

# Notes from 2019 Title 24 Part 6 Code Development Cycle Utility-Sponsored Stakeholder Meeting for Warehouse Topics

Posted January 26, 2017

## Meeting Information

**Meeting Date:** December 12, 2016  
**Topics Discussed:** Warehouse Topics  
**Meeting Time:** 1:00 – 4:00  
**Meeting Host:** California Statewide Utility Codes and Standards Team

## Attendees

First Name	Last Name	Contact	Organization
<b>Statewide Utility Codes and Standards Team</b>			
<i>Utility Staff</i>			
Jim	Kemper	james.kemper@ladwp.com	Los Angeles Department of Water and Power (LADWP)
Kelly	Cunningham	KACV@pge.com	Pacific Gas and Electric Company (PG&E)
Randall	Higa	randall.higa@sce.com	Southern California Edison (SCE)
Chris	Kuch	chris.kuch@sce.com	Southern California Edison (SCE)
John	Barbour	jbarbour@semprautilities.com	Southern California Gas Company (SoCalGas)
<b><i>Codes and Standards Enhancement (CASE) Team Members</i></b>			
Emily	Kehmeier	ekehmeir@energy-solution.com	Energy Solutions
Erin	Linney	elinney@energy-solution.com	Energy Solutions
Heidi	Hauenstein	hhauenstein@energy-solution.com	Energy Solutions
Jon	McHugh	jon@mchughenergy.com	McHugh Energy
John	Arent	jarent@noresco.com	NOESCO
Dimitri	Contoyannis	dcontoyannis@noresco.com	NOESCO
Cathy	Chappell	CChappell@trcsolutions.com	TRC
Doug	Scott	dscott@vacomtech.com	VaCom Technologies
Jay	Doshi	jdoshi@vacomtech.com	VaCom Technologies
<b>California Energy Commission Participants</b>			
Mark	Alatorre	Mark.Alatorre@energy.ca.gov	California Energy Commission (CEC)
Payam	Bozorgchami	payam.bozorgchami@energy.ca.gov	California Energy Commission (CEC)
Michael	Shewmaker	michael.shewmaker@energy.ca.gov	California Energy Commission (CEC)
<b>Peter</b>	Strait	Peter.Strait@energy.ca.gov	California Energy Commission (CEC)
<b>Other Participants</b>			
Patrick	Cocagne		Applied Process Cooling Corporation
Frank	Morrison		Baltimore Aircoil Company
Phillip	Hollander		Baltimore Aircoil Company
Mark	Tomooka		Clark Johnson Co.
Dustin	Lilya		DC Engineering
Armin	Hauer		ebm-papst

Gordon	Struder		EVAPCO, Inc.
Ken	Kincaid		Heatcraft Refrigeration
Glenn	Savage		LG Electronics (HVAC)
Kyra	Weinkle		NORESCO
Kyle	Bowling		RAE Corporation
Andrew	Beall		WinCo Foods

## Meeting Agenda

Time	Topic	Presenter
1:00 – 1:30	Introduction	Randall Higa (SCE)
1:20 – 1:30	Compliance Improvement	Randall Higa (SCE)
1:30 – 2:15	Loading Dock Seals	John Arent (NORESCO)
2:15 – 2:55	Compact Hot Water Distribution Design	Cathy Chappell (TRC) and Doug Scott (VaCom Technologies)
2:55 – 3:00	Review and wrap-up, next steps	Randall Higa (SCE)

## Key Takeaways and Action Items

### 1. Overview

- a. No key takeaways or action items.

### 2. Loading Dock Seals

- a. Dock Seal Action Items
  - i. Develop a more precise definition of dock seals and dock shelters. Determine when and how the different types of seals are specified.
  - ii. Include tenants/building owners in list of stakeholders.
  - iii. Supermarket refrigeration areas are not likely to be a candidate, since they normally leave a loading dock door open throughout the day. (Payam Bozorgchami)
  - iv. Coordinate with evaporative condenser CASE author to determine details of refrigerated warehouses, for evaluation of dock seals.
- b. Next Steps – In addition to addressing the items above, NORESCO will work on the following items:
  - i. Conduct survey instrument to identify warehouse and storage building configurations, use of dock door seals, and other practices.
  - ii. Collect cost information on loading dock seals and dock shelters.
  - iii. Identify candidate buildings for air leakage measurement with dock seals present and not present.

### 3. Hybrid Condensers

- a. Stakeholders were generally supportive of the code change proposal

- b. Frank Morrison (Baltimore Aircoil Company) asked if we are considering requirements for systems that use CO<sub>2</sub> as a refrigerant. He suggested that since the market seems to be moving that way, it would be good to get out in front of the market.
- c. Action item: CASE Team will follow up with the Energy Commission on how to account for benefits from reducing refrigerant use associated with the hybrid condenser measure.

## Meeting Notes

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### Overview of 2019 Title 24 Development

- Randall Higa (Southern California Gas) presented.
- Presentation available [here](#).

#### *Comments and Feedback*

1. No comments or questions.

### Loading Dock Seals

- John Arent (NORESKO, Utility CASE Team) presented.
- Presentation available [here](#).

#### *Comments and Feedback*

1. No comments or questions.

### Hybrid Condensers

- Cathy Chappell (TRC, Utility CASE Team) and Doug Scott (VaCom Technologies, Utility CASE Team) presented.
- Presentation available [here](#).

#### *Comments and Feedback*

1. Frank Morrison (Baltimore Aircoil Company): Why are you looking to have a dry switch point for an adiabatic (hybrid) condenser? It is meant to operate at the design requirement in the hybrid mode. For instance, we would not have a dry requirement for evaporative condensers. Once it is switched from the hybrid mode, it is actually in the majority of cases oversized for dry mode, since the ambient temperature has dropped. We can give you some examples of this after the meeting.
  - a. Doug Scott (Utility CASE Team): Good point. The focus is the approach in adiabatic mode, but maybe we need to clarify that there is a different approach for dry mode. What we have seen most frequently is equipment that is severely undersized in the dry mode, which is actually the bulk of the year. The intent is to ensure we establish the correct metric for overall annual operation. We do not want to use metrics for both dry mode and adiabatic mode; we prefer to use one metric.
  - b. Frank Morrison (Baltimore Aircoil Company): We can work with you to establish the appropriate requirement.

- c. Doug Scott (Utility CASE Team): Yes, so the question would be: is there a relationship between the two metrics? If so, we can establish a requirement for one metric and be relatively sure what the other metric will be based on the relationship between the two.
  2. Frank Morrison (Baltimore Aircoil Company): At some point, I would like to discuss the IAR technical paper with you. We tend to disagree with the finding that air and evaporative systems consume the same amount of energy. Evaporative systems are the most efficient followed by adiabatic systems then air cooled as least efficient.
    - a. Doug Scott (Utility CASE Team): The code requirement would not dictate the type of condensing system to use. Designers can choose the type of system. The code would establish a minimum efficiency requirement for the adiabatic system so that minimum requirements exist for every type of system. Right now there are now minimum requirements for hybrid condensers.
  3. Frank Morrison (Baltimore Aircoil Company): We can help you with an analysis of CO<sub>2</sub> systems, if you want to propose a requirement for this type of systems.
    - a. Doug Scott (Utility CASE Team): That is a good consideration, I think the issue is how prevalent is it in the market and how prevalent will it be when the code comes to into play. We are not proposing requirements for CO<sub>2</sub> systems now.
    - b. Frank Morrison (Baltimore Aircoil Company): Yes, the market seems to be moving that way. It would be good to get out in front of the market
  4. Gordan Studer (EVAPCO, Inc.): Are you going to review and revise the efficiency requirement for air-cooled or evaporative condensers that are in the code today? Will you provide an overview of the existing efficiency requirements for equipment other than hybrid condensers?
    - a. Doug Scott (Utility CASE Team): We will only be presenting a summary of the proposed code change, which is to add efficiency requirements for adiabatic condensers. We will not be modifying existing requirements of dry or evaporative condensers. There will be time at the end to bring up anything you think we are missing on these sections of the code.
    - b. Gordan Studer (EVAPCO, Inc.): My only comment about splitting adiabatic condensers out from an air cooled is that evap cooled method is in front of the fin and tube heat exchanger itself. The fin and tube heat exchanger does not differ from a dry product. I do not see that it matters to have a different standard for the efficiency of the coil, between adiabatic or dry mode. The only difference would be the TD (temperature difference between SCT (Saturated Condensing Temperature) and EAT (Entering Air Temperature)). The performance is fairly linear. You can probably normalize everything on a reference TD basis.
    - c. Doug Scott (Utility CASE Team): The specific efficiency is established at a given temperature.
    - d. Doug Scott (Utility CASE Team): There are a number of variables, it will be easier if we can reach general agreement on some of them. If we agree on efficiency, then the focus may be on sizing.
  5. Gordon Struder (EVAPCO, Inc.): The type of pre-cool as you defined it (e.g., media pad or spray only), prior to entering the fin and tube heat exchanger, could potentially differ substantially and impact overall cost used in analysis.
    - a. Doug Scott (Utility CASE Team): If a manufacturer offers both types of products, we would want to know what is offered as the baseline or standard option. We will use the standard option, which tends to be less expensive, for the cost effectiveness analysis. If

manufacturers use different system types, we will probably try to establish a median across manufacturers.

6. Frank Morrison (BALTIMORE AIRCOIL COMPANY): How will reduction in refrigerant use and water use factor into the analysis? Are the cost savings included in the cost effectiveness analysis?
  - a. Doug Scott (Utility CASE Team): For the last round we had emission factors from refrigerants that we used to evaluate GHG reductions. GHG reductions from reduced refrigerant usage were reported, but not factored into the cost analysis.
  - b. Cathy Chappell (Utility CASE Team): We need to ask the Energy Commission how we can account for the benefit of reductions in refrigerant use. Within the CASE Report analysis, we do present the reduction in refrigerant use and reduction in water use, but I am not sure how the Energy Commission would like us to account for the cost or environmental benefits.
  - c. **Action item: CASE Team will follow up with the Energy Commission on how to account for benefits from reducing refrigerant use associated with the hybrid condenser measure.**
  - d. Frank Morrison (Baltimore Aircoil Company): It would certainly reduce the cost of refrigerants. Another consideration is that evaporative and air coolers have requirements for water use. I know that for hybrid condensers, water impacts will vary based on the type of condenser (e.g., once-through, recirculating). Will there be a water use requirement in the proposed standard for hybrid condensers as well?
  - e. Cathy Chappell (Utility CASE Team): We can look into that as well. I assume that any water requirements for air and evaporative coolers would also apply to adiabatic (or similar types of requirements).
  - f. Doug Scott (Utility CASE Team): I do not think the incremental water usage differences between different hybrid condenser sizes is substantial. We did not take a position water use between air-cooled and evap-cooled when establishing the requirements for those types of condensers during the 2013 code cycle. This may be information that comes out of the analysis.
  - g. Frank Morrison (Baltimore Aircoil Company): We can provide some input on this issue in our response to this session.
  - h. Doug Scott (Utility CASE Team): Certainly if there is some technology that is not going to work, we would want to understand that as well.
7. Phillip Hollander (Baltimore Aircoil Company): Regarding your comment about offering baseline levels based on a TDV analysis for different technologies – what is the goal of establishing minimum efficiency levels? Is it to find an efficiency target that puts hybrid condensers at the same efficiency level as other condensers, or shoot for a higher target using the TDV analysis?
  - a. Cathy Chappell (Utility CASE Team): The efficiency does not need to be better than air-cooled or evaporative, but we want the base case to be more or less equivalent to current air-cooled. This seems to be the most practical approach.
  - b. Doug Scott (Utility CASE Team): If there is no minimum efficiency, which is the case now, you could use any efficiency level you want. This proposal aims to close the loophole that exists today.
  - c. Cathy Chappell (Utility CASE Team): Part of the strategy is to go back to the methodology that was used in the 2013 standards when we develop requirements for air-cooled and evaporative condensers. We will use the same methodology to establish a baseline efficiency for hybrid condensers. We will come up with a version of the minimum requirements and circulate this to the stakeholders. Stakeholder will have the

opportunity to provide feedback before we submit the proposal to the Energy Commission.