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SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

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April 10, 2012

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DOCKET
12-BSTD-1
DATE APR 10 2012
RECD. APR 10 2012

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 12-BTSD-1
1516 Ninth Street
Sacramento, CA 95814-5512

Re: 2013 Building Energy Efficiency Standards: Comments of Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company on Notice of Proposed Action/Revisions to the California Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 1 and Part 6

I. INTRODUCTION

Pacific Gas and Electric Company ("PG&E"), Southern California Edison Company ("SCE"), and San Diego Gas and Electric Company ("SDG&E") (collectively, the investor-owned utilities or "IOUs") appreciate the opportunity to provide comments on the Notice of Proposed Action to modify portions of the California Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 1 and Part 6. Building standards are critical tools for helping California reduce its energy consumption. These comments focus on minor modifications needed to emphasize that updates to the compressed air system requirements in Section 120.6 are applicable only to those existing compressed air systems above a combined rating of 75 horsepower; the minimum combined horsepower for new systems would remain at 25 horsepower.

II. MORE CLARITY IS NEEDED FOR APPLICABILITY TO EXISTING COMPRESSED AIR SYSTEMS

The IOUs are recommending modifications to the proposed 2013 Title 24 45 day language for Section 120.6 (e) Mandatory Requirements for Compressed Air Systems and the Acceptance Test section in the Appendix (NA7).

While the general intent of the whole proposal remains the same, minor modifications are needed to add additional clarity on the applicability of the new code. The IOUs suggest that the minimum horsepower for the application of the code to **alterations of existing systems** should be increased from a combined rating of 25 horsepower to 75 horsepower. The IOUs recommend that the minimum horsepower for new installations remains at 25 horsepower.

This recommended clarification is driven by our staff engineers' field experience and past

customer interactions. Application of the 25 horsepower combined value threshold for existing compressed air system modifications results in a lower financial benefit for small- and medium-sized businesses. Because this customer segment lacks the technical expertise, the guidance and incentives gained through the compressed air programs provided by the utilities are still a cost effective method for obtaining future energy savings. A higher threshold for these systems is appropriate for the larger compressed air systems since these are generally managed by an on-site engineering staff that has experience and the knowledge to implement this new code provision. Furthermore, air compressor technologies become increasingly reliant on efficient part load operation above this power range, as opposed to the on/off strategy employed by smaller reciprocating compressors. Therefore, the IOUs suggest this level be set at 75 horsepower for now, with the intent to lower this threshold in the next code cycle. Focusing on the customer segment below 75 horsepower will allow the IOUs to leverage established programs that provide engineering support and incentives that can help these smaller customers prepare for the next round of code changes.

Alternatively, the CEC could choose to set a lower threshold for alterations to existing systems in this code cycle as a Reach Code.

III. MINOR MODIFICATIONS ARE NEEDED IN SEVERAL AREAS TO BETTER ALIGN THE REQUIREMENTS WITH THE CODE'S INTENT

Several minor modifications are needed, as described below, to better align the new requirements with the intent of the new code requirements.

A. **Trim Requirement (performance versus prescriptive)**: In the past, trim requirement was a performance-based approach for efficient trim operation. (It was intended to required Variable Speed Driven (VSD) compressors, but the performance approach allowed for design flexibility. It also included a requirement for 2 gallons of storage per actual cubic feet per minute (acfm) of trim capacity. The IOUs propose refinements to this requirement that are better aligned with the intent of the code, and suggest that two options be provided: Option 1 is to install a VSD, with at least1 gallon per acfm of storage. Option 2 is the performance-based requirement, still with at least 2 gallons per acfm of storage. This format, to allow two alternatives, mirrors similar requirements already in Title 24, and provides an easier-to-understand compliance option. The storage option was adjusted to better reflect what is appropriate for VSDs as compared to other types of compressors.

B. **Centrifugal Compressors:** The IOUs suggest that specific exemptions be included to exempt systems with centrifugal compressors from both the trim and controls requirements. Stakeholders have recently provided feedback that they have assumed that this type of compressor was excluded due to the complexity of adding controls to centrifugal compressors and in determining trim capacity with centrifugal compressors. The significant complexity of applying this measure to centrifugal compressors does not yield commensurate savings benefits when considering the increased cost and, therefore, an exemption is warranted.

C. **Remote Compressors:** Single compressors located more than 200 feet from any other compressors should also be exempt from the controls requirement. This provides a superior method to better defining what and where the system is, limiting the controls to act only on the main air supply as it may be difficult to sense the demand without a common header. This also would exempt booster compressors from the controls requirement.

D. **Constant Air Demand Sectors:** The IOUs also propose to allow parties to seek exemptions from the Trim requirement from the California Energy Commission ("CEC") if parties can demonstrate that their industry and/or historical operation maintains constant air demand (within 10% of full load). This issue was discussed with stakeholders at several stakeholder meetings, and all agreed that certain sectors have constant air demand and should be exempt from the trim requirement. The challenge was in drafting code language that would not turn into a loophole and be used inappropriately. This proposed exception achieves this goal of providing relief for certain sectors without opening a loophole. Note that applications for this exception will be very rare because most sectors with very constant air demand generally utilize centrifugal compressors, and therefore will already be exempt from the code requirements.

E. **Upsizing:** The code already requires upsizing but the simplifications in the current proposal make the calculation slightly easier and more obvious, without significantly changing the requirement. The IOUs support the inclusion of the specific requirement of 1.25 x, rather than a calculated approach to determining the upsizing requirement based on the effective trim capacity.

F. **Definitions and Acceptance Testing:** Minor changes are proposed to the definitions in Section 100.1, and to the Acceptance Test section in the Appendix (NA7)

IV. CONCLUSION

The IOUs support the adoption of the proposed amended standards, with the inclusion of the minor modifications noted above. Specific red-line modifications to the draft regulation are provided in Appendix A to this letter.

Sincerely,

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On behalf of:
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APPENDIX A

IOUs' Proposed Modifications to 45-day language

(e) Mandatory Requirements for Compressed Air Systems

All new compressed air systems, and all supply side additions or alterations of compressed air systems (excluding treatment equipment and maintenance) where the total combined online horsepower (hp) of the compressor(s) is 25 horsepower or more shall meet the requirements of Subsections 1 through 3.

Exception to Section 120.6 (e): Compressed air systems including at least one centrifugal compressor.

1. Trim Compressor and Storage. The compressed air system shall be equipped with an ~~appropriate~~appropriately sized trim compressor and primary storage to provide acceptable performance across the range of ~~a~~the system and to avoid control gaps.

~~Compressed air~~ The system ~~with more than one compressor online~~shall comply with either 120.6 (e) 1 i *or* 120.6 (e) 1 ii, as follows:

i. The system shall include a Variable Speed Drive (VSD) compressor or set of VSD compressors.

For systems with more than one compressor online, the total combined capacity of the VSD compressor(s) acting as trim compressors must be at least 1.25 times the largest net capacity increment between combinations of compressors.

The system shall include primary storage of at least 1 gallon per acfm of the largest trim compressor.

~~i.~~ii. The system shall include a compressor or set of compressors with total effective trim capacity at least the size of the largest net capacity increment between combinations of compressors, or the size of the smallest compressor, whichever is larger.

The total effective trim capacity of single compressor systems shall cover at least the range from 70% to 100% of rated capacity.

The effective trim capacity of a compressor is the size of the (continuous) operational range where the specific power of the compressor (kW/100acfm) is within 15% of the specific power at its most efficient operating point.

The total effective trim capacity of the system is the sum of the effective trim capacity of the trim compressors.

~~Single-compressor systems shall have a total effective trim of at least 30% of the rated compressor capacity.~~ The system shall ~~also~~ include primary storage of at least 2

gallons per ~~actual cubic feet per minute (~~acfm~~)~~ of the largest ~~net increment~~trim compressor.

EXCEPTION 1 to Section 120.6~~(e)~~ (e) 1: Compressed air systems in existing facilities that are ~~altering~~replacing or adding less than 50% of the total online capacity of the system.

EXCEPTION 2 to Section 120.6 (e) 1: Compressed air systems in existing facilities with a combined horsepower less than 75 horsepower.

EXCEPTION 3 to Section 120.6 (e) 1: Compressed air systems that have been approved by the Executive Director as having demonstrated that they serve loads for which typical air demand fluctuates less than 10%.

2. Controls. Compressed air systems with more than one compressor online, having a combined horsepower rating of more than 100 hp, must operate with ~~an approved~~a controller that is able to choose the most energy efficient combination of compressors within the system based on the current air demand as measured by a sensor.

EXCEPTION to Section 120.6 (e) 2: Individual compressors that are located more than 200 feet from any other compressor in the system need not be operated by the controller.

3. Compressed Air System Acceptance. Before an occupancy permit is granted for a new compressed air system subject to section 120.6(e)2, the following equipment and systems shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified by the Reference Nonresidential Appendix NA7. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements specified in NA7.13.

IOUs' Proposed Modifications to NA7.13 et seq.

NA7.13 Compressed Air System Controls Acceptance Tests

NA7.13.1 Construction Inspection

Prior to functional testing, compressed air ~~system~~systems with 2 or more air compressors and total combined horsepower (hp) rating of more than 100 hp must verify and document the following:

- Size~~,~~ (hp), rated capacity~~,~~ (acfm) and control type of each air compressor
- Total online system capacity (the sum of the individual capacities and sizes)
- System operating pressure
- Compressor(s) designated as trim compressors
- Method ~~and tools for observing and~~ recording the states of each compressor in the system, which shall include at least the following states:
  - Off
  - Unloaded
  - Partially loaded
  - Fully loaded
  - Short cycling (loading and unloading more often than once per minute)
  - Blow off (venting compressed air at the compressor itself)
- ~~Method and tools for measuring the current air demand as a percentage of the total system capacity, including any necessary calibrations.~~

NA7.13.2 Functional Testing

Step 1: Per the test methods outlined in the Construction Inspection, verify that these methods have been employed, so that the states of the compressors and the current air demand (as measured by a flow sensor or otherwise inferred by system measurements) can be observed and recorded during testing.

Step 2: Run the compressed air supply system steadily ~~(~~at as close to ~~a constant~~the expected operation load range as can be practically implemented~~) between 50% and 85%~~ at the time of ~~total system capacity~~testing, for a duration of at least 10 minutes.

Step 3: Observe and record the states of each compressor and the current air demand during the test.

Step 4: Confirm that the combinations of ~~compressors~~compressor states meet the following criteria:

- No compressor exhibits short-cycling (loading and unloading more often than once per minute).
- No compressor exhibits blowoff (venting compressed air at the compressor itself).

- For new systems, the trim compressors shall be the only compressors partially loaded, while the base compressors will either be fully loaded or off by the end of the test.

IOUs' Proposed Modifications to Definitions:

CURRENT AIR DEMAND is the actual cubic feet per minute (acfm) of total ~~airflow~~air flow necessary for end uses in a compressed air system.

LARGEST NET CAPACITY INCREMENT is the largest increase in capacity when switching between combinations of base compressors that is expected to occur under the compressed air system control scheme.

PRIMARY STORAGE is compressed air storage located ~~between~~upstream of the ~~compressors~~distribution system and any ~~dryers~~pressure or ~~other conditioning equipment.~~flow regulators.