



WHPA Goal 2: CQM Standard 180 User Guide Working Group Thursday March 2, 2017 Meeting Notes

Call to Order

The meeting was called to order at 10:05 am PST by Dale Rossi, Chair of this working group and a representative of Field Diagnostic Services Inc. (FDSI).

Roll Call

The Chair considered one member of each organization to be a voting member for this working group. 9 of 16 voting members in attendance would constitute a quorum. 9 voting members, 2 non-voting members, 0 guests and 1 staff were present for a total of 12 attendees.

P = Present at meeting				
A = Absent from meeting; if proxy has been assigned it will be noted below.				
Although Voting Members have been designated by Staff, this group acts primarily by consensus.				
CQM User Guide Working Group Voting Members				
ACCA (Air Conditioning Contractors of America)	Donald	Prather	Contractor Association	P
Air Management Industries	April	Yungen	Contractor (Nonresidential)	
Aire Rite AC & Refrigeration	Don	Langston	Contractor (Nonresidential)	
AMS (American Mechanical Services)	Marc	Pickett	Contractor (Nonresidential)	P
Charles Segerstrom, Energy Efficiency Consulting	Charles	Segerstrom	Energy Efficiency Program Consultant	P
CLEAResult (formerly PECEI)	Todd	Van Osdol	California IOU	P
FDSI (Field Diagnostic Services Inc.)	Dale	Rossi	Third Party Quality Assurance Providers	P
GWP (Goodheart-Willcox Publisher)	Sandy	Clark	Educator, Trainer	
Honeywell E&ES, Commercial Buildings, Trade	Michael	Lawing	Controls (Manufacturer or Distributor)	P
HSGS (Honeywell Smart Grid Solutions)	Shayne	Holderby	Energy Efficiency Program Consultant	
National Comfort Institute	Jeff	Sturgeon	Educator, Trainer	P
Richard Danks Consulting - FacilityPro	Rick	Danks	Other Stakeholder	
SCE (Southern California Edison)	Scott	Higa	California IOU	P
Tre' Laine Associates	Pepper	Hunziker	Energy Efficiency Program Consultant	P
Western Allied Corporation	Mike	Gallagher	Contractor (Nonresidential)	
Warren Lupson and Associates	Warren	Lupson	Other Stakeholder	
CQM User Guide Working Group Non-Voting Members				
BELIMO	Darryl	DeAngelis	Controls (Manufacturer or Distributor)	P
BMI (BuildingMetrics, Inc.)	Pete	Jacobs	Energy Efficiency Program Consultant	
CLEAResult (formerly PECEI)	Michael	Blazey	Energy Efficiency Program Consultant	
HSGS (Honeywell Smart Grid Solutions)	Steve	Varnum	Energy Efficiency Program Consultant	
SCE (Southern California Edison)	Steve	Clinton	California IOU	P
UC Davis EEC (Energy Efficiency Center)	Kristin	Heinemeier	Research Organization	
CQM User Guide Working Group Guests (Non-Voting)				
Adrienne Thomle, Consulting**	Adrienne	Thomle+		
Fresno Unified School District	Frank	DiLiddo		
Little Caesar's **	Wendy	Gallo+		
WHPA Staff (Non-Voting)				
BBI (Better Buildings Inc.)	Mark	Lowry	WHPA Executive Advisor/BBI COO	
BNB Consulting/WHPA Staff	Bob	Sundberg	Energy Efficiency Program Consultant	P (scribe)
Empowered Solutions/WHPA Staff (WHPA Co-Director)	Shea	Dibble	Energy Efficiency Organization	

** Organization is Not a Member of the WHPA; + Individual is NOT Registered with the WHPA; ^(P) after last name = Member/Registrant is Pending Approval from the WHPA Executive Committee

To avoid repetition, the name of the member organization will not be repeated in the body of the minutes past the first identification with the name of the representative participant.



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Welcoming and Member Introductions

Attendees were welcomed.

Approve Previous Meeting Draft Notes

The February 23 meeting draft notes were distributed February 26. Finalized meeting notes would be posted to the WHPA website by Bob Sundberg.

ACTION Items

Feb. 23 **Decision:** the WG decided to concentrate first on how to develop and produce annual reports and attempt work on recommendations for quarterly/periodic reports as time permitted.

Feb. 23 **ACTION:** the working group needed to decide whether they should change their concept of maintenance to include airside measurements or not. Also, whether they believed that airflow related measurement needed to be added to Standard 180 or not.

Dale Rossi, Chair – agreed that the second action item was an item discussed by the group at the previous meeting but he never intended that it would be a future action item. Dale didn't believe that was an issue that this group needed to address or decide. In his opinion, the NCI and airside measurement approaches were not supported in Standard 180. He also did not think that whether airside measurements (airflow and static pressure) should be suggested to the Standard 180 Committee for future revision consideration was in the scope of work for this working group. Those might be considerations for the full CQM Committee or others but not for this group.

Donald Prather, ACCA – recalled that the discussion was about total external static pressure and not the whole NCI approach. The question raised was whether the user guide might include something beyond the strict limits of what was stated in the standard. The standard described the minimum. Anything further was for the working group to decide. He agreed to go with whatever the WG decided.

Dale Rossi – didn't believe there was anything in the standard that would lead you to believe that total external static pressure should be measured or even quantifying or validating airflow.

Pepper Hunziker, Tre' Laine Associates – asked whether that question should be pushed up to the full committee to see what direction could be provided to stay on target?

Dale Rossi – was happy with the answer he believed they already had. That they were to make a user guide for the existing standard. That was one of the key project parameters established a year ago. That had come from Don Langston, personally. He thought that if they tried to anticipate what the standard might allow or become in the future, that would be going down a rabbit hole the group couldn't get out of.

Charles Segerstrom, Energy Efficiency Consulting – his question was that if the standard description was vague and didn't describe in detail exactly what the techniques were to accomplish the maintenance task, should they explain that there might be multiple measurement techniques or was the group bound by a checklist approach and not a measurement approach?

Dale Rossi – this committee spent over a year going over each of the rooftop table maintenance tasks in detail in addition to making specific revision suggestions for the Standard 180 Committee.

See pages 7, 8, 9 of the WG work product: CQM Maintenance Task Working Group Standard 180 Rooftop Unit Table 5-22 Report:

<http://www.performancealliance.org/Portals/4/Documents/Work%20Product/Table5-22%20Rooftop%20Units%20Report%2005-07-2014.pdf>



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Dale Rossi – stated that there was no task in the current standard that needed or used those measurements. That whole concept of measuring total external static pressure or airflow was not in the current standard. The one place it could have been included was were particulates accumulated in air filters rendering them less or ineffective. They would have to either seek to change the standard or have Don Langston change the objective of the working group to address that issue.

Charles Segerstrom – he understood the part about sticking exactly with what was stated in print. But, he was interested to see how far the group could go with what they had in front of them.

Donald Prather, ACCA – while they all seemed to agree that it would be wonderful to have total external static pressure and pressure drop measurements at several key places within the unit when units were first installed to compare with future measurements, that was not the case in California. But, that would be beyond the minimum called for in the standard in the air filter inspection task.

New Business – Dale Rossi and Bob Sundberg

None.

AGENDA

Topic	Discussion Leader	Desired Outcome
Welcome, Roll Call, Member Introduction, Approve Past Meeting Notes, Review Action Items, New Business, Meeting Agenda	Chair, WHPA Staff	Record attendees, welcome any new members, approve previous meeting minutes, review status of any open Action items, planned agenda and bring up any new business items for the WG to consider addressing.
Review of Feb. 23 revisions to draft report	Dale Rossi	Members understand and agree with draft report revisions and WG decisions.
Develop Tasks for each Topic	Dale Rossi	Tasks listed for next topics discussed.
Discuss Measurement, Data Gathering, Reporting, Validation Topic	Dale Rossi	Agree on how they would approach this topic in development of the user guide.
Detailed Plan for Meetings Through June 2017	Dale Rossi	Agree on topics to be worked at all remaining meetings through June 2017.
Confirm last meeting date/time, assign actions and proposed agenda and adjourn.	Dale Rossi, WHPA Staff	Clear understanding of member responsibilities for the next meeting. Next meeting date/time established.

Review of Feb. 23 meeting draft report – Dale Rossi

Defining Performance Objectives for Customer Facing Reporting – Dale Rossi

Annual Review Reporting Performance Objectives

Dale Rossi – the goal for the meeting was to have defined list of what they hoped to achieve by creating those reports.

Dale understood the goals for an annual report to be:

- Compare the performance objectives to the initial starting condition goal metrics. Document the metrics and status for each of the program performance objectives.



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Todd Van Osdol, CLEAResult – asked Dale if he was suggesting a baseline be established for each performance objective? Some could be very analytical like utility bills while others could be more subjective like comparison to a level of occupant comfort complaints?

Dale Rossi, Chair – yes, everything he heard in discussions about what the standard intended indicated setting goals, a metric reduceable to a number. One example was that for energy efficiency, to reduce energy consumption by X or 5 % or some metric/goal. If you were going to have that kind of a goal, you needed to establish a baseline to for comparison to a current value to see if you were meeting your goal. Criterial discussed:

- Goal metric had to be reduceable to a number for comparison purposes
- The source for metric data had to be identified
- The metric needed to be tracked and compared to the goal for reporting purposes

Dale Rossi – example of indoor air comfort. Someone would have to record and count the number of times there were occupied space comfort complaints for a subjective performance objective. The occupant's judgement and complaints could be counted, turned into a number which could be recorded and compared to a baseline and goal.

Todd Van Osdol – what would be the situation when a customer didn't have any previous baseline data, what to compare future metrics against? When there was no defined baseline to start with?

Dale Rossi – energy efficiency and usage would be an easy one. There should be past energy bills to help establish a baseline condition. They'd need to select a reasonable goal to begin with. If they couldn't access or would provide energy bills or pay someone else to gather that data, they might not qualify for having establish a Standard 180 based maintenance program.

Donald Prather, ACCA – what he'd experienced in facility management was they often had records for and frequency of HVAC equipment downtime. They also often had records for the number of customer complaints.

Dale Rossi – he reminded the current WG that the 2016 WG had established some ground rules. One of those was that establishing at least one performance objective for each of the three key goals and purposes for the standard – energy efficiency, thermal comfort, indoor air quality. Failure to do so resulted in a failure to have established a Standard 180 based maintenance program. Unless they documented that a goal did not apply, like thermal comfort didn't apply for a storage space.

Todd Van Osdol – the challenge he saw for the annual reports was establishing how they would track progress against those goals, performance objectives for the more subjective performance objectives they'd probably not tracked before like IAQ and occupant comfort.

Dale Rossi – some performance objectives might not have or need a baseline. A goal for keeping building kW under a specific value would be sufficient for tracking and future comparison. The same approach could be used for occupant comfort goals. You might just establish a goal to have no more than two complaints from those in a specific troublesome space per quarter or year or whatever. In those cases, it wouldn't matter if they didn't have a record for what happened previous years or any baseline to compare to. Just compare to the established goal. A previous baseline condition or metric was not necessary for all performance objectives.

Jeff Sturgeon, NCI, joined the meeting. Dale asked Jeff and the rest of the group whether they could think of any other important things which should be included in an annual report beyond this status against the performance objectives.

Todd Van Osdol – suggested the report might cover changing conditions, physical changes to the building or use within the building. Determine if the original performance objectives were still all relevant.



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Pepper Hunziker, Tre' Laine Associates – asked whether there was a place in the report for an explanation behind why those particular objectives were selected? There could be a change in building management and those coming in might not understand how the current objectives were determined. She was thinking within the context of what would compel the responsible party to continue with that maintenance approach. It could provide a record of what were the original drivers, the decision to have chosen this maintenance approach in the first place. She'd like to have an annual report confirm the decision about the original objectives and be compelled to continue with them going forward.

Dale Rossi – agreed. Putting notes into the annual reports for why those goals were selected might be helpful and a new concept to him. He thought that was a great suggestion.

Jeff Sturgeon, NCI – suggested that a review of whether the performance objectives were being met or not. If they were being met, they should consider setting new ones to address more pressing needs or revise some of the original objectives as “stretch” goals. What was “in it for me” that's been accomplished and re-affirming continuing the practice going forward.

Dale Rossi had the group review the Overview to Standard 180 flow chart and the two process flows – strategic/annual reporting and tactical/quarterly-periodic reporting. He didn't know how or where these two processes could or were linked.

Quarterly Review Reporting Technical and Operational Objectives

Dale Rossi suggested the group change gears and try to address quarterly/periodic reporting. What were the goals for quarterly inspection reports? He suggested reporting on:

- Tasks were accomplished within the prescribed timeframe
- Provide status – were condition indicators acceptable or unacceptable
- How many times in sequence had there been acceptable or unacceptable conditions

Jeff Sturgeon, NCI – within the first quarter following the initial inspections and unit operational evaluations, there might have been some immediate repairs proposed and authorized. You'd want to review the repairs that were completed and that units were all taken care of and returned to normal acceptable operation. Sometimes, there were more extensive repairs called for. The report should summarize which were completed and status for those not yet completed.

Dale Rossi – what he was hearing was that they would take the maintenance plan and add some assurance that the tasks were met – acceptable or unacceptable status. He asked whether they thought it should include raw data. For task “N” should they include the refrigeration temperatures (super heat, subcooling, condenser over ambient etc.), for instance? How granular should the report be?

Jeff Sturgeon – suggested that some owners are very concerned about the equipment state of operation and potential or unexpected capital expenditures for equipment replacement. They'd probably appreciate a summary indicating all units which were operating normally and which ones need to be considered for replacement or would have to be planned for replaced very soon. Extending equipment life as a result of the QM approach would highlight one of the key benefits of this approach. There were some calculators out there for expected equipment life based on maintenance tasks and services delivered to units. The user guide could point them to some of those tools.

Jeff Sturgeon offered to provide a few initial related links.

NATE energy savings calculator and repair or replace tool:

<http://www.hvacradvice.com/site/308/Tips-and-Resources/Energy-Savings-Calculator>

<https://energy.gov/eere/femp/energy-and-cost-savings-calculators-energy-efficient-products>

<http://www.pnnl.gov/uac/costestimator/main.stm>



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Facilitiesnet.com

<http://www.facilitiesnet.com/hvac/article/HVAC-Maintenance-and-Energy-Savings-Facilities-Management-HVAC-Feature--10680>

System Life/Longevity:

<http://www.facilitiesnet.com/hvac/article/HVAC-Maintenance-and-Reliability-and-Longevity--10681?source=next>

OTHER POSSIBLE RESOURCES:

Equipment Life-Cycle database (did not locate rooftop unit information):

<http://www.facilitiesnet.com/hvac/article/HVAC-System-Life-Cycle-Database-Now-Available--8095>

Lawrence Berkeley National Laboratory (LBNL)

“Life Cycle Cost and Payback Period Analysis for Commercial Unitary Air Conditioners” 2004:

<http://seedengr.com/Life-cycle%20cost%20and%20Payback%20Period.pdf>

FEMP Life-Cycle Costing Manual – Handbook 135 - 1995

<http://aesl.hanyang.ac.kr/resource/blcc/blcc-handbk1.pdf>

ASHRAE HVAC Equipment Life Expectancy Chart:

http://www.culluminc.com/wp-content/uploads/2013/02/ASHRAE_Chart_HVAC_Life_Expectancy%201.pdf

Bob Sundberg, WHPA staff – suggested the quarterly/periodic reporting might include a summary of units successfully repaired and those which were not operating properly and which could not cost-effectively be repaired and would be candidates for replacement.

Dale Rossi – quarterly reporting could include that sort of information. But, it kind of violated one of the assumptions he'd operated according to. His assumption was that quarterly reporting could be produced from the inspection records. It didn't require pulling report information from a database. He didn't think that capability and mindset was common among most contractors. However, it could be considered an example of aspirational information which might be included in quarterly reporting. The group had previously talked about having a basic report and then having some “reach” goals for reporting. Goals and examples which could be suggested but not required.

Scott Higa, SCE, joined the group. He agreed with the idea of offering aspirational examples and goals. He thought that the 2016 WG work product had a good description of what the quarterly reporting might include. On page 7 a list of bullets broke out what contractors thought their customers would want to learn about in quarterly reporting:

Page 7:

Reporting from the Quarterly Inspection Data

The reporting generally derived from quarterly maintenance inspection tasking forms is generally not perceived as very interesting to customers as a table showing the date that tasking is complete or listing of condition, exceptions, or repairs done. There is a need for something that makes a point or makes a set of conclusions. Something that a customer can make decisions with. There are those that think reporting completion data is a valid report for the record.

The following reporting is what contractors think customers want, but data availability and processing expertise is perceived to be a limiting factor for them.

- Energy efficiency reporting – Change in kW and kWh usage/sqft. pre-vs-post implementation, more detail as desired and is available
- Repair history – Change in cost of service pre-vs-post implementation, more detail as desired and is available



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- Comfort history – % time within set points, other
- Indoor air quality history – % time below CO₂ alarm set point, humidity, other
- Other, customer/service provider specific.

Scott Higa thought this was a good framework to build on. You could throw the performance objectives into these specific buckets and tie them together.

Dale Rossi – since the 2016 work product was finalized and approved, this group had been talking about a breakout in reporting between annual reporting and quarterly or periodic reporting. All the above items appeared to Dale to be geared more for the annual reporting.

Scott Higa suggested they try to tie back the data from the quarterly reporting to performance objectives. It would help make that quarterly data be more meaningful to the customer by tying it back to their performance objectives. It would help inform the customer how they were trending toward those goals. Someone had already mentioned that the customer might not always understand the impact of that more granular data from the inspections, what it really meant.

Dale Rossi – Scott suggested that the quarterly reports provide some interim numbers related to achieving the annual performance objectives which, they agreed, might be a “reach” goal for reporting. It would depend on the customer whether they wanted to receive and discuss quarterly reports or not and what format would be most meaningful. He thought this was a great idea. He thought this was a “breakthrough” and it provided a missing link between quarterly technical/tactical and annual strategic/goal status reporting.

User Guide Working Group Planning – Dale Rossi

Roadmap/calendar – Decided at Feb. 23 meeting

Feb 23 – Finalize work plan and roadmap – stay at higher level and concentrate on “what” rather than “how”

- 1 - Mar 2 – defining performance objectives for customer facing reporting
- 2 - Mar 9 – categorize data types
- 3 - Mar 16 – categorize data collection methods
- 4 - Mar 23 – categorize useful calculations
- 5 - Mar 30 – categorize useful outputs and descriptions
- 6 - Apr 6 – categorize useful comparisons and conclusions
- 7 - Apr 13 – Write introduction
- 8 - Apr 20 – Write conclusion
- 9 - Apr 27 – Final document review and debate
- 10 - May 4 – Final document review and vote

Closing Comments/Adjournment

The next meeting was scheduled for Thursday March 9 at 10:00 am PST.

The March 2 meeting topic would be a focus on data types for performance objectives. What kind of data could contractors reasonably be expected to collect and what types might be aspirational.

Pepper Hunziker – suggested that they keep a list of the decisions made about reporting, the principles they’d agreed on, to help guide them as they moved forward later with producing user guide text and examples. So, that what they produced later in a work product was in accordance with their decision framework.



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The meeting was adjourned at 11:01 am PST.

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Action Items and Key Decisions

None.