of the change to this Section is to correct punctuation. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)1C – The purpose of the change in this Section is to clarify the application of item vi. The intent of item vi was to require, when lamps and similar removable light sources were inserted into recessed downlight luminaires, that these light sources met elevated temperature tolerance requirements consistent with JA8 requirements and therefore were not at risk of early failure. However, the phrasing of this item introduced an ambiguity regarding LED “retrofit kits” that were complete luminaires designed for installation into existing housings. As the purpose of this item was not to require JA8 testing beyond what is already specified in Table 150.0-A, item vi is being removed and instead the start of the Section specifies that the requirements are in addition to 150.0(k)1A, which effectively provides the same assurance that removable light sources will meet elevated temperature requirements. To the extent that the current language could have been understood to require JA8 testing of luminaires to elevated temperature

requirements applicable to lamps, this change has the substantive effect of removing this requirement; in this case, the change is necessary to preclude this unintended reading and prevent inappropriate and redundant testing of luminaires using both a luminaire test procedure and a lamp test procedure. This change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)1D – The purpose of the change to this Section is to specify its application to fluorescent lamps in the Section's title, thereby avoiding confusion as to its application. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)1E – The purpose of the change to this Section is to extend night light requirements to step lights and path lights, and to apply limits to the wattage and light output of these lights to preclude misclassifying general lighting as night lights, step lights, or path lights solely to take advantage of reduced requirements. This change is necessary to avoid applying JA8 to lighting that is often intentionally providing a limited spectrum to aid navigation without disrupting sleep, while ensuring such lighting is not unnecessarily power consumptive.

Section 150.0(k)1G – The purpose of the change to this Section is to remove redundant language and prevent confusion. Section 150.0(k)1C already prohibits screw bases in recessed downlights, and JA8 already specifies its marking requirements. Therefore, the restatement of these requirements here is unnecessary. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)1H – The purpose of the change to this Section is to more clearly specify that this Section is applicable to lamps and separable light sources, and not to fully integrated luminaires. This change also specifies that elevated temperature requirements also apply to enclosed luminaires, which has the substantive effect of limiting installation of lamps into enclosed fixtures to those tested and shown to tolerate the elevated temperature environment created by the enclosed fixture. This change is necessary to ensure that lamps installed in locations with elevated temperature considerations are limited to those shown to tolerate such conditions, and simultaneously to prevent this Section from applying to fully integrated luminaires not subject to elevated temperature testing.

Section 150.0(k)2B – The purpose of the change to this Section and its Exception is to remove the term "switched", which can be understood to require the physical opening of a circuit via a switch, which is not the intent of this Section. In addition, the phrase "for an extended period of time" is removed from the Exception as the term "extended period of time" is neither defined nor further specified. To the extent the existing language could have been understood as requiring a physical break in the circuit, this change has the substantive effect of allowing digital communicating controls that do not physically break the circuit to be used to control lighting, and are necessary to avoid obstructing the use of advanced digital controls in residential dwellings. This change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)2C – The purpose of the changes to this Section are to replace the term "luminaire" with the more general term "lighting", to replace the term "permit" with the more plain

term “allow”, to replace the term “switched” with the term “turned” consistent with the change to 150.0(k)2B, to specify that the control is a wall-mounted control, and to provide an exception to the requirement that the control be wall-mounted for ceiling fans that provide a remote control. The substantive effect of these changes are to require that the readily accessible control be a wall-mounted control and preclude controls that can be removed from the room from satisfying this Section’s requirements, while allowing for the common practice of providing controls for ceiling fans, including those with integrated lighting, via a remote control. This change is necessary to ensure each room is furnished with appropriately located and functional lighting controls, while retaining allowance for the common practice of controlling fans via remote control.

Section 150.0(k)2E – The purpose of the change to this Section is to add “occupant sensor”, consistent with the change to Section 150.0(k)2I. The substantive effect of this change is to prevent the operation of an occupant sensor installed consistent with that Section from being bypassed. This change is necessary to ensure that controls installed to comply with 150.0(k)2I are not bypassed, regardless of type, and therefore provide their full benefit to the occupant.

Section 150.0(k)2G and H – The purpose of the changes to these Sections are to merge the otherwise identical language and expand the language to refer generically to “controls” rather than to specific control functions, thereby reducing redundancy in Section language. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)2I – The purpose of the change to this Section is to update its numbering following removal of Section 150.0(k)2H. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)2J – The purpose of the changes to this Section are to update its numbering following removal of Section 150.0(k)2H, and to allow installation of occupant-sensing controls provided that they are initially configured to operate in manual-on mode. This change is necessary to avoid banning occupant sensors or other programmable controls where they may be requested by occupants and are capable of providing the same benefit as vacancy sensors. The change to numbering of the Section is necessary to retain its accuracy.

Section 150.0(k)2K – The purpose of the change to remove this Section is to rephrase the Section for clarity and consistency with the other Subsections of Section 150.0(k)2, and to update the Section’s numbering. This is a nonsubstantive change. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)2L – The purpose of the change to this Section is to clarify its intent and narrow its scope to the interaction between undercabinet lighting and ceiling-mounted general lighting, and to update the Section’s numbering. To the extent that the Section could have been understood as requiring that undercabinet lighting be fully isolated from other circuits, this change has the substantive effect of allowing greater flexibility in installation and control strategies provided that the controls continue to allow the undercabinet lighting to be accessed separately from the ceiling-mounted general lighting, and vice versa; in this case, the change is necessary to preclude the unintended, more restrictive reading. The change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)3 – The purpose of the changes to this Section are to simplify and standardize phrasing, and reduce redundancy by combining two Subsections that apply identical requirements to two building areas. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)4 – The purpose of the changes to this Section are to simplify phrasing and remove an unnecessary reference to a different Section. The changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(k)6 – The purpose of the changes to this Section are to correct punctuation and improve phrasing to make clear that the requirements of this Section apply solely to the interior common areas to which it refers. To the extent that this Section could have been read as applying to all lighting in the building, the changes remove a conflict between this Section and the Sections that specify the requirements for specific areas of the building; the changes are necessary to preclude this unintended reading. The changes otherwise clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(m)1 – The purpose of the changes to this Section are to correct the numbering of this Section and its Subsections, remove unnecessary language regarding the California Mechanical Code, and add two Exceptions to Section 150.0(M)1B to address ducts in interior wall cavities (where space for insulation is extremely limited) and ducts that are intentionally directly exposed to the space they are conditioning. The two Exceptions are necessary to prevent inadvertently banning two common design practices relating to ducts, and for which adherence to insulation requirements would provide negligible benefit. The remaining changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(m)9 – The purpose of the change to this Section is to correct punctuation. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(m)10 – The purpose of the change to this Section is to clarify that the Section restricts ducts for which the outermost layer is the only barrier preventing air exchange, and is not intended to restrict ducts that have an internal non-porous layer between the inner core and the outer vapor barrier. To the extent this language could be understood to have restricted this type of ducting, this change has the substantive effect of permitting porous inner core ducts that also incorporate a non-porous inner layer, which are essential for certain HVAC applications (particularly small-duct high-velocity systems); in this case, the change is necessary to avoid obstructing the installation of systems relying on this type of ducting. This change otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(m)12 – The purpose of the changes to this section and its subsections are to improve indoor air quality by increasing the air filtration particle size efficiency requirement from MERV6 to MERV13, and to specify 2-inch depth filters for improved filter airflow, otherwise allow for 1-inch

depth filters if 0.1 inch w.c. pressure drop and 150 ft per minute face velocity for the filter is used for the design. Two more ventilation system types, supply ventilation systems and the supply side of balanced ventilation systems, are required to have air filtration though the filters are not required to be labeled. The term space conditioning systems was added to clarify that systems with thermal conditioning components are called space conditioning systems. Numbering and non-substantive edits were added to improve clarity. The exception for evaporative coolers was moved to the end of section A for clarity.

There are tight relationships and interactions between building insulation and air tightness requirements, ventilation requirements, and indoor air quality, so much so that the Energy Commission is directed in statute to consider the impacts of building standards on indoor air pollution problems: it is inappropriate to consider energy efficiency measures alone, as indoor air quality could be impacted, and it is also inappropriate to consider indoor air quality alone as some approaches to indoor air quality can waste energy. Federal and State law directs the Energy Commission to either directly incorporate or to exceed requirements in national model energy codes (such as ASHRAE 62.1, 62.2, and 90.1), and all nationally recognized model codes address both energy efficiency and indoor air quality. Staff therefore considered both proposed and existing building standards in light of new information about the effects of indoor particulate pollutants as a part of its consideration of new and amended standards for 2019, noting that filters meeting current MERV 6 and 8 requirements are only moderately effective at filtering out airborne particulates (PM10) and are unable to capture or filter out fine particulates (PM2.5).

Increasing ventilation rates increases energy use, both directly via increased fan use and indirectly via loss of conditioned air, whereas increased filtration can occur at a negligible impact on the performance of HVAC equipment and with no loss of conditioned air. In addition, research has shown that California outdoor air is mostly in non-attainment for fine and ultra-fine particles which can be brought into the home by ventilation, creating a feedback loop that substantially increases the amount of ventilation needed to improve indoor concentrations of PM10 and PM2.5. Staff therefore found increasing filtration requirements to be more energy efficient at addressing these issues than increasing ventilation rates.

Staff identified a MERV rating of 13 as being effective at filtering out fine particulate matter (PM2.5) while also being available in a one inch form factor with a negligible effect on pressure drop compared to an average filter with the currently required MERV rating of six.

Staff further identified a need to ensure that HVAC systems are designed to accommodate higher MERV filters so that occupants with a need or desire for improved filtration that meet this need by installing such a filter are not inadvertently harming the energy efficiency, lifespan, or overall performance of their system by doing so. Staff found that when higher MERV filters are installed by occupants, they can potentially increase system pressure drop and reduce system energy efficiency – while some 1” MERV 13 filters exist that have comparable pressure drop to 1” MERV 6 filters, this was not true for all MERV 13 filters nor for filters at higher MERV ratings. Staff found that the industry already produces filters with greater surface area specifically to address pressure drop: by increasing filter depth and number of pleats, the total surface area of the filter is increased and the effects on system pressure decreased. Staff found that filters with the same pressure effects as a one-inch MERV 6 filter and higher MERV ratings are broadly available at a two-inch filter depth, increasing the breadth and depth of selections available to consumers.

In addition to the above, staff notes that individuals that are not able to meet their air filtration and IAQ needs via their HVAC system would be likely to use a supplementary or stand-alone (i.e., portable) air purifier, with an associated increase in energy use. Providing the ability to install high MERV filters into the building’s HVAC system avoids this unnecessary use of energy.

For these reasons, staff is proposing to raise the requirement for the initial filter installed for HVAC equipment to a MERV of 13, and to require that systems be able to accommodate a two-

inch filter so that selection of higher (13 and above) MERV replacement filters does not decrease equipment efficiency. These changes are necessary to ensure that consideration and adoption of envelope requirements is not impeded by indoor air quality concerns, to ensure that selection of higher MERV replacement filters does not impede system energy efficiency, lifespan, or performance, and to avoid increases in energy use that would result from increased use of supplementary or stand-alone (i.e., portable) air filtration and purification devices.

Section 150.0(m)13B and C – The purpose of the changes to these Sections are to establish a more stringent efficiency requirement for gas furnace air-handling units, and to clarify the application of field verification requirements. Staff found that gas furnace air handling units could feasibly and cost effectively achieve a 0.45 watts per CFM efficacy, and therefore improved the existing 0.58 W/CFM requirement to 0.45 W/CFM for this equipment. This necessitated separating out other air handling equipment so as to retain the existing standard for that equipment. Updating the efficiency standard for gas furnace air handlers is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 150.0(m)13D, Exceptions 1, 2, and 3 to Section 150.0(m)13B – The purpose of adding this Section is to incorporate alternate airflow and fan efficacy requirements determined to be appropriate to Small Duct High Velocity (SDHV) forced air systems. Staff analysis showed that these values were achievable by all certified SDHV air conditioners and heat pump combinations. This change removes the burden of SDHV from having to comply via the exception to the current airflow and fan watt values, which were unachievable by this technology. With these values incorporated, Exception 3 is no longer needed and is therefore removed. Exceptions 1 and 2 are also updated to include this new Section in their application. These changes are necessary to ensure Small Duct High Velocity systems are able to be installed in California and held to efficiency standards appropriate for the unique features of the equipment.

Section 150.0(n) – The change to this Section incorporates the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T) as a listing agency able to provide rating of solar water heating systems, consistent with their approval by the Executive Director. As IAPMO is already approved to perform this function, this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.0(n)1A – The purpose of the change to this Section is to modify the existing requirement for electrical reception near the water heater to require the receptacle to be a dedicated circuit and the electric wire to be 10 gauge. This change is necessary to ensure compatibility of the circuit with energy efficient heat pump water heaters.

Section 150.0(o) – The purpose of the changes in this section are to incorporate ASHRAE 62.2-2016 “Ventilation and Indoor Air Quality in Residential Buildings” by reference, but with California amendments listed in the new amendments given in subsections (o)1C, D, E, and F as described below. The term “dwelling unit” mechanical ventilation is intended to be substituted throughout for the term “whole-building” mechanical ventilation when designating the ventilation airflow rate required by section 4 of ASHRAE 62.2 to mirror this change made to terminology in the 2016 version of ASHRAE 62.2. Since the 2019 update is introducing amendments that go beyond the amendments specified in subsections 150.0(o) A, and B which are not new, a numbering organization of the amendments has been introduced to improve clarity. Additionally Subsection 150.0(o)2B introduces a new Title 24, Part 6 HERS verification.

Subsection (o)1C simplifies the method for calculating the required mechanical ventilation airflow rate for single family dwelling units and horizontally attached dwelling units specified by ASHRAE62.2 by using a fixed default value based on a dwelling enclosure

leakage rate of 2 air changes per hour at 50 Pa (0.2 inches water) (2ACH50). This was necessary in order to relieve the burden of mandatory field measurement of dwelling enclosure leakage for most dwellings. The enclosure leakage test will be required for dwelling units that choose to verify enclosure leakage values less than 2 ACH50.

Subsection (o)1D requires use of the air filtration requirements specified in Section 150.0(m)12 instead of the air filtration requirements specified in ASHRAE 62.2. This has the effect of requiring filtration for supply ventilation systems and the supply side of balanced ventilation systems, and for the filtration particle size efficiency to be increased from MERV6 to MERV13. This change is necessary for alignment with Section 150.0(m)12, and for the reasons specified for the changes to Section 150.0(m)12.

Subsection (o)1E specifies two “compartmentalization” options for reducing the effects of pollutant transfer between adjacent multifamily dwelling units and requires use of one of the two options for compliance; the reason for such specificity is because the effectiveness in delivering outside air to the dwelling unit differs between ventilation approaches. Broadly speaking, there are three ways to mechanically ventilate a space: you can supply air to the space, which adds new outside air and pressurizes the space; you can exhaust the air in the space, which depressurizes the space and causes air to be pulled into the dwelling from its surroundings; or you can balance supply and exhaust ventilation so that air is exchanged without creating a pressure differential. The proposed language recognizes that non-balanced ventilation approaches are potentially less effective than balanced ventilation at providing the intended benefits of ventilation to a multifamily dwelling sharing walls with other dwellings and indoor spaces, and therefore less energy efficient: because pressurizing a space means pushing depleted or polluted air into those adjacent spaces, and depressurizing a space means pulling depleted or polluted air in from adjacent spaces, if a non-balanced ventilation strategy is used there is a need to ensure that air exchange is with the outside and not with adjacent dwellings or indoor spaces, otherwise the energy used to move the air is wasted as indoor air quality is not improved.

Option one requires use of balanced ventilation systems that supply the same amount of outside air as they exhaust, thus minimizing any pressure differences between multifamily dwellings that could cause transfer of contaminated air between dwelling units. Option 2 has a prerequisite requirement for the dwelling to be sealed to minimize leakage between adjacent dwelling units such that the enclosure leakage is less than 0.3 cubic feet per minutes at 50 Pa (0.2 inch water) per ft² of enclosure area as determined by a field test by a HERS Rater. If the enclosure complies with 0.3 cfm/ft² of enclosure surface area, when all dwelling units in the building utilize the same ventilation system type, the dwelling units may use supply ventilation, otherwise the dwelling units may use exhaust ventilation. This change is necessary to ensure that energy used for ventilation efficiently provides its intended benefit to indoor air quality and is not wasted on pulling or pushing depleted or polluted air back and forth between adjacent dwellings.

Subsection (o)1F requires multifamily building central ventilation systems that serve multiple dwelling units to be balanced such that the airflow rate for every dwelling unit is greater than or equal to the rate specified by ASHRAE 62.2 section 4.1.1, but no more than 10 percent greater than the specified rate. The balancing means may include but are not be limited to constant air regulation devices, orifice plates, and variable speed central fans at the discretion of the system designer. This change is necessary to limit the impact of high differential pressures throughout the building, and avoid inadvertent impacts on indoor air quality.

Subsection (o)2B requires HERS verification of the HVI certification status of the installed kitchen range hood to determine if the fan is rated in accordance with the specifications in

ASHRAE 62.2. The rating specifications were first adopted by reference to ASHRAE 62.2 in the 2008 version of CA Title 24, Part 6. This HERS verification intends to ensure compliance with the HVI ratings requirement in ASHRAE 62.2 which has generally been not well enforced. Indoor pollutants from cooking that is not adequately exhausted from a dwelling because of inadequate range hood performance has been identified by research as a significant danger to human health. These changes are necessary to ensure compliance with Part 6 requirements relating to residential range hoods, and for consistency with ASHRAE 62.2.

These changes to 150.0(o) are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

Table 150.0-A – The purpose of the changes to this Table are to improve phrasing and remove redundant phrasing, remove obsolete references to GU-24 sockets, expand item 6 to apply to all LED sources and not solely to inseparable luminaires, and to add an item to the first column to cover lighting internal to drawers, cabinetry and closets that is expected to have extremely small duty cycles. This change has the substantive effect of allowing outdoor LED lamps and appropriately controlled lighting internal to drawers, cabinetry and closets to forego JA8 testing and associated requirements, and of requiring GU-24 socketed lighting to be considered identically to all other lighting. These changes are necessary to avoid applying JA8 requirements in situations where they will have negligible benefit, and to remove an inconsistency of treating the same lighting technology differently depending on its socket or connection type.

Table 150.0-B and C – The purpose of the changes to tables 150.0-B and C adds a reference to ASHRAE 52.2 to mirror the same specification that is referenced in Section 150.0(m)12D. A reference is changed to 150.0(m)12iv to reflect the updated location for the same information previously referenced. The clean filter pressure drop specification has been relaxed from 0.05 to 0.1 inch water which is a more attainable value according to newly published performance information made available due to the Title 20 air filter label requirements. The change is necessary to ensure compliance with the clean pressure drop specification regulation is reasonably attainable using current commercially available air filter stock.

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

Section 150.1(a) – The purpose of the change to this Section is to correct the grammar of an explanatory note. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(b), (b)1, (b)2, and (b)3 – The purpose of the change to this Section and to prior Subsections 1 through 3 are to improve the accuracy of existing language and incorporate into the performance standards the use of the Energy Design Rating (EDR) concept, including component EDRs for energy efficiency, solar electric generation and design flexibility, and their combination into a total EDR, for each newly constructed building. The existing three subsections are replaced by two new subsections, one for newly constructed buildings and one for additions and alterations to existing buildings to improve clarity and accuracy. The Energy Design Rating expands the previous scope of the Standards to not only address building energy efficiency measures, but also to incorporate other means to reduce building energy consumption, including the major amount of energy used by plug loads (resulting from equipment and devices brought into homes by occupants that are plugged into electrical outlets), through onsite renewable energy generation and demand response/flexibility measures. The EDR enables a

comprehensive and holistic focus that maximizes the ability for newly constructed buildings to be designed and built to be harmonized with California's electricity grid, consistent with the policies of the Commission's sister agencies, CalISO, CPUC and ARB, to contribute to achievement of California's climate change goals at lowest cost. For the first time this powerful EDR metric is incorporated into the Standards for newly constructed, low-rise buildings. These changes to Section 150.1(b) are necessary to clarify the role of the EDR in performance standards compliance, and to clean-up accuracy issues with existing language regarding energy budgets.

Exception to Section 150.1(b) – The purpose of adding this Exception is to provide the opportunity and flexibility to builders to use Energy Commission approved community shared solar electric generation or battery storage systems (pursuant to the new Part 1, Section 10-115 administrative process) to fully or partially comply with requirements for installation of onsite solar electric generation (PV) systems, providing energy savings benefits, equal to or greater than those resulting from the onsite systems, that are dedicated to be solely and uniquely allocated to the building that would have otherwise received the onsite solar electric generation system. The need for this community solar option has been a high priority Energy Commission policy conclusion of the 2015 and 2013 IEPRs. This Exception is necessary to enable this option for performance standards compliance and clarify its applicability.

Section 150.1(b)4 – The purpose of the change to this Section is to renumber the Section consistent with changes to prior Subsections of Section 150.1(b). This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(b)4B – The purpose of the change to this Section is to identify appropriate field verification methods for heat pumps, whole house fans, central fan ventilation cooling systems, and building enclosures. The substantive requirements of each field verification procedure, applicable to persons performing field verification, are described for the changes that add and update the referenced Sections of Residential Appendix 3 (RA3). Field verification requirements are necessary to ensure that the potential energy efficiency benefits of installed equipment are actually realized and made effective for the occupant of the building.

Section 150.1(c) – The purpose of the change to this Section is to accurately state subsequent Table and Section numbers, consistent with changes proposed for those Tables and Sections that are described below. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)1A – The purpose of the change to this Section is to remove the option of prescriptively installing insulation above the roof rafters to comply with roof and ceiling insulation. Above roof deck insulation may still be installed to comply with insulation requirements under the performance compliance approach. This change is necessary to prevent discrepancies between prescriptive alternatives, where equivalency is not guaranteed without building modeling.

Section 150.1(c)1B – The purpose of the change to this Section is to simplify language relating to insulation requirements, use consistent terminology, and to more quickly direct readers to Table 150.1-A and B where the prescriptive insulation requirements are located. While substantive updates to Table 150.1-A and B are proposed, and are described below, the changes to the language of this Section clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)1C and D – The purpose of the changes to these Sections are to update Table references consistent with proposed changes to Table 150.1-A and B. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)1E – The purpose of the addition of this Section is to require performance of Quality Insulation Installation (QII) measures as a part of prescriptive compliance with insulation requirements. Performance of QII was found to provide a substantial benefit in residential buildings in excess of its cost, and therefore appropriate to include as a requirement for prescriptive compliance. The change is therefore necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 150.1(c)3 – The purpose of the changes to this Section are to correct capitalization, improve phrasing, update references to Table 150.1-A and B consistent with proposed changes to those tables, and add reference to glazed doors consistent with those Tables and also with the proposed change to Section 150.1(c)5. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)5 – The purpose of the change to this Section is to apply prescriptive door requirements to swinging doors when such doors separate conditioned and unconditioned space, and in doing so to add an Exception to this requirement that prevents conflict with fire safety requirements. This change is necessary to bring equivalency with other doors that separate conditioned and unconditioned space, and to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section 150.1(c)7 – The purpose of the change to this Section is to incorporate the specific airflow added for Small Duct High Velocity (SDHV) systems in Section 150.0(m)13D, and to remove the Exception for airflow rates approved by the Executive Director now that an appropriate airflow rate has been established consistent with the same change made to Section 150.0(m)13. This change is necessary to ensure that the proposed airflow value is also used for performing required refrigerant charge testing of SDHV systems, consistent with the proposed changes to Section 150.0(m)13D. This change is necessary to bring equivalency with other doors that separate conditioned and unconditioned space, and to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception 1 to Section 150.1(c)7Aic – The purpose of the change to this Exception is to update reference to Joint Appendix 5 to instead reference Section 110.12, consistent with moving and consolidating demand response requirements in that Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.1(c)8Aii: The purpose of deleting this Section is to delete the current prescriptive option for a storage water heater less than or equal to 55 gallons. Quality Insulation Installation (QII) is proposed to become a prescriptive requirement for all newly constructed low-rise residential buildings. Because this option was equivalent to other prescriptive options because it included QII, now that all options will include QII this option is no longer equivalent in performance to the other options. This change is necessary to ensure that all prescriptive options are equivalent in terms of performance.

150.1(c)8Aii: The purpose of the change in this Section is to allow a Drain Water Heat Recovery device as an option for a storage water heater over 55 gallons. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

150.1(c)8Aiii: The purpose of adding this Section is to add an option to meet the water heating prescriptive requirement by installing an electric heat pump water heater, with either an additional photovoltaic system capacity or with both compact hot water distribution and Drain Water Heat Recovery systems. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

150.1(c)8Aiv: The purpose of adding this Section is to add an option to meet the water heating prescriptive requirement by installing an electric heat pump water heater that meets the requirement of NEEA Advanced Water Heater Specification Tier 3 or higher. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

150.1(c)8Bi and Bii: The purpose of the changes to these Sections are to simplify code language and reduce redundancy. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.1(c)8Biii: The purpose of the change in this Section is to add an option for central water heating systems to meet a reduced solar savings fraction requirement by using Drain Water Heat Recovery devices. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

Section 150.1(c)9 - The purpose of the changes to these Sections are to update Table references consistent with proposed changes to Table 150.1-A and B. These changes clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)10 – The purpose of the change to this Section is to update the prescriptive requirement for gas furnace air handlers for consistency with the change to required efficacy in Section 150.0(m)13B and C. This change has the substantive effect of requiring prescriptive compliance with the updated standard for gas furnace air handlers that are part of central fan integrated ventilation systems. This change is necessary to maintain consistency of requiring prescriptive fan efficacies for central fan integrated ventilation systems equal to the mandatory fan efficacies applicable to standalone equipment, and ultimately to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Exception 2 to Section 150.1(c)11 – The purpose of the change to this Section is to remove unnecessary language, consistent with other updates to phrasing of mass wall requirements and exceptions. The change clarifies without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.1(c)12 – The purpose of the change to this Section is to clarify phrasing and to add more specific reference to the Energy Commission's directory of certified appliances. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.1(c)14: The purpose of the addition of this Section is to add a prescriptive requirement for installation of a photovoltaic system that has an annual electrical output equal to the dwelling's annual electrical usage. This change is necessary to pursue the State's goals relating to Zero Net Energy low-rise residential buildings.

Exception 7 to Section 150.1(c)14 – The purpose of adding this Exception is to enable the Energy Commission to establish additional exceptions to the requirements for onsite solar electric generation (PV) systems in situations where the rules of public entities or utilities would cause the Commission's cost effectiveness conclusions to not apply. This could happen related to rules concerning photovoltaic system compensation (resulting from CPUC or municipal utility Net Energy Metering decisions), interconnection requirements or fees established by utilities, electricity rates charged by municipal utilities, grid resource procurement decisions made by municipal utilities, or possibly through other decisions. The Exception provides certain types of information that would be required for petitions by any entity to the Commission. This is necessary for the Energy Commission to address potential decisions that may occur during the effective period of the 2019 Standards, and to ensure that the Commission is able to comply with the statutory requirements for the Standards to be cost effective.

Table 150.1-A – The purpose of the changes to Table 150.1-A are to make the following amendments and updates:

- remove the option of prescriptively installing insulation above the roof rafters to comply with roof and ceiling insulation requirements. This change is necessary to prevent discrepancies between prescriptive alternatives, where equivalency is not guaranteed without building modeling.
- remove the 'no air space' option/values for below deck insulation. This change is necessary to prevent discrepancies between prescriptive alternatives, where equivalency is not guaranteed without building modeling.
- increase the prescriptive below deck insulation R-value requirement from R-13 to R-19 for climate zones 4 & 8-16. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- decrease the prescriptive above grade framed wall U-factor requirement from 0.051 to 0.048 for climate zones 1-5 & 8-16. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- insert a row for Quality Insulation Installation (QII). This change is necessary to align with the prescriptive requirement of 150.1(c)1E.
- update the prescriptive fenestration U-factor requirement to 0.30 for all climate zones. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- update the prescriptive fenestration SHGC requirement to 0.23 for climate zones 2, 4 & 6-15. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- update the prescriptive fenestration SHGC requirement to 'NR' for climate zone 16. This change is necessary to acknowledge the benefit of increased solar gain in climate zones which are dominated by heating and have minimal cooling.
- update the fenestration maximum west facing fenestration area requirement to 'NR' for climate zone 16. This change is necessary to acknowledge the benefit of increased solar gain in climate zones which are dominated by heating and have minimal cooling.
- insert a row for Doors. This change is necessary to align with the prescriptive requirement of 150.1(c)5.
- update footnote #4 to remove the term "thermal" from "heat capacity". This change is necessary to alleviate confusion within the industry over use of the term "thermal heat capacity".

Table 150.1-B – The purpose of the changes to Table 150.1-A are to make the following amendments and updates:

- remove the option of prescriptively installing insulation above the roof rafters to comply with roof and ceiling insulation requirements. This change is necessary to prevent discrepancies between prescriptive alternatives, where equivalency is not guaranteed without building modeling.
- remove the ‘no air space’ options/values for below deck insulation. This change is necessary to prevent discrepancies between prescriptive alternatives, where equivalency is not guaranteed without building modeling.
- update the prescriptive below deck insulation R-value requirement to R-19 for climate zones 4, 8, 9 & 11-15. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- insert a row for Quality Insulation Installation (QII). This change is necessary to align with the prescriptive requirement of 150.1(c)1E.
- update the prescriptive fenestration U-factor requirement to 0.30 for all climate zones. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- update the prescriptive fenestration SHGC requirement to 0.23 for climate zones 2, 4 & 6-15. This change is necessary to improve thermal performance of the building and increase energy efficiency and savings.
- update the prescriptive fenestration SHGC requirement to ‘NR’ for climate zone 16. This change is necessary to acknowledge the benefit of increased solar gain in climate zones which are dominated by heating and have minimal cooling.
- update the prescriptive fenestration maximum west facing fenestration area requirement to ‘NR’ for climate zone 16. This change is necessary to acknowledge the benefit of increased solar gain in climate zones which are dominated by heating and have minimal cooling.
- insert a row for Doors. This change is necessary to align with the prescriptive requirement of 150.1(c)5.
- update footnote #4 to remove the term “thermal” from “heat capacity”. This change is necessary to alleviate confusion within the industry over use of the term “thermal heat capacity”.

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

Section 150.2(a) – The purpose of the change to this Section is to remove an explanatory note that did not possess any regulatory effect. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(a) - The term “dwelling unit” mechanical ventilation is intended to be substituted throughout for the term “whole-building” mechanical ventilation when designating the ventilation airflow rate required by section 4 of ASHRAE 62.2 to mirror this change made to terminology in the 2016 version of ASHRAE 62.2. This is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section 150.2(a)1Ai – The purpose of the change made to this Section is to require R-21 cavity insulation in a 2x6 wall extension. This change is necessary to provide consistency with the Commission’s move towards higher efficiency wall systems.

Section 150.2(a)1Aiii – The purpose of the changes made to this Section are to update the prescriptive requirements for additions greater than 700 square feet to require R-15 insulation in a 2x4 wall cavity and R-21 in a 2x6 cavity for additions in which the existing exterior siding is neither being replaced or removed. This change is necessary to provide a compliance pathway for additions involving the conversion of previously unconditioned space to conditioned space.

Section 150.2(a)1Bi and ii – The purpose of the changes made to this Section are to update the prescriptive requirements for additions less than or equal to 700 square feet to provide clarity and better alignment with the prescriptive requirements of Section 150.1(c). This change is necessary to capture greater energy efficiency where possible.

Section 150.2(a)1Biii – The purpose of the change made to this Section is to require R-21 cavity insulation in a 2x6 wall extension. This change is necessary to provide consistency with the Commission’s move towards higher efficiency wall systems.

Section 150.2(a)1Bv – The purpose of the change made to this Section is to clarify that quality insulation installation is not required for additions less than or equal to 700 square feet. This change is necessary to align with the CASE report proposal.

Section 150.2(a)1Bvi – The purpose of the changes made to this Section are to update the prescriptive requirements for additions less than or equal to 700 square feet to require R-15 insulation in a 2x4 wall cavity and R-21 in a 2x6 cavity for additions in which the existing exterior siding is neither being replaced or removed. This change is necessary to provide a compliance pathway for additions involving the conversion of previous unconditioned space to conditioned space.

Exception to Section 150.2(a)1B – The purpose of this change is to exempt enclosed rafter ceilings from having to meeting the insulation requirements of 150.2(a)1Bi. This change is necessary due to complications caused by the geometry of the existing building’s roofline. It would be impossible to meet the insulation requirements of 150.1(c).

Section 150.2(a)1C – The term “dwelling unit” mechanical ventilation is intended to be substituted throughout for the term “whole-building” mechanical ventilation when designating the ventilation airflow rate required by section 4 of ASHRAE 62.2 to mirror this change made to terminology in the 2016 version of ASHRAE 62.2. This is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

150.2(a)1Di: The purpose of the change to this Section is to remove the phrase “natural gas or propane” because the prescriptive options proposed under 150.1(c)8 includes water heating systems other than natural gas or propane. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.2(a)1Div: The purpose of removing this Section is to eliminate redundant and potentially confusing language: the option specified in this Section is a performance approach to compliance, and is not a prescriptive requirement. As such, this Section is fully redundant with Section 150.2(b)2. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(a)2C – The term “dwelling unit” mechanical ventilation is intended to be substituted throughout for the term “whole-building” mechanical ventilation when designating the ventilation

airflow rate required by section 4 of ASHRAE 62.2 to mirror this change made to terminology in the 2016 version of ASHRAE 62.2. This is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section 150.2(b)1A – The purpose of the change to this Section is to simplify language, use consistent terminology, and to more quickly direct readers to Table 150.1-A and B, where the prescriptive requirements are located. While substantive updates to Table 150.1-A and B are proposed, and are described below, the changes to the language of this Section clarify without materially altering the requirements in the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1Ci and 150.2(b)1Cii – The purpose of the change to this Section is to exclude reference to Section 150.0(m)11, capitalize the table reference and to replace an ambiguous allowance for systems where “the TDV energy use of the new system is more efficient than the existing system” with a specific Exception applicable to heat pumps. Fundamentally, specifying determination of TDV energy use is specifying use of performance modeling, which is a separate compliance path from prescriptive compliance: the ability to install TDV-equivalent equipment is already provided by the performance compliance path, and including the phrasing here would still require performance modeling despite being presented as a prescriptive option. Heat pump equipment was the most likely to make use of this provision, and is held to federal appliance efficiency standards, therefore staff have proposed to replace this provision with a prescriptive Exception for heat pumps.

The substantive effect of these changes is to allow prescriptive electrification of existing residential buildings, rather than requiring use of performance modeling. Removal of reference to Section 150.0(m)11 is necessary as this Section relates to duct sealing and duct requirements for alterations are specified in the next subsequent Section, Section 150.2(b)2D, making the reference to 150.0(m)11 potentially confusing and potentially in conflict with the explicit requirements of Section 150.2(b)2D and 150.2(b)2E. Removal of the allowance for TDV-equivalent systems is necessary to correctly separate the prescriptive and performance compliance approaches. Correcting the table reference is necessary for consistency since the table headings are capitalized. Addition of the Exception for heat pumps is necessary to allow for electrification projects to proceed without requiring potentially costly energy modeling, while still guaranteeing that efficient equipment is used for space heating.

Section 150.2(b)1D – The purpose of the changes to this Section are to relocate the duct leakage compliance requirements for entirely new or complete replacement duct systems in multifamily dwelling units for alterations from Table RA3.1-2 to be included with the existing specifications for single family dwelling units in this subsection. Relocating this specification allows elimination of duct leakage target values from Table RA3.1-2 in keeping with the convention of specification of compliance targets in the Standards language, and verification procedures the Residential Appendices. Accordingly, the reference to Table RA3.1-2 has been deleted from this section. Additionally, additional language clarifies that 150.2(b)1Diib is applicable to both single family and multifamily dwellings. This change is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1E – The purpose of the changes to this Section are to simplify phrasing and clearly state that this Section applies to both single family and multifamily dwellings, consistent with the overall scope of Section 150.2. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1Fii – The purpose of this change is to separately identify Small Duct High Velocity (SDHV) systems from other types of air cooled air conditioners and air source heat pumps. This change is necessary because subsection 150.2(b)1Fiia contains specific airflow requirements for SDHV systems separate from other air cooled systems. This change clarifies and gives direction to users of Part 6 that SDHV systems are categorized separately.

Section 150.2(b)1Fiia – The purpose of the change to this Section is to incorporate the specific airflow value applicable for Small Duct High Velocity (SDHV) systems., SDHV systems are inherently different and operate differently than other air cooled air conditioners and heat pumps, therefore SDHV systems needed a different target airflow. The value specified in this change has been determined to apply to all certified SDHV air conditioners and heat pumps and is consistent with other mentions of airflow for SDHV systems in other sections of Part 6. This change is necessary to ensure that the proposed airflow value is used for performing required refrigerant charge testing of SDHV systems. With this change to identify SDHV system airflow, EXCEPTION 2 is no longer relevant and therefore must be removed. The purpose of the change to EXCEPTION 1 is to remove specific airflow values since these are already within Section 150.2(b)Fiia, which now contains multiple airflow values. Rather than incorporate more than one value into the exception and further complicate verbiage, Staff determined mentioning specific airflow values was unnecessary and had no material effect. The purpose of the change to EXCEPTION 3 is to update reference with the removal of EXCEPTION 2. These changes are necessary for simplicity and clarification, and do not materially alter the requirements of the Draft Express Terms and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

EXCEPTION 1 to Section 150.2(b)1Fiia – The purpose of the change to this Exception is to update reference to Joint Appendix 5 to instead reference Section 110.12, consistent with moving and consolidating demand response requirements in that Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

EXCEPTION 1 to Section 150.2(b)1Fiib – The purpose of the change to this Exception is to update reference to Joint Appendix 5 to instead reference Section 110.12, consistent with moving and consolidating demand response requirements in that Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1Fiii – The purpose of this change is to separately identify Small Duct High Velocity (SDHV) systems from other types of air cooled air conditioners and air source heat pumps. This change is necessary because subsection 150.2(b)1Fiiia contains requirements for SDHV systems as well as other air cooled systems. This change clarifies and gives direction to users of Part 6 that SDHV systems are categorized separately. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16insert purpose and necessity of changesSection 150.2(b)1G – (Check with Jeff; we will need to describe how this is not redundant with 150.2(b)2C, given that it specifies “replacement”.)

Section 150.2(g) – The purpose of this change is to give direction to an alteration scenario that the 2016 Standards did not mention. Prior to the 2013 Standards, space conditioning system alterations were subject to the fuel switching limitation of Section 150.2(b)1C. During the 2013 Standards update Section 150.2(b)1C became only applicable to complete replacement space conditioning system which consisted of mechanical cooling or heating equipment and associated

distribution systems such as duct work. With this change under the 2013 Standards, mechanical cooling or heating equipment was no longer subject to the fuel switching limitation. This was an oversight and unintended consequence by making Section 150.2(b)1C only applicable to complete replacements.

From a new construction perspective, gas furnaces and electric heat pumps are viewed as equivalent for compliance with Part 6. With more interest in electrification there has been a growing need for a prescriptive alteration path for replacing gas furnaces with electric heat pumps. This change offers a prescriptive path but guards against replacing a gas furnace with an electricity intensive heating system such as electric resistance. Since the standards view gas furnaces and electric heat pumps as equivalent for new construction, Staff determined that the alteration scenario was substantially similar and therefore should be viewed the same. The substantive effect of this change is to allow prescriptive electrification of existing residential buildings.

150.2(b)1H, 150.2(b)1Hiii: The purpose of the changes to these Sections is to add the word "Altered" consistent with the Scope of Section 150.2(b) and the other Subsections of Section 150.2(b)1. This change is necessary to avoid ambiguity and ensure uniformity in the application of Section 150.2(b)1's subsections.

150.2(b)1Hii: The purpose of adding this Section is to move a specification currently in Sections 150.2(b)1Hiiia and 150.2(b)1Hiiib into a more appropriate location, and to redraft the specification for clarity. In addition, the Section now specifies that it applies only to recirculation systems serving individual dwelling units. The relocation of the specification clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Specifying that the Section applies only to recirculation systems serving individual dwelling units is necessary to prevent conflict between this provision and the recirculation requirements applicable to multifamily buildings.

150.2(b)1Hiiia: The purpose of the change to this Section is to remove a specification that was relocated to Section 150.2(b)1Hii. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.2(b)1Hiiib: The purpose of adding this Section (and renumbering the subsequent Sections) is to add an option to meet the water heating alteration prescriptive requirement by the installation of heat pump water heater with additional photovoltaic system capacity, consistent with the proposed inclusion of this prescriptive option in 150.1 for newly constructed buildings. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

150.2(b)1Hiiic: The purpose of adding this Section (and renumbering the subsequent Sections) is to add an option to meet the water heating alteration prescriptive requirement by the installation of heat pump water heater that meets the requirement of NEEA Advanced Water Heater Specification Tier 3 or higher, consistent with the proposed inclusion of this prescriptive option in 150.1 for newly constructed buildings. This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

150.2(b)1Hiiid: The purpose of the change to this Section is to more clearly specify the connection of gas to the building referred to by this Section and to remove redundant language; this includes removing the specification relating to recirculation systems that is proposed to be moved to Section 150.2(b)1Hii. This change clarifies without materially altering the requirements

in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.2(b)1Hiie: The purpose of the change to this Section is to more clearly specify the connection of gas to the building referred to by this Section. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

150.2(b)1Hiid (removed): The purpose of removing this Section is to eliminate redundant and potentially confusing language: the option specified in this Section is a performance approach to compliance, and is not a prescriptive requirement. As such, this Section is fully redundant with Section 150.2(b)2. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1I – The purpose of the changes made to this Section is to clarify that adding a new surface layer on top of the existing exterior surface shall be required to meet the requirements of Section 110.8. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)1J – The purpose of this change is to clarify that installation of lighting retrofit products into existing screw-base sockets as part of an alteration are not prohibited by Part 6, or specifically by Section 150.0(k) restrictions on installing ceiling-recessed screw-base sockets in newly constructed buildings. To the extent the existing language could have been understood to require removal of existing screw-base sockets, or to prohibit the use of existing sockets by new retrofit kits, this change has the substantive effect of permitting existing screw-base sockets to remain in place and be used to power newly installed lighting retrofit devices, and is necessary to avoid either prohibiting installation of energy efficient devices or require unneeded alteration of existing sockets. Otherwise, this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)2 – insert purpose and necessity of replacing the text and note with “The altered component(s) and any newly installed equipment serving the alteration shall meet the applicable requirements of subsections A, B, and C below.”

Section 150.2(b)2 – the purpose of the change is to delete an unnecessary limitation and Note, and to replace that text with a preamble to give clear direction for use of subsections A, B, and Cand as necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section 150.2(b)2A – The purpose of the change to this Section is to incorporate the effect of an existing Exception directly into Section language by providing more detailed reference to the applicable portions of Section 150.0(m); this avoids the need to look on multiple pages to understand the Scope of this Section. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

TABLE 150.2-C – The purpose of the changes made to this Table is to define the standard design for an altered door both with and without third party verification. This change is necessary to maintain consistency with other measures, and to provide an opportunity for potential performance compliance credit when verifying the existing condition.

EXCEPTION 3 to Section 150.2(b) – the purpose of the change to delete this exception is to coordinate with the changes made to references to 150.0 mandatory requirements specified in Section 150.2(b)1, 150.2(b)1C, and 150.2Bb)2A, to eliminate confusion and to clarify the direction for applicability of mandatory requirements for both prescriptive and performance compliance. The change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

APPENDIX 1-A DOCUMENTS INCORPORATED BY REFERENCE

The purpose of changing the title of this Appendix is to directly state the phrase “documents incorporated by reference” to more clearly and directly indicate that the purpose of Appendix 1-A is to list all documents incorporated by reference in the Standards or Reference Appendices by title and date. This change is necessary to ensure that all documents intended to be incorporated by reference in the Standards or Reference Appendices are adequately incorporated by reference, and to provide clarity to the public about what the purpose of Appendix 1-A is.

The purpose of the changes within the Appendix is to accurately identify all of the documents incorporated by reference in Part 6, where these references are proposed to be updated in 2019 or where a reference was missing from Appendix 1-A in previous versions of the Standards and Reference Appendices, and to delete documents that are either not referenced in Part 6 or the Reference Appendices or that were not intended to be incorporated by reference. These changes are necessary to ensure that all documents intended to be incorporated by reference into the Standards and Reference Appendices are adequately incorporated by reference and to provide clarity to the public about the full title, date, and location of the documents incorporated by reference into the Standards or Reference Appendices.

APPENDICES TO THE REGULATIONS

The Alternate Calculation Approval Manual (ACM Manual) and all of the Reference Appendices are adopted along with and are a part of the standards. Due to their volume and complexity, they are not codified. They are incorporated by reference. The purposes, rationales, necessity and benefits of the changes to these documents are described below.

REFERENCE APPENDICES

JOINT APPENDICES

JA1 – Definitions

JA1 – The purpose of the changes to this Appendix are to use the term “Definitions” for the Section’s title, remove definitions that are redundant with those stated in Part 6 Section 100.1, and incorporate reference to Part 6. In addition, the following amendments to specific definitions are proposed:

Definitions were added for Battery System, Stationary Storage and California Flexible Installation

(CFI) to support proposed new Appendices 11 and 12. These changes are necessary to ensure accurate and precise definitions for two situations that affect system installation.

A definition was added for California Public Utilities Commission (CPUC) Rule 21, to support a reference to Rule 21 in the newly proposed Joint Appendix 11. This change is necessary to provide formal name and citation to the CPUC rule.

Definitions were added for “Fume Hood Sash Obstruction Sensor” and “Sash Zone Presence Sensor”, to support their use in NA7 and define the specific sensors being evaluated for the test. This change is necessary to provide a level of granularity needed for testing of automatic fume hood sash closures that is not required for general discussion of the devices in Part 6.

The definition of “Omnidirectional Lamp” was updated to match the definition used in the most recent version of the ENERGY STAR Lamps specification, consistent with its use in JA8. This change was necessary to ensure consistency with the ENERGY STAR.

The word “Multifamily” was corrected to not be hyphenated where it occurs in the definitions of “Low-Rise Residential Building”, “Model”, and “Multifamily Dwelling Unit”. This change was necessary to ensure consistent presentation of the term.

The substantive effect of adding the noted definitions is described in the Sections in which they are used. Adding these definitions is necessary to support the noted Sections.

The update to the definition of “Omnidirectional Lamp” is necessary to support updating the ENERGY STAR test procedures incorporated by reference, and ensure that the definition here is consistent with the definition in the test procedures.

Correcting the word “multifamily”, as well as the removal of redundant definition language and replacement with reference to Part 6, clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

A definition was added for “NEMA LE 7-2015”, to support its use in RA3.5.6.3. This change is necessary to ensure specificity in the version of the NEMA standard being referenced.

Finally, versions were updated for references to ANSI Z21.10.3, ASHRAE Standard 193, ASTM E2357, ANSI/IES RP-16, and UL 1598. These changes were necessary to maintain the currency of the Reference Appendices and ensure consistency with current national and international standards.

JA2 - Reference Weather/Climate Data

JA2 – The purpose of the changes to this Appendix are to allow use of projected polygons for determining climate zone, to place Table 2.1 into a nonregulatory document that allows for updates outside of the rulemaking cycle, to remove a potentially confusing reference to climate zone from Table 2.2, and to provide additional discretion to local jurisdictions in determining how to address zip codes that include multiple climate zones. These changes are necessary to facilitate use of Geographic Information System (GIS) tools for accurate assessments of climate zones and climate boundaries, and to allow more immediate responsiveness when new zip codes are created or existing zip codes are altered by the US Postal Service.

JA3 - Time Dependent Valuation (TDV) Data

(No changes to this Section.)

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

JA4.1.7, Equation 4-1 – The purpose of this change is to remove a typographical error that has duplicated the heading for Equation 4-1 onto an incorrect page. This change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

JA4.1.7, Table 4.3.8 – The purpose of the change to this Section is to add values for curtain walls to Table 4.3.8 consistent with, and as a companion to, the existing values for spandrel panels. In addition, the Section language is updated to specify the distinction between spandrel panels and curtain walls, and the assumptions used to generate the matching curtain wall data. This change is necessary to facilitate appropriate use of curtain walls via accurate performance data and ensure that curtain walls are not inappropriately considered equivalent to spandrel panels in thermal performance.

JA4, Tables 4.3.11 and 4.3.12 – The purpose of the updates to these Tables are to correct calculated values relating to log and straw bale construction. These values are intended to be based on values in the ASHRAE Handbook – Fundamentals, however a mathematical error was identified that caused them to be incorrect. This change is necessary to ensure the values in this Table are accurately calculated and are consistent with what would be determined by using the ASHRAE Handbook – Fundamentals.

JA5 – Technical Specifications For Occupant Controlled Smart Thermostats

JA5 - The purpose of the changes to this Appendix are to remove requirements that are redundant with Section 110.12, including OpenADR2.0a and 2.0b as incorporated by reference into Section 110.12, and to clarify and reorganize the remaining language. These changes have no substantive effect. These changes are necessary to support the consolidation of requirements into Section 110.12, while retaining detailed specification of default behaviors in this Appendix.

JA6 – HVAC Fault Detection and Diagnostic Technology

(No changes to this Section.)

JA7 – Data Registry Requirements

Section JA7.1 has been changed to standardize the use of the term Appendix JA7 instead of Joint Appendix JA7, or Reference Joint Appendix JA7. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Asymmetric Key Encryption has been changed to clarify the reference to the California digital signature regulations. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Commission Compliance Document Repository was changed to change to make a typographical correction to make the word registered a word that is not capitalized. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections

11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Compliance Registration Package was changed to include digitally signed with encrypted as descriptors for the data, and to clarify that Zip file format is a commonly used file format, but not to characterize it as the most commonly used method. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Data Registry, Residential Data registry, and Nonresidential Data Registry, to use the term "Title 24, Part 6" instead of "Part 6". The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Digital Certificate was changed to revise the format for the reference to the California digital signature regulations. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for External Digital Data Source (EDDS) is a new definition needed to support new requirements for data exchange specified in Section JA7.7. This change is necessary because it is referenced in the Standards

Section JA7.2 definition for Documentation Author was changed to make a typographical correction to capitalize only the first letter of Documentation, and to capitalize only the first letter of Author. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Electronic Signature is changed to update the format of the reference to the California definition of electronic signature. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Field Technician was updated to revise the term Reference Joint Appendix to Appendix. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definitions for HERS, HERS Provider, and HERS Rater are changed to update the format for the references to the title 20 HERS regulations. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Registration has been changed to clarify the digital signature appearance is displayed following the registration signer's signature block. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Registration signer has been changed to clarify the references to

Sections 10-103 are in chapter 10 of Title 24, Part 1. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for Standards has been reworded. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for XML Schema has been changed to remove bold formatting from some of the words that should not have bold formatting. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.2 definition for XSL-FO has been changed to change a word from a to an. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.3 has been changed to standardize terminology for Appendix JA7 and data registry requirements Manual. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.4.1 is changed to standardize the term Appendix JA7 and to clarify that Registration Providers are required to be approved in accordance with Section JA7.8. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.4.5 has been changed to clarify that Field Technicians shall be certified Acceptance Test Technicians when required by Section 10-103.1 or 10.103.2. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.4.7 is changed to clarify that there may be other interested parties to the construction project besides builders, designers, installers, and raters. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.2 is changed to provide clarifying details and to reorganize the text for better readability. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.3 has been changed to correct the words "can all" to "shall". The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.3.1 is changed to clarify that use of a symbol such as n/a is also allowed. The

change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.4 is changed to clarify the standardized use of "Appendix JA7" terminology and to change use of "are" to use of "shall be". The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.4.1 is changed to clarify that the numbering convention is "described" in Section JA7.5.4.2 since the numbering convention layout has been moved into the Data Registry Requirements Manual that is approved by the Energy Commission. Maintaining the numbering convention in the Data Registry Requirements Manual is necessary in order to make possible revisions to the numbering convention if needed, so that the needed changes can be approved by the Energy Commission between code cycle updates. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.4.2 is changed to delete the numbering convention layout in order for the numbering convention to be moved into and maintained in the Data Registry Requirements Manual that is approved by the Energy Commission. Maintaining the numbering convention in the Data Registry Requirements Manual is necessary in order to make possible revisions to the numbering convention if needed, so that the needed changes can be approved by the Energy Commission between code cycle updates. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.5 is changed to add the word shall to clarify that the digital signature technology required to be used for document registration shall make electronic verification possible. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.6 is changed to eliminate a reference to 2013 standards introducing mandatory HERS verification for which there are compliance options, and to say instead that the Standards specify this. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.6.1 is changed to clarify the wording of the project status report requirement, and to include mention that other parties to the construction project besides builders, designers, installers, and raters may be recipients of communications from enforcement agencies contained in project status reports. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.7.1, Section JA7.5.8, JA7.5.9, and JA7.5.10 are changed to clarify that direction for data input for creation of compliance documents is given in Section JA7.7.1, and deletes reference to Section JA7.9 because JA7.9 has been deleted. The approval methods that were previously given in Section JA7.9 have been relocated to be integrated into the approval requirements for Data Registries in Section JA7.8. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.5.9.2 is changed to delete detailed description of the numbering convention in order for the numbering convention to be moved into and maintained in the Data Registry Requirements Manual that is approved by the Energy Commission. Maintaining the numbering convention in the Data Registry Requirements Manual is necessary in order to make possible revisions to the numbering convention if needed, such that the needed changes can be approved by the Energy Commission between code cycle updates. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section JA7.6.2.2.2 is changed to improve the clarity of the language. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Sections JA7.6.2.2.4, JA7.6.2.2.5, are changed to improve the clarity of the language, and to include mention that additional guidance is given in the Data Registry Requirements manual. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.2.2.6 is changed to use the term signature instead of certificate. The change is not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.2.2.7 is changed to use new terminology "External Digital Data Source" (EDDS) as a substitute for the use of "other software tools" in order to clarify the distinction between data sources used for data input to Data Registries, and Compliance Software Tools that are approved by the Energy Commission that produce Certificate of Compliance documents. The change adds a reference to Section JA7.7.1.2 where requirements for use of EDDS are given. The change adds a reference to the Data Registry Requirements manual for additional guidance for use of EDDS. The change is necessary in order to maintain consistency with Section JA7.7.

Section JA7.6.2.3.4 is changed to provide clarification that the electronic documentation described in this section is the type that is output from the compliance software tools approved by the Energy Commission, and to provide additional description for the type of information that is appended to these documents including registration numbering and date and time stamps. A mention is added that additional guidance is given in the Data Registry Requirements Manual. These requirements are not substantive changes. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.2.4.1 is deleted because it is obsolete and no longer applicable due to the fact that the Data Registry requirements are no longer on a software development schedule. Approval of Data Registries is fully specified in Section JA7.8. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.2.4.2 numbering is changed to JA7.6.2.4.1 and is changed to add mention that guidance for use of digital signature technology and digital certificates is given in the Data Registry Requirements manual. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.3.1.2 is changed to correct the term for Commission Compliance Document

Repository to be consistent with the definition in section JA7.1, to edit the section to clarify the descriptions of digital signature verification, to eliminate use of the proprietary name Adobe Reader and mention that there are numerous freeware PDF readers that can be used, to delete a requirement to have a security protocol approved by the Energy Commission and substitute a reference to the JA7.7.1.6 requirement for Security and Authentication for the Performance Certificate of Compliance, and to delete mention of the Data Registry Requirements Manual in this location because it is mentioned in JA7.7.1.6. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.3.1.2 is also changed to delete a specification for guidance to be included in the 2016 ACM Reference Manual. This is needed because the ACM reference manual does not provide guidance for these data transmittals. Rather the procedures for validating security of transmittals are given in JA7.7.1.6 and guidance is given in the data registry requirements manual. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section 6.3.2.1 is changed to clarify the authorized user gives an electronic image of their signature to the Registration Provider not the Data Registry, and adds an option for the Registration Provider to make available alternative methods for creating the electronic image for the electronic signature. The change is necessary to allow reasonable flexibility to users and does not diminish the validity of the electronic signatures. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.3.2.4 is changed to delete the words "Reference Joint" in order to be consistent with use of the term Appendix JA7 and to substitute the word "in" for "given". The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.3.2.4 is changed to clarify that in addition to digitally signing the compliance document, the Registration Provider must make available a procedure that allows users to securely acquire the digital certificate issued by the Data Registry's certificate authority. This requirement is needed in order to ensure the electronic document can be authenticated by freeware PDF readers. To the extent that electronic authentication is made available to persons such as enforcement agencies who receive electronic copies of registered documents, better enforcement of the Title 24, Part 6 building energy efficiency standards is made possible, and this change is necessary to improve these processes. This change is ultimately necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section JA7.6.3.2.4 is changed to relocate the required statement that the provider is not responsible for the accuracy of the information, and clarifies that the digital signature appearance is required only once after the responsible person's signature block, and does not require other information to be included in the digital signature appearance such as water marks date or time stamps. This change is necessary in order to make creation of the digitally signed documents less complicated and technologically less difficult to implement, but does not reduce the reliability of the security the digital signatures provide.

Section JA7.6.3.2.6 is changed to make clarifying edits to the language. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.6.3.2.7 is changed to substitute use of a new defined term External Digital Data Source (EDDS) for the term “other software tools” in order to draw the distinction between external digital data sources and performance compliance software approved by the Energy Commission. Reference to JA7.7.1.2 is added for requirements for use of EDDS, and reference to JA7.7.1.6 is added for requirements for use of compliance software approved by the energy commission. The changes are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.7 preamble is changed to more clearly describe the data exchange processes that have been implemented in data registries as determined during the implementation of the data registry requirements as software applications. The changes are not substantive. The changes are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.7.1 is changed to more clearly describe the data exchange transaction types including keyed-in data entry described in JA7.7.1.1, compliance software output described in JA7.6.1.6, and use of a new defined term External Digital Data Source (EDDS) described in JA7.7.1.2 and reference was added for approval requirements for EDDS given in JA7.8. A statement requiring EDDS to be approved by the Energy Commission is required as prerequisite to use of an EDDS. Language that required use of Title 24, Part 1 Section 10-109 or use of approval procedures in Section JA7.9 is deleted. The changes are necessary in order to clarify the distinctions between these data transfer types, and to give direction for approval of EDDS. To the extent that these requirements are necessary for ensuring the integrity of the document registration process, which ensure compliance with the Title 24, Part 6 Standards requirements, this change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section JA7.7.1.2 is changed to substitute a new defined term “External Digital Data Source” for a deleted term “software tools” which was not intended to mean the same thing as the performance compliance software approved by the Energy Commission. The descriptions for the transfer of data and images (related to “software tools”) is deleted, and language that is specific to the EDDS is inserted and clarified to be an alternative to key-in data entry, and specifies that EDDS are required to be approved in accordance with Section JA7.8. To the extent that these requirements are necessary for ensuring the integrity of the document registration process, which ensure compliance with the Title 24, Part 6 Standards requirements, this change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section JA7.7.1.2.1 is a new subsection added in order to list EDDS data exchange requirements as follows:

- a) The data exchange from an EDDS to a Data Registry shall be initiated only by an authorized user of the Data Registry; only while the user is logged into his Title 24, Part 6 Data Registry user account; and only by use of a data exchange feature managed and made available to the user by the Data Registry user interface.
- (b) The data exchange from an EDDS to a Data Registry shall not be an unattended automatic electronic data exchange transaction.
- (c) The Registration Provider shall ensure the authorized user has the opportunity to review and revise the information transmitted to the data registry by use of an EDDS prior to making electronic signature controls available to the user.

- (d) The Registration Provider shall be responsible for managing the security and integrity of the data exchange with the EDDS.
- (e) The Registration Provider shall ensure that user data uploads to the EDDS, and subsequent storage and maintenance of compliance data in the EDDS are done using best practices for secure data exchange and secure data storage.
- (f) The Registration Provider shall ensure that the data exchange processes that import data into the Data Registry from the EDDS are performed using best practices for secure data exchange.
- (g) The user's compliance data may be uploaded automatically to an EDDS datastore, such as by network-connected diagnostic field verification instruments, or it may be keyed in by the user using an EDDS services software user interface.
- (h) The data transmitted from an EDDS to a Data Registry shall conform to the XML schema for each respective Title 24, Part 6 compliance document for which the data is to be used. All data provided to complete compliance documents shall be subjected to data validation by the Data Registry software after the data is transmitted to the Data Registry.
- (i) The current compliance document schemas approved for use by the Energy Commission shall be made available to the EDDS services providers as needed in order to clarify the Title 24 Part 6 compliance document data requirements.
- (j) Additional guidance for interfacing with and managing EDDS technical features may be given in the Data Registry Requirements Manual

Addition of these EDDS requirements makes available to Data Registries and to authorized users of Data Registries, greater flexibility in the available methods for data input for document registration procedures, and potential for improvements data input accuracy. Registration Providers and data Registry users have requested the energy commission provide this added data input utility. To the extent that these requirements are necessary for ensuring the integrity of the document registration process, which ensure compliance with the Title 24, Part 6 Standards requirements, this change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section JA7.7.1.2.2 is a new subsection added in order to describe 3 External Digital Data Sources (EDDS) that are expected to be used, but does not limit use of other types of EDDS if approved by the Energy Commission. The types listed are as follows:

- (a) Diagnostic instrument manufacturer services that incorporate wireless or web-based data logging capabilities into their products, capture and store relevant information from field diagnostic testing procedures, and provide digital access to the stored data to the diagnostic tool owners and other parties to the field verification procedure.
- (b) Third party quality control programs (TPQCP) that verify the work of participating installers, collect and evaluate more detailed data than necessary for compliance, identify in real-time during the installation invalid and inaccurate installer testing and noncompliant installations, and enable corrected testing with the goal of bringing installations into compliance before the installer leaves the job site. TPQCP descriptions and requirements are specified in Appendix RA2.7.
- (c) Internet-based datastores that are administered to ensure the security and integrity of data input to the datastore by authorized users of Title 24, Part 6 Data Registries, who

subsequently transmit the stored data to a Title 24, Part 6 Data Registry while logged-in to the Data Registry during Title 24, Part 6 document registration procedures.

Addition of these EDDS requirements makes available to Data Registries and to authorized users of Data Registries, greater flexibility in the available methods for data input for document registration procedures, and potential for improvements data input accuracy. Registration Providers and data Registry users have requested the energy commission provide this added data input utility. To the extent that these requirements are necessary for ensuring the integrity of the document registration process, which ensure compliance with the Title 24, Part 6 Standards requirements, this change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section JA7.7.1.3 is changed to clarify the electronic image file format used for compliance documents. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.7.1.4 is changed to reorder and revise the language to improve clarity and readability. The changes are not substantive. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16

Section JA7.7.1.6 is a new subsection that provides direction to data Registries to digitally inspect the Certificate of Compliance Registration Packages submitted for registration to ensure both the Certificate of Compliance data and PDF image components of the compliance software output are authentic and have not been tampered with. Mention is included that guidance for Data Registry use of the digital signing technologies shall be given in the Data Registry Requirements Manual. To the extent that these requirements are necessary for ensuring the integrity of the document registration process, which ensure compliance with the Title 24, Part 6 Standards requirements, this change is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

JA8 – Qualification Requirements for High Efficacy Light Sources

The purpose of the changes to this Appendix are to improve harmonization with State and federal standards, including ENERGY STAR standards, and specifically to incorporate the most recent versions of the referenced ENERGY STAR tests for lumen maintenance and rated life and eliminate differences between this testing and the testing required for JA8. Harmonizing with these requirements is necessary to avoid imposing redundant testing requirements that do not generate novel information or additional benefit, given that these tests are often costly to perform.

The changes also include clarifying sample size requirements, updating references to required federal efficiency tests, allowing Title 20 regulated light sources subject to Color Rendering Index (CRI) requirements under those regulations to be compliant with JA8 CRI requirements, clarifying reference to the ENERGY STAR test for audible noise, and removing specific Du'v' requirements relating to color temperature that are more narrow than those specified in applicable reference standards. These changes are similarly necessary to streamline compliance and prevent conflict between requirements of different programs.

Lastly, the changes include applying the existing 4000K color temperature limit to all light sources, rather than a split 3000K limit for some lighting types and a 4000K limit for others. This change is necessary to remain technology neutral with regard to the types of lighting devices that may be installed within newly constructed residential buildings, and to simplify and streamline overall compliance.

JA8.3.3 – The purpose of the change is to add test procedure outlines for light source with fade-in feature and also for light source with a standby power mode. This is necessary as the existing test does not contain the procedures to handle the operation scenario of light source with fade-in feature and also for light source with a standby power mode. The change is also necessary to clarify the test and thereby avoid confusions of any manufacturers and test laboratories from conducting the test on light source products with fade-in feature or with a standby power mode.

JA8.3.7 – The purpose of the change is to incorporate the most recent versions of the referenced ENERGY STAR tests for noise to the JA8 audible test requirement. The change is necessary to avoid outdated testing requirements that do not generate benefit and could cause confusion to manufacturers and testing laboratories conducting the tests.

JA8.4.6 – The purpose of the change is to re-write the exception for the section by deletion of the exception and incorporate the Exception's requirement as part of the section. This change does not materially alter the requirements, and are necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

JA8.5 – The purpose of the change is to update the marking date to "2019" in order to reference to the changes to the Standards update. This updated change does not materially alter the requirements in the Draft Express Terms, and are necessary to improve the code's compliance with clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

JA9 – Qualification Requirements for Low Leakage Air Handling Units:

(No changes to this Section.)

JA10 – Test Method for Measuring Flicker of Lighting Systems and Reporting Requirements

(No changes to this Section.)

JA11 – Qualification Requirements for Photovoltaic Systems

The purpose of adding this appendix is to support updates to the Standard language requiring installation of solar photovoltaic systems. The Appendix includes specification of array orientation, shading verification, system monitoring, and interconnection requirements, and provides requirements for installers as well as verification procedures for building inspectors. This appendix is necessary to describe in specific detail the qualification and installation requirements for photovoltaic systems.

JA12 – Qualification Requirements for Battery Storage Systems

The purpose of adding this appendix is to support updates to the Standard language relating to installation of a residential battery storage system. This appendix describes the qualification requirements for battery storage systems, including minimum battery performance criteria, control strategies, safety, and interconnection requirements. This appendix also provides verification procedures for building inspectors. This appendix is necessary to describe in specific detail the qualification and installation requirements for battery storage systems.

RESIDENTIAL APPENDICES

RA1 – Alternative Residential Field Verification and Diagnostic Test Protocols

RA1 – The purpose of the change to this Appendix is to update a link to compliance information and suggestions present on the Energy Commission website. This change is necessary to ensure the correct functioning of the included link, and otherwise clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2 – Residential HERS Verification, Testing and Documentation Procedures

RA2 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table RA2-1 – The purpose of the changes made to this Table is to clarify that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to reflect that QII is now a prescriptive measure.

Table RA2-1 the purpose of the changes in this table is to ensure it accurately mirrors the HERS verifications that are presented in RA2. Accordingly Rated Heat Pump Capacity RA3.4.4.2 is added for use when the performance compliance approach requires verification, Maximum Rated Total Cooling Capacity formerly RA1 is deleted as it is no longer an available performance compliance credit, Whole House Fan RA3.9 is added for use when the performance compliance approach requires verification, Central Fan Ventilation Cooling System RA3.3.4 is added for use when the performance compliance approach requires verification. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.3.1.1 is changed to delete reference to Maximum Rated total cooling capacity credit which is a verification that is no longer offered, and to clarify that Dwelling Unit Envelope sealing is not allowed as a whole-building compliance feature. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.4.1 is changed to mirror the allowance for enforcement agency viewing of compliance documents in a HERS Registry as specified in Standards Section 10-103(a)3F and 10-103a)5C. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.4.3 is updated to mirror the changes made to the Third Party Quality Control Program TPQCP requirements section RA2.7. The description of the changes are given the descriptions of the changes to RA2.7 below.

Section RA2.5 is changed to mirror the allowance for enforcement agency viewing of compliance documents in a HERS Registry as specified in Standards Section 10-103(a)3F and to reference the delegated signature authority section 10-103(a)3A. The changes are necessary to improve

Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.6.1 is changed to mirror the allowance for enforcement agency viewing of compliance documents in a HERS Registry as specified in Standards Section 10-103(a)5C. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.6.3.2 is changed to clarify the procedure for opening a new sampling group and does not substantively alter the procedure. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7 is changed to clarify Third Party Quality Control Program (TPQCP) responsibilities, data collection responsibilities for TPQCPs, HERS Provider responsibilities with regard to TPQCPs, HERS Rater responsibilities with regard to TPQCPs, and conflict of interest guidelines for TPQCPs. The RA7 information has been reordered and renumbered to aid readability. Since the changes to RA2.4.3 are mirrored from RA7, the change information that follows is described for RA2.7 subsections, but the change information also applies to the mirrored changes shown in RA2.4.3.

Section RA2.7 preamble restates the description of the function of the TPQCP and does not represent a substantive change. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.7.1 is a new subcategory TPQCP that collects into one location and restates existing responsibilities to clarify the requirements, and also introduces a new substantive requirement for use of automatic location tracking of the TPQCS instruments or software tools. The requirement for location tracking is necessary in order to ensure the integrity of the TPQCP requirements for the testing and corrections feedback from the TPQCP to the installer in the field actually happen in the field as expected which is part of the reasoning behind granting TPQCPs a 1 in 30 sampling allowance. The addition of use of location tracking is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

RA2.7.2 is a new subsection that collects into one location and restates existing data collection requirements. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7.3 is a new subsection that collects into one location and restates existing HERS Provider responsibilities with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7.4 is a new subsection that collects into one location and restates existing HERS Rater responsibilities with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7.5 is a new subsection that collects into one location and restates existing conflict of interest guidelines with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7.6 is a new subsection that collects into one location and restates existing conditions of TPQCP approval. There is one substantive change that requires the TPQCP applicant to submit a detailed description of the training the TPQCP will provide to the installing contractors. This change is necessary to clarify the training expectations thus to ensure the integrity of the TPQCP. The ensuring the installer training requirements are clearly defined is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402. The other clarification changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA2.7.7 is a new subsection that collects into one location and restates the training requirements for TPQCP installing contractors. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA2.8 is changed to clarify the use if installation certificates at final inspection when a Third Party Quality Control Program is used. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3 – Residential Field Verification and Diagnostic Test Protocols

RA3 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA3.1.4.2.2 is changed to clarify that the protocol is applicable to both split and packaged systems and that nominal air handler airflow is applicable to small duct high velocity systems and specifies 250 cfm per nominal ton of condensing unit cooling capacity for use for small duct high velocity systems consistent with requirements given in Standards Section 150.0(m)13D. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table RA3.1-2 is changed to eliminate the duct leakage compliance criteria that are already specified in Standards section 150.0(m)11, Standards Section 150.2(b)1D, and Standards Section 150.2(b)1E. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA3.3.4 is a new protocol added to provide direction for field verification of central fan ventilation cooling systems (CFVCS) when performance compliance specifies use of a CFVCS. the addition of the new verification protocol is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

Section RA3.4.4.1 is changed to include HSPF since a new protocol for verifying heat pump ratings is added to Section RA3.4.4.2. Additionally there is language to clarify that the name of the product certification directory used for the verification shall be reported, and if the product directory publishes a certification number for the system, the certification number shall also be reported. This change does not make a substantive change to the verification protocol, but clarifies the data reporting information requirement. The changes are necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402, and to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section RA3.4.4.2 is added to provide a verification protocol for heat pumps when heat pumps verification is specified by the performance compliance approach. The new verification protocol is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

RA3.6.2 – The purpose of the changes to this Section are to edit for clarity and add reference to new pipe insulation requirements in the California Plumbing Code, consistent with the changes made to acknowledge the Plumbing Code in Part 6. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.6.4 – The purpose of the changes to this Section are to edit for clarity and delete unnecessary language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.6.5 – The purpose of the proposed change is to rename the existing credit to HERS-Verified Compact Hot Water Distribution System Expanded Credit and modify the qualification requirements. The proposed change is necessary to be consistent with changes in RA4.4.6.

RA3.6.9 – The purpose of the addition of this Section is to add a HERS verification procedure for Drain Water Heat Recovery Systems. This is a new compliance credit and this section is necessary to describe in specific detail the qualification and HERS verification requirements for this credit.

Section RA3.7.4.3 is added to provide a new verification protocol for kitchen range hoods as required by Standards Section 150.0(o)2B. The new verification protocol is necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

Section RA3.8 has been changed to reference the newest version of Residential Energy Services Network's (RESNET) Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems (ANSI/RESNET/ICC 380-2016) (RESNET 380). Additionally, protocol is changed to incorporate California-specific amendments: i) When multifamily dwelling unit enclosure leakage is to be tested, the test shall be conducted with the dwelling unit as if it were exposed to the outdoor air on all sides, top and bottom by opening doors and windows of adjacent dwelling units, ii) Only use of the One-Point Airtightness Test specified in RESNET 380 Section 3.4.1 is to be used for enclosure leakage, thus eliminating use of other tests specified by RESNET 380, iii) determination of the results has been amended to include calculation of a result in units of cfm50 per unit of dwelling unit enclosure surface area. To the extent that these changes simplify

verification of enclosures and reduce the number of compliance documents required for documenting the enclosure leakage, the change is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. and to the extent that the changes support new requirements for verification of enclosure leakage in multifamily dwelling units required in Section 150.0(o)D, the protocol is needed to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

Section RA3.9 is a new protocol that has been added to provide verification of Whole House Fan (WHF) airflow rates (cfm) and fan efficacy (w/cfm) when required by the performance compliance approach. The new protocol is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

RA3.5.1 – The purpose of the changes made to this Section is to clarify a note to specify that quality insulation installation applies to the entire thermal envelope for newly constructed buildings; previously, it could be read as conflicting with Part 6 language for additions and alterations that specify that only the added or altered components are subject to Part 6 requirements. As this note is explanatory, not regulatory, the changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve code's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.2 – The purpose of the changes made to this Section are to update the definitions for 'Compression', 'Delaminated', 'Friction Fit', and 'Inset Stapling' for clarity and readability. Additionally, allowable compression has been reduced from 50% to 30%, and acronyms for polyisocyanurate (PIR) and polyurethane (PUR) were added for consistency. A definition for 'Non-standard Framing' was also added for clarity. These changes are necessary to clarify the meaning and intent of each defined term, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3 – The purpose of the changes made to this Section is to clarify that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to align with the CASE report proposal, and reflect that QII is now a prescriptive measure.

RA3.5.3.1.1 – The purpose of the changes made to this Section are to incorporate proper terminology for 'flame spread index' and 'smoke development index', clarify that excessive compression is not allowed, and to remove duplicate language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.1.3 – The purpose of the changes made to this Section is to improve readability and remove legacy language. These changes are necessary to remove outdated language regarding what information is to be collected by the Certificate of Installation.

RA3.5.3.2 – The purpose of the changes made to this Section is to provide clarity and reduce redundancy. Language was inserted to capture other sealants used for air sealing, and some language condensed into an exception. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.2.1(b) – The purpose of the changes made to this Section is to provide a compliance pathway for cases where minimally expansive foam is not allowed. These changes are necessary to provide an alternative for sealing narrow-framed cavities around window frames and door jambs where the manufacturer’s warranty would be voided if minimally expansive foam was used.

RA3.5.3.2.3 – The purpose of the changes made to this Section is to provide clarity and improve readability by referring generally to obstructions rather than to specific common types of obstructions; to incorporate a second method of shaping insulation that may apply when accounting for obstructions; and to limit compression to less than or equal to 30% of the insulation’s nominal thickness, where previously this Section could be read as completely prohibiting any and all compression which is impractical for installation of insulation. These changes have the substantive effect of allowing broader and more flexible application of this Section to more types of insulation products, and are necessary to both allow appropriate installation of effective insulation products and avoid both being overly specific and being nonspecific in ways that impede effective installation of insulation.

RA3.5.3.2.5 – The purpose of the changes made to this Section is to provide clarity and to separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were made into their own subsection (RA3.5.3.2.10). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.2.6 – The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.2.8 – The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.2.9 – The purpose of the changes made to this Section is to address single member headers that are the same width as the wall. These changes are necessary to clarify that no insulation is required for full-width single member headers, provided the entire wall has at least R-2 continuous insulation.

RA3.5.3.2.10 – The purpose of the changes made to this Section is to address gable ends. Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.3 – The purpose of the changes made to this Section is to provide clarity, improve readability by correcting terminology, and address insulation around combustion appliance flues. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6’s compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.3.1 – The purpose of the changes made to this Section is to clarify that the requirements

of vented rafter ceilings. Additionally, language regarding insulation around combustion appliance flues was moved to Section RA3.5.3.3. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.3.2 (removed) – The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated with Section RA3.5.3.2.10. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.3.2 (new) – The purpose of the changes made to this Section is to provide clarity, as well as insert new language regarding compliance for batt insulation installed under an HVAC platform. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.3.3.4 – The purpose of the changes made to this Section is to incorporate verification procedures for below deck insulation. These changes are necessary to reflect that QII is now a prescriptive requirement in Part 6.

RA3.5.4 - The purpose of the changes made to this Section is to reflect that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to align with the CASE report proposal, and reflect that QII is now a prescriptive requirement.

RA3.5.4.1.1 - The purpose of the changes made to this Section are to incorporate proper terminology for 'flame spread index', 'smoke development index' and 'insulation contact (IC)', and to remove duplicate language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.1.3 - The purpose of the changes made to this Section is to improve readability and remove overly specific language referring to forms used to record compliance with Part 6: it is not necessary to refer to the specific content of the forms in this Section, versus simply referring to the form inclusive of its content. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.2(a) – The purpose of the changes made to this Section is to provide clarity and to capture other sealants used for air sealing. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.2.1(b) – The purpose of the changes made to this Section is to provide a compliance pathway for cases where minimally expansive foam is not allowed. These changes are necessary to provide an alternative for sealing narrow-framed cavities around window frames and door jambs where the manufacturer's warranty would be voided if minimally expansive foam was used.

RA3.5.4.2.3(c) – The purpose of the changes made to this Section is to provide clarity and to

align with the reduced threshold for allowable compression. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.2.5 - The purpose of the changes made to this Section is to provide clarity and to separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were made into their own subsection (RA3.5.4.2.10). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.2.6 - The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.2.9 - The purpose of the changes made to this Section is to address single member headers that are the same width as the wall. These changes are necessary to clarify that no insulation is required for full-width single member headers, provided the entire wall has at least R-2 continuous insulation.

RA3.5.4.2.10 - The purpose of the changes made to this Section is to address gable ends. Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.3 – The purpose of the changes made to this Section is to provide clarity, and improve readability by correcting terminology. Additionally, the length of time for insulation to settle has been increased to 14-days. These changes are necessary to allow loose-fill insulation more time to settle, as it can take up to 30-days to settle to its final installed thickness and assuming the bulk of the settling occurs after 7-days is too permissive. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.3.1 – The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.4.3(h). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.3.2 (removed) – The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.4.2.10. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.3.2 (new) – The purpose of the changes made to this Section is to provide clarity, as well as insert new language regarding compliance for loose-fill insulation installed under an HVAC platform. The changes clarify without materially altering the requirements of the Draft Express

Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.4.3.4 – The purpose of the changes made to this Section is to incorporate verification procedures for below deck insulation. These changes are necessary to provide appropriate support for its inclusion as a prescriptive requirement, consistent with the verification required for other prescriptive measures.

RA3.5.5 – The purpose of the changes made to this Section is to reflect that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to and reflect that QII is now a prescriptive requirement in Part 6.

RA3.5.5.1 – The purpose of the changes made to this Section are to incorporate proper terminology for 'flame spread index' and 'smoke development index', and to remove duplicate language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.1.2 - The purpose of the changes made to this Section is to improve readability and remove legacy language. These changes are necessary to remove outdated language regarding what information is to be collected by the Certificate of Installation.

RA3.5.5.2(a) – The purpose of the changes made to this Section is to provide clarity and to capture other sealants used for air sealing. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.2.1(b) – The purpose of the changes made to this Section is to provide a compliance pathway for cases where minimally expansive foam is not allowed. These changes are necessary to provide an alternative for sealing narrow-framed cavities around window frames and door jambs where the manufacturer's warranty would be voided if minimally expansive foam was used.

RA3.5.5.2.5 - The purpose of the changes made to this Section is to provide clarity and to separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were made into their own subsection (RA3.5.5.2.10). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.2.6 - The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.2.9 - The purpose of the changes made to this Section is to address single member headers that are the same width as the wall. These changes are necessary to clarify that no insulation is required for full-width single member headers, provided the entire wall has at least R-2 continuous insulation.

RA3.5.5.2.10 - The purpose of the changes made to this Section is to address gable ends.

Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.3 – The purpose of the changes made to this Section is to correctly identify a lighting requirement in Part 6 that affects insulation installation, and to provide consistency with other quality insulation installation (QII) Sections of the Reference Appendices. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.5.3.2 (removed) - The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.5.2.10. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6 - The purpose of the changes made to this Section is to reflect that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to reflect that QII is now a prescriptive requirement in Part 6.

RA3.5.6.1.2 – The purpose of the changes made to this Section is to reduce the allowable depressions to less than or equal to 1/2-inch. These changes are necessary as allowing ocSPF to vary in thickness by up to 1-inch over 10% of the surface area being insulated results in a significant increase in the overall U-factor of the assembly.

RA3.5.6.1.3 – The purpose of the changes made to this Section is to remove duplicate language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.1.5 - The purpose of the changes made to this Section is to improve readability and remove overly specific language referring to forms used to record compliance with Part 6: it is not necessary to refer to the specific content of the forms in this Section, versus simply referring to the form inclusive of its content. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.2.1(b) - The purpose of the changes made to this Section is to provide a compliance pathway for cases where minimally expansive foam is not allowed. These changes are necessary to provide an alternative for sealing narrow-framed cavities around window frames and door jambs where the manufacturer's warranty would be voided if minimally expansive foam was used.

RA3.5.6.2.4(b) – The purpose of the changes made to this Section is to provide clarity that the insulation shall be installed without gaps or voids. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.2.5 - The purpose of the changes made to this Section is to provide clarity and to

separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were made into their own subsection (RA3.5.6.2.10). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.2.6 - The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.2.9 - The purpose of the changes made to this Section is to address single member headers that are the same width as the wall. These changes are necessary to clarify that no insulation is required for full-width single member headers, provided the entire wall has at least R-2 continuous insulation.

RA3.5.6.2.10 - The purpose of the changes made to this Section is to address gable ends. Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.6.3(h) – The purpose of the changes made to this Section is to provide clarity and improve readability. Additionally, language has been added to capture recessed can lights rated for insulation contact (IC) appropriate for use with polyurethane spray foam. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarityCalifornia Government Code Sections 11349 and 11349.1,California Code of Regulations, Title 1, Section 16provide a compliance pathway for recessed can lights that comply with NEMA LE 7-2015.

RA3.5.6.3.2 – The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.6.2.10. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7 - The purpose of the changes made to this Section is to reflect that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to align with the CASE report proposal, and reflect that QII is now a prescriptive requirement.

RA3.5.7.1.1 – The purpose of the changes made to this Section are to incorporate proper terminology for 'flame spread index' and 'smoke development index', and to remove duplicate language. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.1.3 - The purpose of the changes made to this Section is to improve readability and remove legacy language. These changes are necessary to remove outdated language regarding what information is to be collected by the Certificate of Installation.

RA3.5.7.2.3 - The purpose of the changes made to this Section is to provide clarity and to separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were

made into their own subsection (RA3.5.7.2.8). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.2.4 - The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.2.8 - The purpose of the changes made to this Section is to address gable ends. Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.3 - The purpose of the changes made to this Section is to address light fixtures, and to provide consistency with other quality insulation installation (QII) Sections of the Reference Appendices. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.3.1 - The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.7.2.8. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.3.2 – The purpose of the changes made to this Section is to provide clarity and consistency with other quality insulation installation (QII) Sections of the Reference Appendices. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.7.3.4 – The purpose of the changes made to this Section is to improve grammar and readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8 – The purpose of the changes made to this Section is to reflect that quality insulation installation (QII) is no longer a performance compliance option. These changes are necessary to align with the CASE report proposal, and reflect that QII is now a prescriptive requirement.

RA3.5.8.1.1 – The purpose of the changes made to this Section are to incorporate proper terminology for 'flame spread index' and 'smoke development index', and to remove duplicate language regarding covers and obstructions that are already specified in preceding Sections. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.1.3 – The purpose of the changes made to this Section is to improve readability and remove legacy language. These changes are necessary to remove outdated language regarding what information is to be collected by the Certificate of Installation.

RA3.5.8.1.4 – The purpose of the changes made to this Section is to correctly reference the ICF installer. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.2.3 – The purpose of the changes made to this Section is to provide clarity and to separate out gable ends from kneewalls and skylight shafts. Requirements for gable ends were made into their own subsection (RA3.5.8.2.8). The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.2.4 – The purpose of the changes made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.2.8 – The purpose of the changes made to this Section is to address gable ends. Requirements for gable ends were separated out from kneewalls and skylight shafts, so that requirements pertaining only to gable ends could be addressed more specifically. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.3 – The purpose of the changes made to this Section is to address light fixtures, and to provide consistency with other quality insulation installation (QII) Sections of the Reference Appendices. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA3.5.8.3.1 – The purpose of the changes made to this Section is to reduce redundancy within the code. This language is already incorporated in Section RA3.5.7.2.8. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA4.4.1 – The purpose of the changes to this Section are to edit for clarity and add reference to new pipe insulation requirements in the California Plumbing Code, consistent with the changes made to acknowledge the Plumbing Code in Part 6. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA4.4.3 – The purpose of deleting this Section (and renumbering subsequent Sections) is to remove language relating to a compliance option that no longer exists due to changes in the California Plumbing Code: as the Plumbing Code now imposes a universal requirement for residential hot water pipe insulation, installation of the insulation referred to in this Section is no longer optional and provision of credit for going above the minimum requirements of California

law is no longer appropriate. This change is necessary as this credit no longer exists due to new pipe insulation requirement in the California Plumbing code.

RA4.4.6 [and subsequent renumbering] – The purpose of adding this Section (and renumbering subsequent Sections) is to add specifications relating to Compact Hot Water Distribution Systems. This is a new compliance credit and this section is necessary to describe in specific detail the qualification requirement for this credit.

RA4.4.16 – The purpose of the change to this Section is to rename the existing credit to HERS-Verified Compact Hot Water Distribution System Expanded Credit and modify the qualification requirements. The proposed change is necessary to be consistent with changes in RA4.4.6

RA4.4.20 – The purpose of the change to this Section is to add the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T) as a listing agency for solar water heating systems and collectors, consistent with their addition to Part 6. This change is necessary because IAPMO R&T has been approved by the Executive Director as listing agency as of August 8, 2017, and is proposed for addition into Part 6 as a part of this rulemaking.

RA4.4.21 – The purpose of adding this Section (and renumbering subsequent Sections) is to add specifications relating to Compact Hot Water Distribution System. This is a new compliance credit and this section is necessary to describe in specific detail the qualification and verification requirements for this credit. RA3.7.4.3 – The purpose of adding this Section is to provide a verification protocol for kitchen range hoods in support of Section 150.0(o)2B. The new verification protocol is necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

RA3.8 - The purpose of the changes made to this Section are to reference the newest version of Residential Energy Services Network's (RESNET) Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems (ANSI/RESNET/ICC 380-2016) (RESNET 380). Additionally, protocol is changed to incorporate California-specific amendments: i) When multifamily dwelling unit enclosure leakage is to be tested, the test shall be conducted with the dwelling unit as if it were exposed to the outdoor air on all sides, top and bottom by opening doors and windows of adjacent dwelling units, ii) Only use of the One-Point Airtightness Test specified in RESNET 380 Section 3.4.1 is to be used for enclosure leakage, thus eliminating use of other tests specified by RESNET 380, iii) determination of the results has been amended to include calculation of a result in units of cfm50 per unit of dwelling unit enclosure surface area. To the extent that these changes simplify verification of enclosures and reduce the number of compliance documents required for documenting the enclosure leakage, 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. and to the extent that the changes support new requirements for verification of enclosure leakage in multifamily dwelling units required in Section 150.0(o)D, the protocol is needed to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

RA3.9 – The purpose of adding this Section is to provide verification of Whole House Fan (WHF) airflow rates (cfm) and fan efficacy (w/cfm) when required by the performance compliance approach, consistent with verification of other HVAC-related equipment. The new protocol is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402.

RA4 – Eligibility Criteria for Energy Efficiency Measures

RA4 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA4.4.1 – The purpose of the changes to this Section are to edit for clarity and add reference to new pipe insulation requirements in the California Plumbing Code, consistent with the changes made to acknowledge the Plumbing Code in Part 6. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA4.4.3 – The purpose of the proposed deletion of this Section (and subsequent renumbering of later Sections) is to remove a credit that would now apply to an action that is mandatory under the California Plumbing Code. Because this action is no longer optional, it must be considered part of the standard design of the building and therefore cannot be awarded credit as an optional energy efficiency measure. This change is necessary for consistency with the change in the Plumbing code to require pipe insulation, and to avoid treating a mandatory requirement as an optional measure.

RA4.4.6 [and subsequent renumbering]: The purpose of the proposed addition of this Section is to add a new compliance credit for Compact Hot Water Distribution Systems. Minimizing the transit distance between the water heater and the fixtures requesting hot water reduces heat loss during transit and minimizes the amount of cold water resident in the piping that needs to be displaced before the hot water arrives at the fixture. Recognizing these efficiency benefits via a compliance credit therefore is necessary to ensure appropriate treatment under Part 6.

RA4.4.16 The proposed change will rename the existing credit to HERS-Verified Compact Hot Water Distribution System Expanded Credit and modify the qualification requirements. The proposed change is necessary to be consistent with changes in RA4.4.6

RA4.4.20 The proposed change will add the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T) as a listing agency for solar water heating systems and collectors, consistent with their approval by the Executive Director. As IAPMO is already approved to perform this function, this change clarifies without materially altering the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

RA4.4.21 The proposed change will add this section for Drain Water Heat Recovery System. This is a new compliance credit and this section covers the qualification and verification requirements for this credit. This change is necessary to support inclusion of Drain Water Heat Recovery in Part 6 consistent with other measures that provide compliance credit.

NONRESIDENTIAL APPENDICES

NA1 – Nonresidential HERS Required Verification, Testing and Documentation Procedures

NA1 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing; it does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.1 is changed to include multifamily dwelling units in the scope due to the inclusion of high-rise multifamily dwelling units in the scope of ASHRAE 62.2-2016 and incorporated into Title 24, Part 6 in accordance with the Requirements in Standards Section 120.1(b)2. Additionally, there is a change to add language to clarify that Acceptance Test Technicians (ATT) may serve the function of a HERS rater for field verification purposes as specified by the new section NA1.9. To the extent that the changes support new requirements for verification of enclosure leakage in multifamily dwelling units required in Section 150.0(o)D, the protocol is needed to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of Part 6. The changes are also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

The change to clarify use of ATTs for verification is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Table NA1-1 was added to Section NA1.1 to provide a summary of the existing and new protocols listed in Section NA2. The table was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.2 was changed to clarify that the builder is responsible for ensuring compliance with applicable field verification and eligibility criteria, and removes redundant requirements also found in NA1.6.1 for HERS to scrutinize certificates of Compliance, Installation, and acceptance. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.2.1.1.1 was deleted because it is obsolete: the Section addresses "document registration requirements prior to January 1, 2015", and this date has passed. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.2.1.1.1 was changed to delete an obsolete effective date and to clarify the meaning of registered document. Also since the scope has been expanded to include HERRS procedures other than duct leakage testing, the term "applicable HERS measures" was substituted for "duct leakage testing". The changes were necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.2.2 was changed to clarify the Section is applicable to verifications that are not limited solely to verification of duct leakage, and to clarify that enforcement agencies are able to view completed compliance documents on a Data Registry (and are not held to only reviewing physical documents in the field at final inspection) as specified in 10-103(a)3F, 10-103(a)4C, and 10-103(a)5C. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.3.1 was changed to clarify the scope includes verifications other than duct leakage

verification and to include allowance for an enforcement agency to elect to view completed compliance documents on a Data Registry instead of in the field at final inspection as specified in 10-103(a)3F, 10-103(a)4C, and 10-103(a)5C. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.3.2 was changed to clarify that the data stored is electronic data and images. An incorrect reference to RA2 was deleted. The reference to Title 20 requirements for document retention was corrected. A paragraph describing the requirement to make completed documents available was edited for clarity. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.3.3 is updated to match the changes made to the Third Party Quality Control Program TPQCP requirements in section NA1.7; the substantive effects of the changes to the TPQCP language are described for Section NA1.7, below. The change to match NA1.7 is necessary for consistency with that Section and therefore to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.3.4 was changed to clarify that the scope of NA1 is expanded to include verification of additional features in buildings and not solely duct leakage in space conditioning systems, and to add a contingency for viewing documents in a data registry in accordance with Standards Section 10-103(a)3F when a nonresidential data registry is approved. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.4 was changed to clarify that the scope of NA1 is expanded to include verification of additional features in buildings and not solely duct leakage in space conditioning systems, and to add a contingency for viewing documents in a data registry in accordance with Standards Section 10-103(a)3F when a nonresidential data registry is approved. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.5 was changed to clarify that the scope of NA1 is expanded to include verification of features in buildings other than duct leakage in space conditioning systems, and adds a contingency for viewing documents in a data registry in accordance with Standards Section 10-103(a)4C when a nonresidential data registry is approved. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.6 was changed to clarify that the scope of verification now includes group sampling of both systems and dwelling units. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.6.1 was changed to clarify that the scope of verification is not limited to space conditioning units, but included all measures that require verification. An allowance for viewing the completed verification in a Data Registry instead of posting in the field as specified in 10-103(a)5C is added. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.6.2 was changed to clarify that the scope of verification is not limited to space conditioning systems, but includes systems and dwelling units. The change was necessary to improve Part 6's

compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.6.3 was changed to mirror parallel language from RA2.6.3.1 that describes sampling of dwelling units. Additional edits were made to clarify the scope includes both systems and dwelling units. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.6.4 was changed to mirror parallel language from RA2.6 that includes reference to both systems and dwelling units, and includes addition of subsection headings to improve readability. The change was necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7 was changed to mirror the same changes made to the TPQCP section in RA3.7. NA1.7 preamble restates the description of the function of the TPQCP and does not represent a substantive change. NA1.7.1 is changed to clarify Third Party Quality Control Program (TPQCP) responsibilities, data collection responsibilities for TPQCPs, HERS Provider responsibilities with regard to TPQCPs, HERS Rater responsibilities with regard to TPQCPs, and conflict of interest guidelines for TPQCPs. NA1.7 information has been reordered and renumbered to aid readability. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA1.7.1 is a new subcategory TPQCP that collects into one location and restates existing responsibilities to clarify the requirements, and also introduces a new substantive requirement for use of automatic location tracking of the TPQCS instruments or software tools. Requiring location tracking is necessary to ensure compliance with TPQCP requirements for providing testing and corrections feedback from the TPQCP to the installer in the field.

NA1.7.2 is a new subsection that consolidates and restates existing data collection requirements. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7.3 is a new subsection that consolidates and restates existing HERS Provider responsibilities with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7.4 is a new subsection that consolidates and restates existing HERS Rater responsibilities with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7.5 is a new subsection that consolidates and restates existing conflict of interest guidelines with regard to the TPQCP. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7.6 is a new subsection that consolidates and restates existing conditions of TPQCP

approval. There is one substantive change that requires the TPQCP applicant to submit a detailed description of the training the TPQCP will provide to the installing contractors. This change is necessary to clarify the training expectations thus to ensure the integrity of the TPQCP. The ensuring the installer training requirements are clearly defined is necessary to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy consistent with Public Resources Code §25402. The other clarification changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.7.7 is a new subsection that consolidates and restates the training requirements for TPQCP installing contractors. There are no substantive changes to these requirements. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.8 was changed to clarify the scope of the verifications has been increased to include systems and dwelling units. The requirements were also corrected to clarify that in the absence of a nonresidential data registry, the submittals of certificates of compliance cannot be registered with a Data Registry, thus are submitted to the enforcement agency, and not to a Data Registry. Also, and allowance for the enforcement agency to view certificates of Installation and Acceptance is contingent on the approval of a nonresidential data registry. Edits were made to clarify the use of an installation certificate as basis for the final inspection when TPQCP was used. The changes are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA1.9 – The purpose of this change is to incorporate an approved alternative procedure for field verification and diagnostic testing. This alternative procedure was approved by the Energy Commission as an alternative residential field verification protocol under Part 1, Section 10-109; this change fully incorporates this alternative in order to expressly provide for its use within the Standards. This change is necessary to formally provide this alternative in regulatory language, and to inform users of Part 6 that this alternative procedure is available.

NA2 – Nonresidential Field Verification and Diagnostic Test Procedures

NA2 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA2.1.1 – The purpose of this change is to update the section reference for duct leakage. This change is necessary ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

Section NA2.2 is a new protocol added to provide HERS verification of mechanical ventilation systems for improved indoor air quality as required by 120.1(b)2. Adding this protocol is necessary to verify whether ventilation rates comply with minimum standards and the consequences if compliance with these standards is not verified and does not occur. This change is necessary to ensure compliance with minimum ventilation standards. This change is also consistent with State statutes and policy of protecting and enhancing the indoor environmental quality in buildings.

Section NA2.3 is a new protocol mirrored from Section RA2.8 in order to provide for dwelling unit enclosure HERS verification for High Rise Multifamily Dwelling Units as required by Section 120.1(b)2Avb. This addition is necessary to address air leakage from adjacent dwelling units when non-balanced ventilation results in pressurization. For example, exhaust ventilation is intended to bring in fresh air from outside the dwelling unit by negatively pressurizing the interior space, however in multifamily dwellings where the majority of exterior walls are between adjoining units and not between the dwelling and the outside there is a risk that air is merely moved between dwelling units rather than exchanged with outside air, resulting in buildup of indoor pollutants. This change is necessary to ensure that a builder's choice to not use a balanced ventilation system per the options provided in Section 120.1(b)2Avb, and therefore to create pressure differentials between dwellings, does not inadvertently lead to indoor air quality impacts.

NA3 - Fan Motor Efficiencies

(No change to this Section.)

NA4 - Compliance Procedures for Relocatable Public School Buildings:

(No change to this Section.)

NA5 - RESERVED

(No change to this Section.)

NA6 – Alternate Default Fenestration Procedure to Calculate Thermal Performance:

NA6.1(a) – The purpose of the changes made to this Section is to reduce the allowable square footage from 1,000 square feet to 200 square feet in order to utilize the Alternate Default Fenestration Procedure for site-built fenestration. These changes are necessary to promote the use of the Computer Modeling Approach for site-built fenestration as required by Section 110.6(a)5.

NA6.5.1 – The purpose of the changes made to this Section is to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA6.5.2 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA6.5.3.1 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA6.5.3.2 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7 – Installation and Acceptance Requirements for Nonresidential Buildings and Covered Processes

NA7 Table of Contents – The purpose of this change is to update section references with correct page numbers. This change is necessary to ensure correct referencing; it does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's

compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.4.1.1(d) – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.1.2 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.2.1 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.2.1(g) – The purpose of the changes made to this Section is to update the publication date for the document referenced. This change is necessary as the publication was re-endorsed January 1, 2015.

NA7.4.2.2 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.2.3 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.2.4(a) – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.2.4(b) – The purpose of the change made to this Section is to update the publication date for the document referenced. This change is necessary as the publication was re-endorsed January 1, 2015.

NA7.4.3.1 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.3.2(g) – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.3.3 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.4.3.4 – The purpose of the changes made to this Section are to update the compliance document references. These changes are necessary as the documents referenced are from 2008 and are no longer applicable.

NA7.5.2 – The purpose of this change is to correct section references. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria

of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.3 – The purpose of this change is to update the section reference and to mention the alternative field verification protocol for field verification. Section 140.4(l) was amended to now include two subsections. The applicable section for duct leakage requirements was moved to subsection 140.1(l)1. This change is necessary to continue to reference the correct section. The alternative protocol was approved under the 2016 Standards and NA1.9 was created under the 2019 Nonresidential Appendix to incorporate this alternative. It is necessary to mention this alternative in the Functional Testing Step 2, since Step two gives direction on how to obtain field verification.

NA7.5.4 – The purpose of this change is to correct section references. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.5 – The purpose of this change is to correct section references. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.6 - The purpose of this change is to correct section references. This change is necessary to ensure correct referencing and does not materially alter the requirements in the Draft Express Terms, and is necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.12 – The purpose of this change is to establish a new acceptance test for functional field verification of Fault Detection and Diagnostics (FDD) systems that are not certified to the Energy Commission. A new requirement for the 2019 Standards is to require FDD's for all cooling systems over 4.5 tons that incorporate an air economizer. FDD certification to the Energy Commission is also required for FDD systems that are packaged or module based with embedded control logic. Part of the certification submittal to the Energy Commission is proof of basic functionality of the FDD system, therefore negating an exhaustive field test. FDD systems that are not of this type but rather based in custom control logic programed into a central management system are not required to be pre-certified to the Energy Commission. Since the control logic has not been proven to the Energy Commission via certification it is important for field technicians to perform this functional testing. This new acceptance test is necessary to ensure proper function and fault detection of the infield programmed control logic.

NA7.5.13 – The purpose of the change made to this Section is to correct misspellings, provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.14 – The purpose of the change made to this Section is to correct misspellings, provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.15 – The purpose of the change made to this Section is to remove a reference to the 2016 Standards, provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.5.17 – The purpose of this change is to establish a new acceptance test for occupant sensor zonal control. New to the Standards is the requirement for occupant sensor zonal control for spaces that incorporate an occupant sensor to comply with the lighting control requirement and that are identified by Table 120.1-A as a space eligible to reduce the ventilation to zero. This requirement also outlines at what conditions the space must be in to actually turn off the ventilation. The space must be unoccupied and be within the deadband of the setpoint. This acceptance test confirms that controls are capable of sensing and reacting to these conditions. This change is necessary to ensure proper function and compliance with the occupant sensor zonal control requirements.

NA7.6.2.5 – The purpose of the change to this Section is to incorporate verification of the override and holiday shutoff features of an automatic time switch control into the verification test procedure for the control. This change is necessary to ensure correct performance of these features, consistent with the intent of the test to ensure the configuration and functionality of the control.

NA7.10.3.2.2 – The purpose of the change made to this Section is to correct misspellings, provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.10.3.3 – The purpose of this change is to establish a new acceptance test for adiabatic condensers. New to the Standards are condenser efficiency and control requirements for adiabatic condensers. In order for the system to be controlled properly the temperature sensors, condenser fans, compressors and control logic must be verified in the field. This acceptance test confirms that controls are capable of sensing and reacting to specified test conditions. This change is necessary to ensure proper function and compliance with the adiabatic condenser requirements.

NA7.14 – The purpose of the change made to this Section is to provide clarity and improve readability. The changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve Part 6's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

NA7.16 – The purpose of adding this Section is to add acceptance test requirements for laboratory and process exhaust fan systems, consistent with their proposed addition to Part 6. Systems that utilize wind or chemical concentration volume flow rate control must comply with construction inspections and functional testing before occupancy permits can be granted. This change is necessary to support inclusion of proposed laboratory and process exhaust fan system requirements in Part 6 consistent with the verification required for other process measures.

NA7.17 – The purpose of adding this Section is to add acceptance test requirements for laboratory automatic fume hood sash closures. Systems that utilize automatic sash closures must comply with construction inspections and functional testing before occupancy permits can be granted. This change is necessary to support inclusion of proposed laboratory and process exhaust fan system requirements in Part 6 consistent with the verification required for other process measures.

NA7.18. – The purpose of adding this Section is to establish new acceptance tests for high-rise residential dwelling unit ventilation. New to the Standards are high-rise residential dwelling unit ventilation requirements, which closely align with the low-rise residential ventilation protocols. This change in requirements made the 2016 Standards Outside Air Acceptance Test irrelevant to high-rise residential dwelling units. This new acceptance test gives guidance to the field technician and identifies the appropriate test procedures applicable to high-rise residential dwelling units. These changes are necessary to verify compliance with minimum ventilation air.

NA8 - Luminaire Power

(No change to this Section.)

ALTERNATIVE CALCULATION METHOD (ACM) APPROVAL MANUAL

ABSTRACT – The purpose of the changes to the Abstract are to accurately reflect the content of the rest of the ACM, with consideration of the changes proposed for 2019. As the Abstract is not directly regulatory but merely describes the regulations in the subsequent Sections of the ACM, the changes clarify without materially altering the requirements of the Draft Express Terms, and are necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.1.1 – The purpose of the change to this Section is to accurately incorporate a proposed change to Section 1.1.5. The substantive effects of the proposed change to Section 1.1.5 are described for that Section; the change here clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.1.2 – The purpose of the change to this Section is to add a parenthetical statement accounting for the fact that files for transferring information to HERS raters are not a requirement of all building projects. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.1.4 – The purpose of the change to this Section is to add a parenthetical statement accounting for the fact that files for transferring information to HERS raters are not a requirement of all building projects. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.1.5 – The purpose of adding this Section (and renumbering its subsequent Section) is to allow for the use of alternate nonresidential simulation engines where the use of alternate software does not result in alternate modeling results. This change is necessary to prevent inadvertently disallowing proprietary software from consideration for approval under Part 6, when it can be demonstrated that the differences in proprietary elements do not alter the end result expected by the software.

1.2.1 – The purpose of the change to this Section is to correct grammar. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to

improve The ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.2.2 – The purpose of the change to this Section is to correct grammar. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.3.1 – The purpose of the change to this Section is to account for the proposed addition of Section 1.1.5. The substantive effects of the proposed change to Section 1.1.5 are described for that Section; the change here clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.3.2 – The purpose of the changes to this Section are to clarify the language relating to vendor incorporation of changes to the Compliance Manager, and provides the ability for the Energy Commission to determine that a change to the Compliance Manager is not significant enough to require updating of vendor software. The change is necessary to prevent requiring updates relating to trivial changes to the Compliance Manager, as well as to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.4.1 – The purpose of the change to this Section is to add specificity regarding the situations that this Section is intended to address. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.5.1 – insert purpose and necessity for change to 1.5.1

1.5.2 – The purpose of the change to this Section is to adds language to more clearly indicate that this Section is applicable to a vendor. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

1.7 – The purpose of the change to this Section is to more clearly and directly phrases the contents of its second paragraph. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

2.1 – The purpose of the change to this Section is to improve clarity, in part by referring to subsequent Section 2.4, and remove the ability to read this Section as providing greater flexibility than is specified in Part 6. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

2.3 – The change to this Section updates a reference to Part 6 for consistency with its proposed update to a 2019 edition. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

2.4 – The change to this Section updates a reference to Part 6 for consistency with its proposed update to a 2019 edition. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

3.6 – The change to this Section updates references to Part 6 as well as two legally mandated Compliance Manuals for consistency with their proposed update to a 2019 edition. This change clarifies without materially altering the requirements of the Draft Express Terms, and is necessary to improve the ACM's compliance with the clarity and consistency criteria of California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

(No change to Appendix A or B to the ACM.)

III. INCLUSION OF THE ECONOMIC IMPACT ASSESSMENT

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

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

Pursuant to the requirements of Government Code section 11346.2(b)(3), this section of the ISOR contains “[a]n identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the adoption, amendment, or repeal of a regulation.” All of these documents have been filed in this proceeding and are available to the public unless subject to copyright or other restrictions on free dissemination. They are docketed under docket number 17-BSTD-02.

Documents that are not protected by copyright are available electronically at <http://www.energy.ca.gov/title24/2019standards/>. In addition, all document, including those protected by copyright, are available at the California Energy Commission located at 1516 9th Street, in Sacramento, California.

Note that the majority of Documents Relied Upon are code change proposals; for each of these documents, staff have separately prepared a Staff Supplement to transparently document staff’s consideration and reasoning with respect to each proposal. These are also available at the specified website.

Table 1: Documents Relied Upon

Required Filings	
Document Number	Report Title
399	Economic and Fiscal Impact Statement
(none; supplement)	Attachments to Form 399 (explanatory document and spreadsheet file)
(none; supplement)	2019 TDV Methodology Report (February 15, 2017)

Nonresidential Code Change Proposals	
Document Number	Report Title
2019-NR-LIGHT1-F	Outdoor Lighting Power Allowances
2019-NR-LIGHT2-F	Indoor Lighting Power Densities
2019-NR-LIGHT3-F	Nonresidential Outdoor Lighting Controls
2019-NR-LIGHT4-F	Nonresidential Indoor Lighting Controls

2019-NR-LIGHT5-F	Nonresidential Advanced Daylighting Design
2019-NR-LIGHT6-F	Nonresidential Indoor Lighting Alterations
2019-NR-ASHRAE62.1-F	Nonresidential Ventilation & Indoor Air Quality (IAQ)
2019-NR-ASHRAE90.1-F	Proposals Based on ASHRAE 90.1
2019-NR-MECH1-F	Prescriptive Efficiency Requirements for Cooling Towers
2019-NR-MECH2-F	Economizer Fault Detection and Diagnostics (FDD) for Built-Up Air Handlers
2019-NR-MECH3-F	Variable Exhaust Flow Control
2019-NR-MECH4-F	High Efficiency Fume Hoods in Laboratory Spaces
(none; proposal submitted by California Energy Alliance (CEA), April, 2017 (revised June, 2017))	Building Energy Efficiency Measure Proposal To The California Energy Commission For The 2019 Update To The Building Energy Efficiency Standards Nonresidential Lighting Alterations

Residential Code Change Proposals	
Document Number	Report Title
2019-RES-ENV1-F	High Performance Walls
2019-RES-ENV2-F	High Performance Attic (HPA)
2019-RES-ENV3-F	Residential High Performance Windows and Doors
2019-RES-ENV4-F	Quality Insulation Installation (QII)
2019-RES-IAQ-F	Residential Indoor Air Quality
2019-RES-HVAC1-F	Residential Quality HVAC
2019-RES-DHW1-F	Compact Hot Water Distribution

2019-RES-DHW2-F	Drain Water Heat Recovery
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All Other Documents Relied Upon	
Document Source	Title
Noresco; December 7, 2017	Cooling Tower Efficiency LCC Addendum
E2e Working Paper 031; June 1, 2017	Residential Building Codes Do Save Energy: Evidence From Hourly Smart-Meter Data
NAIMA; October 19, 2017	North American Insulation Manufacturers Association Comments on Draft 2019 Standards
Proctor Engineering Group; November 2017	Residential Furnace Blower Performance Testing
Translational Psychiatry; January 2017 (doi:10.1038/tp.2016.262)	Timing of light exposure affects mood and brain circuits
Air Resources Board; July, 2005	Indoor Air Pollution in California
California Energy Commission; December 1994	California's Energy Efficiency Standards and Indoor Air Quality
Illuminating Engineering Society (website article by Cori Jackson)	Commercial Lighting's Role in Automated Demand Response Programs
Lawrence Berkeley National Laboratory; 04-21-2014 (http://escholarship.org/uc/item/2nj5z1xm)	System Effects of High Efficiency Filters in Homes
Lawrence Berkeley National Laboratory; October 2012	Energy Implications of In-Line Filtration in California
Los Angeles Times; July 9, 2017 (http://www.latimes.com/local/lanow/la-me-ln-freeway-pollution-filters-20170709-story.html)	L.A. requires air filters to protect residents near freeways. Are they doing the job?
Environmental Health Perspectives, volume 120, number 12; December 2012	Is CO2 an Indoor Pollutant? Direct Effects of Low-to-Moderate CO2 Concentrations on Human Decision-Making Performance
Indoor Air; 2000;10; 212-221	Risk of Sick Leave Associated With Outdoor Air

	Supply Rate, Humidification, and Occupant Complaints
International Journal of Environmental Research and Public Health; November 2015 (doi:10.3390/ijerph121114709)	Economic, Environmental and Health Implications of Enhanced Ventilation in Office Buildings
Indoor Air; 2015; doi:10.1111/ina.12254	The effects of bedroom air quality on sleep and next-day performance
RDH Building Engineering Ltd.; April 2, 2013	Air Leakage Control in Multi-Unit Residential Buildings - Development of Testing and Measurement Strategies to Quantify Air Leakage in MURBS
U.S. Department of Energy; March 2015	Field Testing of Compartmentalization Methods for Multifamily Construction
California Energy Commission; March 2014 (CEC-500-2015-045)	Unique Multifamily Buildings Proposed Energy Code Measures
Ernest Orlando Lawrence Berkeley National Laboratory; February 2016 (LBNL-1004365)	Development of a Tracer Gas Capture Efficiency Test Method for Residential Kitchen Ventilation
Ernest Orlando Lawrence Berkeley National Laboratory; March, 2017 (LBNL-2001009)	Development of a Standard Test Method for Reducing the Uncertainties in Measuring the Capture Efficiency of Range Hoods
American Chemical Society; 2012 (dx.doi.org/10.1021/es3001079 Environ. Sci. Technol. 2012, 46, 6167-6173)	Performance Assessment of U.S. Residential Cooking Exhaust Hoods
Ernest Orlando Lawrence Berkeley National Laboratory; November 2011 (LBNL-5265E-r1(3))	Performance of Installed Cooking Exhaust Devices
U.S. Department of Commerce; June 6, 2012 (Volume 432; 350-356)	Reduction of exposure to ultrafine particles by kitchen exhaust hoods: The effects of exhaust flow rates, particle size, and burner position
California Energy Commission, March 2011 (CEC-500-2012-062)	Efficiency Characteristics and Opportunities for New California Homes (ECO)
California Air Resources Board; May 21, 2016	Reducing In-Home Exposure to Air Pollution
14th Canadian Conference on Building Science and Technology - Toronto, Ontario 2014	A Field Study of Airflow in Mid to High-Rise Multi-Unit Residential Buildings
ASHRAE; 2007	Measured Change in Multifamily Unit Air Leakage and Airflow Due to Air Sealing and Ventilation

	Treatments
U.S. Department of Energy; February 2016	Evaluation of Passive Vents in New Construction Multifamily Buildings
U.S. Department of Energy; July 2014	Evaluation of Ventilation Strategies in New Construction Multifamily Buildings
U.S. Department of Energy; January 2017	Measure Guideline: Ventilation Guidance for Residential High-Performance New Construction – Multifamily
RDH Building Engineering Ltd.; August 2015 (TB-009)	Air Quality in Multi-Unit Residential Buildings
Center for Energy and Environment; November 2004	Reduction of Environmental Tobacco Smoke Transfer in Minnesota Multifamily Buildings Using Air Sealing and Ventilation Treatments
California Energy Commission; November 2009 (CEC-500-2009-085)	Ventilation and Indoor Air Quality In New Homes
Atmospheric Environment; March 2004 (doi:10.1016/j.atmosenv.2004.03.027)	Contribution from indoor sources to particle number and mass concentrations in residential houses
University of Birmingham; January 2013 (10.1016/j.atmosenv.2013.01.061)	Emissions and indoor concentrations of particulate matter and its specific chemical components from cooking
California Air Resources Board; November 30, 2001	Indoor Air Quality: Residential Cooking Exposures
Atmospheric Environment; August 2009 (doi:10.1016/j.atmosenv.2009.08.043)	Indoor acrolein emission and decay rates resulting from domestic cooking events
International Journal of Environmental Research and Public Health; April 2010 (doi:10.3390/ijerph7041744)	Measurement of Ultrafine Particles and Other Air Pollutants Emitted by Cooking Activities
Environmental Health Perspectives; July 2003	Particle Concentrations in Inner-City Homes of Children with Asthma: The Effect of Smoking, Cooking, and Outdoor Pollution
Atmospheric Environment; June 2009	Particle emission factors during cooking activities
Environmental Health Perspectives; January 2014	Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California
Environmental Science & Technology;	Source Strengths of Ultrafine and Fine Particles

March 2004 (doi:10.1021/es0306260)	Due to Cooking with a Gas Stove
Indoor Air; September 2014 (doi:10.1111/ina.12163)	Ultrafine particles from electric appliances and cooking pans: experiments suggesting desorption/nucleation of sorbed organics as the primary source

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

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

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

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

During the initial, informal stage of the rulemaking process, the Commission conducted an extensive public process, considered many suggestions from stakeholders about (1) alternatives that could improve the feasibility of the Commission’s preliminary versions of the proposed regulations or could reduce their adverse impacts; (2) the technical and cost-effectiveness analyses of those preliminary proposals; and (3) the language in those proposals.

Many of the measures in the proposed Standards were developed by the Codes and Standards Enhancement (CASE) Program of California’s Investor-Owned Utilities, a statewide program that is funded with a surcharge on energy bills and that is dedicated to the advancement of California’s building and appliance energy efficiency standards. In 2013 and 2014 CASE representatives held numerous meetings with building industry stakeholders to vet potential code updates, identify industry concerns, and resolve issues. In the summer of 2017, the Energy Commission began a series of 9 pre-rulemaking public workshops for all interested parties to build upon and continue this process.

During the Commission's pre-rulemaking workshops, which focused on the feasibility and cost effectiveness of potential revisions to the Standards, the Commission received a large number of comments. Based on the comments the Commission developed Preliminary Draft Standards and held a comprehensive pre-rulemaking public workshop on October 4th and 5th to obtain public comment on those; in turn, many more comments were received and, in response to them, the Commission produced the proposed regulations that accompany this ISOR.

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

1. Consideration of alternatives to residential measures – The Energy Commission considered several alternatives for the proposed residential measures. These alternatives resulted from close interactions with stakeholders and are reflected in the differences between the October pre-rulemaking publication of proposed changes and the attached Draft Express Terms.

For solar photovoltaics, staff conducted extensive outreach and interaction with stakeholders and reviewed a broad range of options for requiring renewable energy equipment as part of residential construction. Staff was attentive to stakeholder needs for options and exceptions relating to this equipment, and to the need to guarantee a minimum level of performance for the consumer and therefore that the monetary benefit of the system to the consumer exceeds the marginal cost of its installation. Staff also considered current Net Energy Metering requirements and overgeneration concerns, and were careful to select an amount of generation that maximized benefit to the homeowner while minimizing unintended negative consequences to California's energy infrastructure.

For water heating, staff explored several options for creating a prescriptive compliance path for heat pump water heaters. Staff determined that alternatives that would lead to a weakening of overall energy efficiency under the performance approach to compliance would not be appropriate or consistent with statute. Similarly, staff determined that alternatives that risked preemption by federal law would not be appropriate or consistent with statute. The proposed language creating a prescriptive pathway was found to best thread the needle between these significant constraints.

For walls and attics, staff considered several alternate U-factor requirements as well as alternate prescriptive assemblies for high performance walls and roof deck insulation, and differing amounts of (or expected properties of) continuous insulation. The proposed language represents a more modest increase in efficiency than originally considered and is closer to values suggested by stakeholders in the building industry, including insulation manufacturers and chemical companies.

For windows, staff considered alternate SHGC values, including values proposed in stakeholder comments. The selected value is the result of consideration of all identified options and received comments.

For ventilation, staff considered alternatives to incorporating by reference the current versions of ASHRAE 62.1 and 62.2, including the "do nothing" alternative of retaining reference to older versions of these Standards. Staff found that either changing the requirement to rely in a different, less well established or less commonly used standard, or retaining reliance on a deprecated version of the Standard, would increase the difficulty of complying with code without providing any clear benefit. Thus, staff found proposing to incorporate the current versions of the Standard by reference, in place of the

incorporation of their prior versions, to be appropriate. In doing so, staff also considered several alternatives to the ASHRAE requirements-as-written, resulting in the set of amendments to each ASHRAE standard proposed in the Draft Express Terms.

For air leakage, in the rulemaking for the 2016 Standards stakeholders proposed an alternative HVAC system leakage test that would supersede the currently prescribed test for duct leakage. The proposed test, ASHRAE 215, is in the process of adoption by ASHRAE but is not yet adopted. As the currently prescribed duct leakage test already provides the majority of the benefit that would be realized by the system leakage test, the Energy Commission previously decided not to pursue this alternative within the 2016 rulemaking, but expressed interest in reviewing and potentially incorporating the test once it is finalized and published. Staff reviewed the pre-publication drafts ASHRAE 215 and have been following its progress through the ASHRAE adoption process; if the proposed test is adopted during the public comment period of this rulemaking, then the Energy Commission will consider incorporating this test procedure within this rulemaking.

In parallel to the above, a group of stakeholders proposed inclusion of a SMACNA test procedure for building leakage. Staff found that, while this alternate test provided some of the anticipated benefits of the ASHRAE 215 test, it contained elements that would be a significant departure from both current practice and the practices prescribed by ASHRAE 215. Staff therefore determined that incorporating this test would increase complexity and create confusion, as well as create opportunities to take advantage of the differences between test procedures. For these reason, staff declined to pursue inclusion of the SMACNA test.

The updated MERV requirements were developed under direct coordination with the California Air Resources Board (CARB), to ensure that filtration requirements were set at a level appropriate for our current understanding of human indoor air quality needs and the effects of particulate pollutants on human health. The Energy Commission considered both higher and lower MERV values, noting that MERV 11 is the lowest value that is still able to capture the smallest category of particulates known to have an effect on human health, and that MERV ratings above 16 would have effects comparable to that of a HEPA filter. MERV 13 was selected based on availability of filters, and in particular filters that would maximize filtration performance and capture of small particulates while having a minimal impact on pressure drop relative to current MERV 6 and MERV 8 filters. In addition, consideration of a stakeholder proposal from the 2016 rulemaking process to require a deeper filter box was included in the consideration of this proposal, resulting in the proposed two inch depth requirement.

Relating to lighting, the Energy Commission considered alternatives to the proposed updates to residential lighting requirements. Specifically in relation to the flicker requirements in JA8, the Energy Commission considered NEMA's proposal to adopt the SVM limit recommended in NEMA 77, rather than the 1.0 limit currently proposed. Staff considered both a 1.3 and a 1.6 limit, with assistance from stakeholders, and identified that higher limits increased the performance gap between the current standard and the worst-case light sources that would be permitted under a higher SVM. Staff determined that where an SVM of 1.0 crosses and has a slow divergence from the 30% limit that begins at 140Hz and reaches a maximum 5% increase in allowed depth of flicker at 200Hz, lower SVM values exceeded the current standard at a wider range of frequencies and by significantly larger amounts: whereas an SVM of 1.0 allows 5% additional depth of flicker at 200Hz, an SVM of 1.6 allows 10% additional depth of flicker starting at 70Hz and begins sloping further away from the 30% limit at 100Hz, allowing an additional 30% depth by 200Hz (double the depth of flicker currently allowed). Given that staff are not revisiting the current limit on flicker in proposing to allow use of an alternate test method, and have not conducted any analysis nor received any code change proposals that would

support revising or weakening the Standard by the amount represented by a higher SVM, staff selected an SVM of 1.0 for its consistency with the recommended Pst standard, its intersection with Pst occurring under the 30% limit, and for the negligible amount by which a worst-performing light source would potentially exceed the current limit.

Staff also received and considered comments relating to color temperature and dimming, and amended the pre-rulemaking language to reflect the consideration of these comments.

For furnaces, the proposed 0.45 watt per CFM requirement for furnace fans was proposed to the Energy Commission as a standard for all residential air handling equipment. Staff evaluated several types of air handling equipment and determined that while the standard was appropriate for furnaces, it was not appropriate for other residential equipment that would be likely to use a permanent split capacitor (PSC) motor. Staff therefore proposed the alternative of applying the standard solely to furnace equipment.

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

2. Consideration of alternatives to nonresidential measures – The goal of aligning the 2019 Regulations with the ASHRAE 90.1 national standard meant that much of the work investigating feasible alternatives was conducted by ASHRAE in adoption of their 90.1 national standards. The Energy Commission did conduct an independent consideration of whether the ASHRAE measures were feasible and cost effective for California and in doing so considered alternatives to the ASHRAE standards and solicited feedback from stakeholders.

Two such alternatives to the ASHRAE 90.1 requirements were selected and proposed for the 2019 code:

- Staff found that aligning with ASHRAE 90.1's fan power methodology was appropriate, but pursued an alternate set of stringency criteria.
- Staff did not pursue alignment with ASHRAE 90.1 Exhaust Air Heat Recovery specifications, as staff found that information on the cost effectiveness of this measure was limited.
- Staff found that requiring occupant sensor based ventilation controls were appropriate for areas where existing lighting control requirements would cause an occupant sensor to already be installed, thereby ensuring the cost effectiveness of this measure.

The Energy Commission did not find the broad alternative of neglecting to align with ASHRAE 90.1 to be a reasonable alternative to the proposed regulations. Where ASHRAE has done significant work to identify energy-saving measures and practices in the construction of non-residential buildings, it would be unreasonable to refuse an examination of their results for potential inclusion in California's code. The Standards already parallel ASHRAE 90.1 in several areas, and prior editions of the Standards have

adopted measures from prior versions of ASHRAE 90.1. This update can best be understood as a decision to “keep pace” with another runner on the same trail.

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

For ventilation, in addition to updating the incorporation by reference of ASHRAE 62.1 and 62.2, staff considered several alternate approaches to ventilation of nonresidential, high rise residential, and hotel-motel buildings. Staff identified that exhaust-only ventilation systems in high-rise multifamily can pull air from adjacent dwelling units rath

For lighting, the specific values proposed for lighting power allowances went through several revisions, with the goal of aligning these allowances to the expected performance of middle-of-the-market LED lighting. Staff also undertook an effort to align the various space types and categories with ASHRAE 90.1, where feasible. Of note, the proposed indoor values, and several of the outdoor values, are rounded to the nearest 0.05 compared to originally proposed values for ease of calculation and implementation. The proposed Power Adjustment Factors for daylighting devices also underwent revision to ensure minimal complexity in both use and enforcement.

For lighting classification and power, staff’s proposal to make amendments to consider the installation of efficient lamps in the rating of a space’s installed lighting power, and to improve the language applicable to modular lighting systems, is driven by steady feedback received on the implementation of the 2016 Standards and seeks to address these concerns. Staff broadly considered the risk of “snap back”, meaning the replacement of efficient lamps with inefficient ones, to be minimal given the equivalent price and modern acceptance of LED products, and also considered the additional flexibility provided by both lamp-based systems and modular systems in adapting spaces to tenant needs. Staff therefore considered the alternative of leaving existing restrictions in place to be the less preferred alternative.

For lighting controls, the Energy Commission received two separate proposals for simplifying alteration requirements, and ultimately pursued a hybrid of these alternatives. Staff did not find that the “do nothing” alternative of leaving the 2016 language as-is would be responsive to ongoing stakeholder concerns, and is anticipating additional stakeholder comments and recommendations during the rulemaking period.

The proposed language for lighting alterations evolved over extended discussions of alternatives with affected stakeholders. Alternatives to the proposed language included more stringent measures, such as a higher blanket reduction in the percent reduction approach, as well as less stringent measures such as remaining without a square foot “cap” on said approach. The Energy Commission considers the proposed language to be the best compromise between available alternatives: a less stringent approach, as proposed, would not ensure that lighting in alterations continues to advance in efficiency, while a more stringent approach would not resolve the issue of scope identified as applying to luminaire modifications. Similarly, some stakeholders proposed retaining the current structure of luminaire modifications being both a subtype of and an exception to a lighting system alteration. As the examination of this section was driven primarily by a need to clarify this complex and potentially confusing interaction, the Energy Commission chose the proposed separation of the language over the alternative of leaving this complex interaction in place.

For laboratory fume hoods, staff evaluated the broad availability of fume hood devices in the California market and the different available approaches to minimizing unnecessary air exchange and fan power draw, before drafting the specification present in the Draft Express Terms.

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

For the substantive changes resulting from this process, the Energy Commission chose the most straightforward and least burdensome alternatives that kept the intent and function of the regulations intact. For example, the proposed changes to Part 1, Section 10-103.1 and 10-103.2 seek to address an ability for field technicians that are stripped of their certification to immediately reapply for certification with the same or an alternate certification provider, and to do so in a way that imposes the least burden on certification providers. These changes additionally address a request to minimize costs associated with on-site quality assurance of field technicians testing mechanical systems, and in doing so propose a solution that reduces costs without reducing the assurance provided by on-site observation. In developing these proposed amendments the Energy Commission considered both more restrictive alternatives, such as permanently barring any ATT or ATE that loses certification, and more permissive alternatives such as only requiring that their status be displayed and not that it be considered when admitting the person to an ATT or ATE program, settling on a proposal between these two extremes. The Energy Commission made every effort to identify and capitalize on such opportunities as it reviewed the existing 2016 Standards, and to incorporate stakeholder feedback into development of its proposed amendments.

For the nonsubstantive changes, the Energy Commission considered alternate phrasings and selected phrasings that best complied with the principles of using short, direct sentences, using the active voice, and maintaining consistency in use of terminology and phrasing, without risking inadvertent substantive changes. Staff were also responsive in considering alternate phrasings proposed by commenters.

The Energy Commission found the broad alternative of not conducting a “cleanup review” of the 2019 Standards or incorporating the resulting changes to be more burdensome than the proposed changes, given that the changes make the code clearer, more consistent, more readable, more understandable, more compliant with applicable statutes, more enforceable, and include changes that streamline and directly reduce the compliance burden of the code without compromising its effect.

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

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

It is quite likely that during the course of the rulemaking, the Commission will receive comments that are helpful in improving the proposed standards. These comments may include additional reasonable alternatives that the Energy Commission will consider during the course of the rulemaking. The public comments received and reviewed by the Energy Commission in the pre-rulemaking period are docketed under Docket Number 17-BSTD-01, and are available on our website at <http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/>.

VI. STATEMENT OF JUSTIFICATION FOR PRESCRIPTIVE STANDARDS

Government Code Section 11346.2(b)(4) requires a statement of the reasons why an agency believes any mandates for specific technologies or equipment or prescriptive standards are required. Part 6 provides the option of following either a list of prescriptive requirements, or of following a performance-based approach to compliance using building modeling software. Thus, for the prescriptive requirements stated in Sections 140, 141, 150.1, and 150.2, compliance based on achieving a performance standard rather than following the prescriptive specifications is available.

The proposed changes to mandatory requirements have, where possible, avoided mandating use of specific technologies or equipment, or prescribing the performance of specific actions or procedures. The requirements of these Sections are generally performance-based efficiency metrics, such as EER values for air conditioners and R-values for insulation products. In the rare cases where specific technologies or equipment are specified, it is following lengthy consideration of alternatives as shown in the Documents Relied Upon and the record of pre-rulemaking public review and commentary.

The proposed changes to the Reference Appendices do include specification of acceptance test protocols for various building systems. By their nature, these must be prescribed procedures in order to ensure the test's efficacy and guarantee consistent results. The alternative of establishing a "performance standard" for testing that would allow for arbitrary actions to be performed in supposed service of building system testing was determined to be inappropriate (due to lack of consistency and comparability) as well as prone to abuse.

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

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

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

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

Table 2 – Summary of Statewide Costs and Energy Bill Savings

Sector	Statewide Measure Costs of Compliance	Statewide Energy Bill Savings	Statewide Net Savings
Residential	\$1,950 Million	\$3,050 Million	\$1,100 Million
Nonresidential	\$220 Million	\$820 Million	\$600 Million
Total	\$2,170 Million	\$3,870 Million	\$1,700 Million

VII. DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

Government Code 11346.2, subd. (b)(6) requires certain agencies—including the Energy Commission—to “describe [their] efforts, in connection with a proposed rulemaking action, to avoid unnecessary duplication or conflicts with federal regulations contained in the Code of Federal Regulations addressing the same issues.” The Energy Commission regularly evaluates federal law for its application to residential and nonresidential buildings, and in particular for any preemptive effects, and has not identified any federal regulations that duplicate or conflict with either the Energy Code generally or the specific amendments proposed in the Draft Express Terms. For this reason, staff has concluded that there are no federal regulations prescribing building standards within the scope of Title 24 Part 6. Therefore, the proposed regulations do not duplicate or conflict with any federal regulations.