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March 23, 2016

Veronica Martinez
Compliance and Enforcement Unit
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: CALCTP Lighting Controls Acceptance Test Technician Adjustments to the 2016 Training Curriculum

Dear Ms. Martinez:

ICF International, in its capacity as program administrator for the California Advanced Lighting Controls Training Program (CALCTP), is submitting adjustments to its approved application to the California Energy Commission (CEC) as outlined in California Code of Regulations, Title 24, Part 1, § 10-103-B(d).

Curriculum related materials were sent in advance of these items on March XX, 2016. Included in this submission are the three standards that were outlined in a letter received from Mr. Randy Brumley on February 16, 2016.

We look forward to your review and approval of our application.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Mark V. Ouellette

Mark V. Ouellette
Senior Program Manager
Enclosure/Attachment:

cc: Joe Loyer, CEC Compliance and Enforcement Unit
Bernie Kotlier
Tom Enslow
Doug Avery

Standards:

1. **Part 1, §10-103.1(c)3F: The ATTCP shall review a random sample of no less than 1% of each Technician's completed compliance forms, and shall perform randomly selected on-site audits of no less than 1% of each Technician's completed acceptance test.** Summary of change: This update to the *Standards* adds a quality assurance requirement for minimum sample size for ATTCP to review acceptance forms and tests to ensure consistent compliance. Although staff encourages a larger sample size and frequent auditing, staff requires a description and findings from a quality assurance program implementing this minimum standard.

CALCTP has designed a quality assurance "audit" program utilizing best practices around a "quality assurance audit model." CALCTP follow the guidelines established by the American Institute of CPA's (AICPA) in the "Audit Sampling Considerations of Circular A-133 Compliance Audits" to address sampling size in an audit environment.

A-133 audits are required by the federal government and provide a statistically reliable method of quality assurance. In the "Audit Sample"" chapter AICPA recommends, "If the auditor determines that internal control over compliance is effectively designed and implemented, Circular A-133 requires that the auditor plan the audit to support a low level of assessed control risk. This requires the auditor to plan to obtain a high level of assurance that controls operate as designed. Therefore, generally, samples for control tests are designed to achieve a 90 percent to 95 percent confidence level."

However, AICPA state that there are several inherent risk factors that could impact noncompliance, which included, specifically:

- New program with little history with compliance requirement.
- Complex processing or judgment.
- Significant deficiencies or material weaknesses observed in the past.
- Correspondence from program officials indicating potential problems.
- Lack of adherence to applicable laws and regulations in prior years.
- High auditee turnover in a particular area.
- Very high volume of activity.
- Substantial change in the policies, processes, or personnel associated with the compliance requirement.

For infant programs, it is recommended the audit program require a 90 to 95 percent confidence level to ensure that any initial issues with noncompliance are identified and addressed. Because the CALCTP-AT program is still in its infancy, ICF has set a goal of conducting enough quality assurance audits during the 2016 Standards to have a 90% confidence level that all acceptance test assessments are done correctly.

The formula for determining the appropriate confidence level will be:

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}, \text{ where } \hat{p}$$

p=percentage
z= Z-Score or standard score which is the number of standard deviations is above the mean
n = sample size

As requested by the California Energy Commission (CEC) staff, CALCTP as a lighting controls acceptance test provider will conduct two types of audits. A paper quality assurance audit and an on-site quality assurance audit, with goal being that 80% of the audits are paper audits and 20% are on-site audits. Once a CALCTP lighting controls acceptance test technician has completed his 5th acceptance test, the technician will be eligible for both types of audits. With 1,048 certified CALCTP-AT technicians this means an additional 1,000 on-site audits and will require additional staff placed throughout the state. The changes CALCTP is proposing is outlined in the table below.

Code	Confidence Level	Anticipated % of Projects Audited*	Paper Audits	On-Site Audits**
2013 Standard	98%	12%	8%	4%
2016 Standard	90%	6%	5%	1%

*the actual number of projects audited will depend on the total number of projects, the above identified is the anticipating a minimum pool of 250 projects in the course of a year. If more projects are completed the % of projects audited will decrease.

** The percentage of on-site audits for the 2013 standards were at the California Advanced Lighting Controls Training Program – Acceptance Test (CALCTP-AT) level, per the guidance for 2016 standards the on-site audits will be at the technician level. Currently, CALCTP has certified 1,048 technicians and 420 CALCTP-AT employers. The new formula will result in an additional 1000+ on-site audits if every technician completes at least one acceptance test.

ICF will use the following to determine the appropriate sample size:

$$n = \left(\frac{z \cdot \sigma}{MOE} \right)^2$$

n = Necessary Sample Size
z = Z-Score which is determined by the confidence level
σ =1-Standard Deviation

In conducting audits, CALCTP's auditors, ICF International, will continue to use the methodology outlined in the 2013 application of identifying an issue as either a failed item or a failed test. The criteria is identified below as well as the implications to a lighting controls acceptance test technician for failing an on-site audit.

Failed Item versus a Failed Test

A "failed Item" constitutes a category of failure on the part of the lighting controls acceptance test technician such as: failure to ensure appropriate documentation is available and complete; failure to conduct automatic daylight controls tests, lighting shut-off control tests, outdoor lighting control tests or demand responsive controls test; failure to verify power adjustment factors are correct when claimed; or failure to confirm installed lighting controls are certified to the California Energy Commission.

A "failed test" occurs when at least one of the threshold specifications is not met during the testing and inspection process. "Threshold Specifications" is a set of specific pass/fail criteria for each lighting control device or system requiring acceptance testing. Threshold specifications are established for minimum

performance levels necessary to pass acceptance tests as outlined in the California Advanced Lighting Controls Training Program—Acceptance Test Technician Course.

Additional Oversight For Failing a Quality Assurance Audit

If a lighting controls acceptance test technician and/or a lighting controls acceptance test employer has failed either a paper quality assurance audit or an on-site-quality audit, both the CALCTP-AT Technician and the CALCTP-AT Employer will receive additional quality assurance oversight. As opposed to the anticipated percentage referenced above, technicians and employers that fail a quality assurance site visit will receive the following scrutiny.

Result	% of Projects Audited	Action That Will Be Take
Failed Either a Paper or On-Site Quality Assurance Audit	50% of Future Projects Audited until they have passed 2 on-site audits	On-Site Quality Assurance Audit Only
Failed a Second Quality Assurance Audit, the Second is an On-Site Audit	100% of Future Projects Audited, until passed 4 on-site audits	On-Site Quality Assurance Audit Only
Failed a Third Quality Assurance Audit, while still in the failed pool.		Recommendation sent to CALCTP Board to Terminate from CALCTP-AT Program

2. **Part 1, §10-103.1(f): The ATTCP may amend a submitted or approved application as described in this Section.** Summary of change: This update to the *Standards* allows an Amendment Process for ATTCPs to provide both substantive and nonsubstantive changes to a submitted or approved ATTCP application. It is not necessary to resubmit a revised complete application.

CALCTP would like to make two ammendments to its approved application. These are:

1) Allowance to provide on-line employer and recertification training; and,
2) Increase the cost of on-site audits to address needs to have staff members relocated near projects.

1) Allowance to provide on-line training:

As part of the requirement to provide reasonable access without an undue hardship to all certified Lighting Controls Acceptance Test Technician certification program and all certified participants in the Lighting Controls Acceptance Test Employer certification program, CALCTP would lie to provide on-line recertification courses.

To date, CALCTP has certified 1,333 acceptance test technicians and over 868 individuals representing 473 acceptance test employers. CALCTP feels for these acceptance test technicians and acceptance test employer representatives it would be an additional burden to come to instructor-led classes for recertification purposes.

Furthermore, for the 473 employers many of them are sending additional staff to the course as they have had staff turnover. CALCTP offers this ability at no-cost to the acceptance test employer. It is CALCTP's intent to provide "reasonable access" to our curriculum by providing printed copies of recertification course materials, "live" "slide-shows" of course material, online access of course materials, classroom lectures on course material, electronic copies of course materials, hard copy video versions of course materials, hard copy video versions of course material "slide shows", hard copy videos of lectures on course materials, and hard copy or downloadable multi-media presentations of course material and online streaming versions of course materials including "webinars" as specified in

ϕ 10-103-A (c) C.; Printed quizzes, online quizzes, electronic copies of quizzes, verbal quizzes in a classroom setting, and hard copy or downloadable multimedia quizzes; Secure and timed online testing of course material, and printed and proctored testing on course material in a classroom setting; Hands-on "labs" or exercises, live "lab" demonstrations, online videos or slide-shows of "lab" demonstrations, hard copy video versions of video recordings of "lab" demonstrations or "slide-shows" of "lab" demonstrations, and hard copy or live interactive ("webinar") versions of "lab" demonstrations, or downloadable multimedia demonstrations of "labs". Additionally, if circumstances require, training may be provided by actual testing of lighting control installations or through the use of an Energy Commission-approved "challenge test" as described in section 13.11.1 of the 2013 Nonresidential Compliance Manual for the 2016 Building Energy Efficiency Standards.

CALCTP has a secure online website which requires unique participant log-in information. Only those logged-in under their unique username and password will have access to the recertification curriculum.

2). Increase the cost of on-site audits to address needs to have staff members relocated near projects.

Based on the program parameters, a percentage of projects, chosen randomly, will receive either a paperwork "desk" review, or an onsite, in-person, quality-assurance review. Each review will be based upon the following fee structure.

CALCTP 2013 Title 24 Lighting Controls Quality Assurance Reviews

Type of Review/Audit	Fee Paid to ICF
For Each Quality Assurance Desk Review	$200 per Audit
Per On-Site, In Person Quality Assurance Visit	$400 per Audit

CALCTP Proposed 2016 Title 24 Lighting Controls Quality Assurance Reviews

Type of Review/Audit	Fee Paid to ICF
For Each Quality Assurance Desk Review	$200 per Audit
Per On-Site, In Person Quality Assurance Visit	$500 per Audit

The additional site visits in less metropolitan areas requires the administrators to have additional on-call staff available to conduct site visits. While this will mean an added expense to the employers, technicians and eventually the customers in comparing to similar programs the expense is less than the going market rate as seen by the cost comparison.

Type	BPI Charges*Additional Training Cost	NABCEP Charges*Additional Training Cost	CALCTP Proposed*Covers Training
Initial Application	$500	$500	$500 for Single Office $750 for Multi-Office
Initial Application (Quality Assurance Fee)	$1,000	$375 Per Audit (3 Audits will be Required for Initial Application or $1,125)	$200 for Paper Audits $500 for On-Site Audits

3. **Part 6, §130.4(a)7: This update certifies that lighting system receiving the Institutional Tuning Power Adjustment Factor complies with Section 140.6(a)2J and Reference Nonresidential Appendix NA7.7.6.2.** Summary of change: This update to the *Standards* adds an acceptance test for a lighting system using an Institutional Tuning Power Adjustment Factor and introduces the new acceptance form, NRCA-LTI-05. The only Power Adjustment Factor (PAF) permitted is Institutional Tuning.

   The CALCTP curriculum for new lighting controls acceptance test technicians has a section titled, "Institutional Tuning Controls" starting on confidential material slide #182. In addition, there is an additional exercises on institutional tuning beginning on slide #230, as well as a quiz and additional exam questions.

4. **Part 6, NA7.6.1: This update certifies that lighting systems receiving the Daylight Dimming Plus OFF PAF complies with Section 140.6(a)2J and Reference Nonresidential Appendix NA7.6.1.** Summary of change: This update to the *Standards* adds an acceptance test for a lighting system receiving a PAF for Daylight Dimming Plus OFF control and modifies the Acceptance Test Form NRCA-LTI-02.

   The CALCTP curriculum for new lighting controls acceptance test technicians has information on this new requirements, which is forms part of the acceptance tests for automatic daylighting controls. Information is provided on confidential material slide #114 and 116. In addition, this material is included via quiz and additional exam questions.

As discussed with Ms. Veronica Martinez on March 4, for the additional updated sections outlined, CALCTP will reference the location in the revised curriculum for new lighting control acceptance test technicians that references the changes. The information is also in the recertification training, but we wanted to reduce the amount of time to highlight the same material. This information can be shared upon request.

Updated Section in *Building Energy Efficiency Standards,* Part 6	**Description of Change**	**Location in Curriculum for New Applicants**	**Location in Curriculum for Recertification**
§130.1(b)3 Mandatory Indoor Lighting Controls, Multi-level Lighting Controls	This update provides clarification that dimmable luminaires shall be controlled with a manual dimmer capable of ON and OFF functionality and removes the requirement that dimmable luminaires also utilize one other control strategy (lumen maintenance, tuning, etc.)	Slides and notes 133, 134, 137, 138, and 139	Slides and notes 63, 64, 68, 69, and 70
§130.1(c)1 Mandatory Indoor Lighting Controls, Shut-off Controls, Exception 3	This update increases allowable continuous lighting for means of egress from 0.05 watts/ft^2 to 0.1 watts/ft^2.	Slides and notes 131, 149	Slides and notes 61, 73
§130.1(c)1 Mandatory Indoor Lighting Controls, Shut-off Controls, Exception 5	This update adds a new exception to shut-off controls to allow illumination when provided by lighting equipment that is designated for emergency lighting, connected to an emergency power source or battery supply, and is intended to function in emergency mode only when normal power is absent.	Slides and notes 131, 149	Slides and notes 61, 73
§130.1(c)5 Mandatory Indoor Lighting Controls, Shut-off Controls	This update adds a requirement for specific areas to have vacancy/partial ON controls rather than normal occupancy sensors.	Slide and note 134	Slide and note 64

§130.1(e) Mandatory Indoor Lighting Controls, Demand Responsive Controls	This update excludes areas with less than 0.5 watts/ft^2 from 10,000ft^2 threshold to reduce lighting power in response to a Demand Response Signal.	Slide and note 163	Slide and note 81
§130.2(c)3B Outdoor Lighting Controls and Equipment, Controls for Outdoor Lighting	This update increases the maximum dimming permitted as part of an active motion controlled lighting system from 80% to 90%.	Slides and notes 207, 208	Slides and notes 107, 108
§130.2(c)4 Outdoor Lighting Controls and Equipment, Controls for Outdoor Lighting	This update removes outdoor sales lots and sales canopies from this section. These spaces must now comply with Section 130.2(c)3.	Slide and note 209	Slide and note 109
§140.6(a)2J Prescriptive Requirements for Indoor Lighting, Calculation of Actual Indoor Lighting Power	This update clarifies that the only PAF permitted is Institutional Tuning.	Slides and notes 67 and 68	Slides and notes 44 and 45
§140.6(a)3C Prescriptive Requirements for Indoor Lighting, Lighting Wattage Excluded	This update provides clarification that lighting wattage used for make-up and hair lighting purposes is excluded from the prescriptive calculations when controlled with a vacancy sensor.	Slides and notes 134	Slide and note 64
§140.7(a)6 Requirements for Outdoor Lighting	This update removes ATMs from excluded wattages. Calculations now need to include ATM lighting for outdoor lighting power adjustments.	Slides and notes 200, 206	Slides and notes 102 and 106

§141.0(b)2I Additions, Alterations, and Repairs to Existing Nonresidential, High-rise Residential, and Hotel/Motel Buildings to Existing Outdoor Lighting, and to Internally and Externally Illuminated Signs; Alterations; Prescriptive Approach; Entire Luminaire Alterations	This update changes the requirement to allow scenarios where alterations to multi-level controls, if triggered, can be more cost effective. If the lighting power is 85% or less of the allowance, then it is permissible to have one control step between 30-70%. If lighting power is greater than 85% of the allowance, then the requirement of 130.1(b) is applicable. There is an alternative option (§141.0(b)2(ii)) that allows the reduction of lighting power by 35-50% from existing, thereby allowing an exemption to the multi-level control requirement of 130.1(b). See Table 141.0-E at the end of §141.0 for further reference.	Slide and note 9	Slide and note 9
§141.0(b)2J Additions, Alterations, and Repairs to Existing Nonresidential, High-rise Residential, and Hotel/Motel Buildings to Existing Outdoor Lighting, and to Internally and Externally Illuminated Signs; Alterations; Prescriptive Approach; Luminaire Component Modification	This update provides relief to the trigger for acceptance testing of smaller projects if controls added were for 20 or fewer luminaires.	Slide and note 9	Slide and note 9
§141.0(b)2L Additions, Alterations, and Repairs to Existing Nonresidential, High-rise Residential, and Hotel/Motel Buildings to Existing Outdoor Lighting, and to Internally and Externally Illuminated Signs; Alterations; Prescriptive Approach; Alterations to Existing Outdoor Lighting Systems	This update provides clarification for general requirements, adds specifics to certain areas, and provides relief to the trigger for acceptance testing for smaller projects if controls added were for 20 or fewer luminaires.	Slide and note 9	Slide and notes 9

§140.6 Table 140.6-A Lighting Power Density Adjustment Factors	This update removes certain power adjustment factors and adds two new PAF for Institutional Tuning and Daylight Dimming plus OFF	Slides and notes 67, 68	Slides and notes 44, 45
§140.6 Table 140.6-B, Table 140.6-C, Table 140.6-D, Table 140.6-E, Table 140.6-F, Table 140.6-G	These updates modify lighting power densities to reflect the industry shift to LED lighting as the design baseline.	Included as resources, not directly applicable to acceptance testing	Included as resources, not directly applicable to acceptance testing
Reference Nonresidential Appendices, NA7.6.1.2, NA7.6.2.3, NA7.6.3.2, NA7.8.2	These updates add descriptions for minimum sampling to test functionality of photocontrols.	Slide 108, and Included as resources	Slide 54, and Included as resources