CEESP Goal 2.1: CQM Standard 180 User Manual Working Group
Thursday October 8, 2015 Meeting Notes

Call to Order

The scheduled 60 minute meeting was called to order at 10:05 a.m. PDT by Dale Rossi, Chair of this working group and a representative of Field Diagnostic Services Inc (FDSI).

Roll Call

The Chair had not yet designated voting members for this new working group, He planned on working toward consensus on decisions and expected to name one active participant from each organization as a voting member. 9 of 17 initial members attended this meeting plus 1 WHPA staff for a total of 10 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 Maintenance Task Working Group Initial Members				
ACCA (Air Conditioning Contractors of America)	Donald	Prather	Contractor Association	
AHRI	Warren	Lupson	HVAC Manufacturer Association	P
Aire Rite AC & Refrigeration	Don	Langston	Contractor (Nonresidential)	P
BELIMO	Darryl	DeAngelis	Controls (Manufacturer or Distributor)	
BMI (BuildingMetrics, Inc.)	Pete	Jacobs	Energy Efficiency Program Consultant	P
CLEAResult (formerly PECI)	Michael	Blazey	Energy Efficiency Program Consultant	
FDSI (Field Diagnostic Services Inc.)	Dale	Rossi	Third Party Quality Assurance Providers	P
GWP (Goodheart-Willcox Publisher)	Sandy	Clark	Educator, Trainer	P
Honeywell ECC, Commercial Buildings, Trade	Michael	Lawing	Controls (Manufacturer or Distributor)	P
Honeywell ECC, Commercial Buildings	Adrienne	Thomle	Controls (Manufacturer or Distributor)	P
HSGS (Honeywell Smart Grid Solutions)	Shayne	Holderby	Energy Efficiency Program Consultant	
Marina Mechanical	Denny	Mann	Contractor (Nonresidential)	
National Comfort Institute	Jeff	Sturgeon	Educator, Trainer	
Richard Danks Consulting	Richard	Danks	Other Stakeholder	
SCE (Southern California Edison)	Steve	Clinton	California IOU	P
Tre' Laine Associates	Pepper	Hunziker	Energy Efficiency Program Consultant	
UC Davis EEC (Energy Efficiency Center	Kristin	Heinemeier	Research Organization	P
CQM Maintenance Task Working Group Non-Voting Members				
CQM Maintenance Task Working Group Guests				
WHPA Staff (Non-Voting)				
Better Buildings Inc. (BBI)/WHPA Executive Advisor	Dale	Gustavson	Energy Efficiency Program Consultant	
BNB Consulting/WHPA Staff	Bob	Sundberg	Energy Efficiency Program Consultant	P (scribe)
Enpowered 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

New members welcomed: none.

New Business

None.

Approve Previous Meeting Draft Notes

Draft meeting notes from the September 24 meeting were distributed October 6. No suggested revisions or corrections were received. Bob Sundberg would have the minutes finalized and posted to this working group's portion of the CQM Committee site.

ACTION Items

ACTION: Dale Rossi offered to put together a flow chart of the chain of maintenance responsibilities for the group for the next meeting. Completed.

ACTION: Sandy Clark committed to provide a summary of the group "functionality" brainstorming discussion prior to the next meeting. She would try to see if that discussion suggested some ideas about the form for a user manual. Completed.

AGENDA

Topic	Discussion Leader	Desired Outcome
Welcome, Roll Call, Member Introduction, Past Meeting Notes, 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.
List and Discuss Working Group Objectives	Chair	Reach agreement on WG objectives.
Brainstorm and refine User Manual suggested content, order and form	Sandy Clark	Review Sandy Clark's summary from Sept. 24 meeting regarding user manual "function" and implications for "form."
Review 1) basic information flow and 2) basic process flow charts	Dale Rossi	Members reach a common understanding regarding maintenance related roles and contract/plan development.
Establish Meeting Day, Time, Next Meeting Logistics and Agenda Items	Chair, WHPA Staff	Schedule next meeting day/date and time.

Establish WG Objectives for up to Five 2015 Meetings

Not addressed.

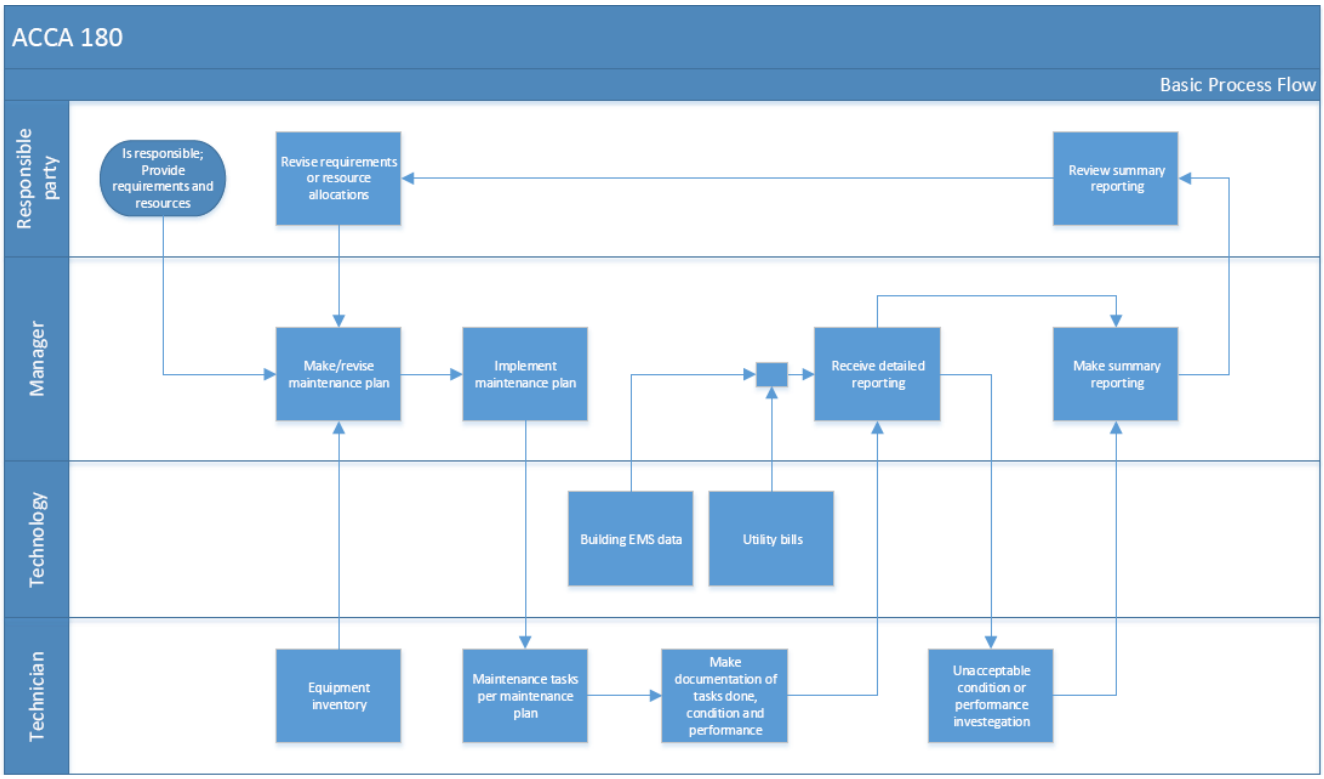
ASHRAE Requirements for Development of User Guides

Not discussed.

Maintenance - Basic Process Flow Chart and Basic Information Flow Charts

Dale Rossi, FDSI and Chair, began the meeting with a review of the Basic Process Flow Chart he'd created. He intended this chart to depict the maintenance plan and contract development and implementation processes on which Standard 180 was based. He hoped the group could come to agreement on the process flow which might help provide

a common understanding. The three key players were 1) the responsible party (owner, facility manager, financial authority etc.), manager (either contractor service manager or facility manager of a maintenance staff who managed the "process" of implementing maintenance" or other intermediaries like contract sales manager, site representative) and technician (individuals who implemented contract/plan maintenance tasks. Dale walked the group through his explanation of the flow chart. He pictured implementation of Standard 180 based maintenance as a cycle with feedback and revisions. A process of refinement and improvement.



Kristin Heinemeier, UC Davis EEC, asked whether Standard 180 detailed where there was a difference between "maintenance tasks" and "service and repair tasks."

Dale Rossi helped clarify that this was not delineated clearly in the original 2008 standard nor in the 2012 revised standard. Part of the work that his CQM Standard 180 Maintenance Task Working Group (MTWG) had focused on while working through Section 5 Table 5-22 Rooftop Units was to bring further clarity to this distinction, especially for circumstances where maintenance tasks were contracted out. His WG had worked through all Table 5-22 tasks and tried to distinguish which were commonly considered maintenance tasks, which typically included replacement of filters and motor belts. Also, where repair or replacement was called for were tasks agreed to be beyond the maintenance agreement. Those next repair or replacement steps typically required the owner or responsible party's approval for additional work and billing and were not covered under the maintenance contract cost. The job of a well implemented plan (Section 4) was to have the owner/responsible party and service provider clearly state and agree which tasks and/or activities would be covered under a maintenance contract and which would require reporting to the owner with quotes for the additional charges and gaining approval before work on those activities could proceed. The MTWG had worked very hard to provide suggestions to the Standard 180 Committee about the need for such clarification.

The work of Dale Rossi's earlier Maintenance Task Working Group was readily available and posted to their portion of the CQM Committee Site within the WHPA site (www.performancealliance.org) at:
http://www.performancealliance.org/MaintenanceTask/tabid/437/Default.aspx --- Working Group location

http://www.performancealliance.org/Portals/4/CQM_Std80MaintenanceTaskWG_Table5-22ReportSummary20140612.pdf Working Group Rooftop Table 5-22 work product

http://www.performancealliance.org/Portals/4/Documents/Committees/Goal2/CQM/Report_of_the_CQM_Maintenance_Task_Working_Group3_Draft_20150702.pdf Working Group Economizer Table 5-12 work product

Don Langston, Aire Rite AC and Refrigeration, joined the group for a few minutes having taken time away from his all day meetings. Dale Rossi asked Don for comments on their direction. Don stated that he'd reviewed Sandy Clark's document and thought it would prove to be very valuable in helping frame the user manual they would develop. He'd caught a portion of Kristin's question and Dale's answer and commented that that a good maintenance plan required a great deal of communication both ways. The scope of maintenance plans typically included only "clean, check/inspect and report" tasks, not equipment repairs or component/unit replacement.

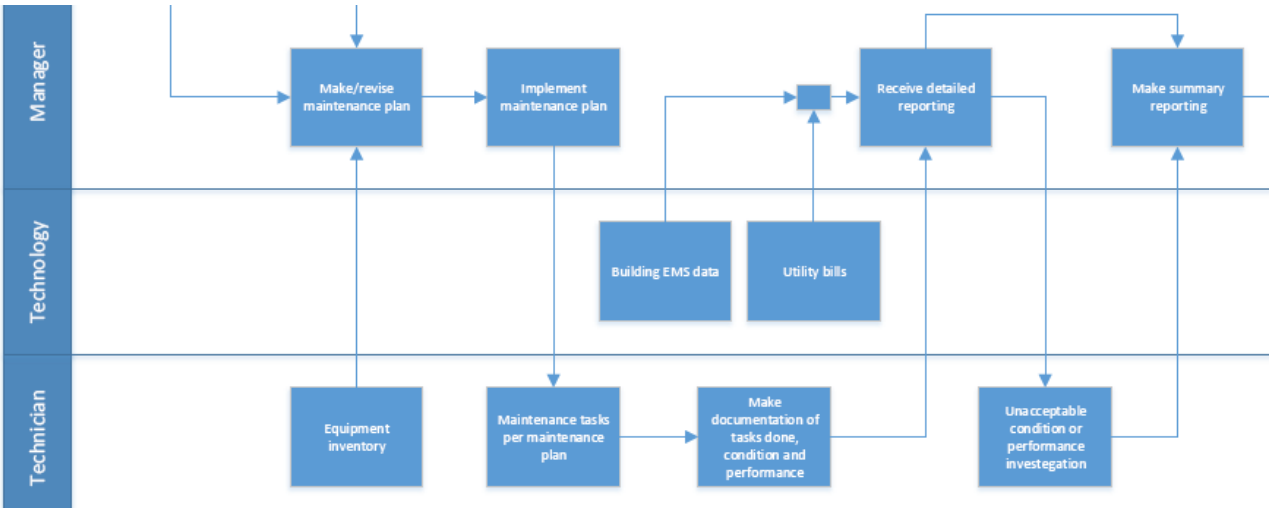
Kristin Heinemeier, UC Davis EEC, had been reading tasks in Standard 180 Section 5 RTU Table 5-22 and came across a number of tasks like checking a fan drive which had a description of repair or replace as necessary. She thought that replacement, then, would not be part of a typical maintenance contract. She thought there was a need to clearly state in the task tables where maintenance ended and there was a need to leap off the maintenance page to another page that dealt with service. What needed repair which would require a proposal and approval before proceeding.

Don Langston indicated that what Kristin had just described dealt with fault communication. A technician had observed a fault or abnormal functioning. How that would be communicated and to which decision-maker at what level. While Section 5 dealt with the description of each maintenance task task, the way he looked at this user manual, the manual would serve to help outline answers like he'd just described. The process of communication and just where the lines were drawn between tasks in Section 5 and a clear implementation plan in Section 4. If you didn't set up a good foundation with a clear plan from Section 4, then implementing the tasks would not be at all clear on what each party was responsible for and what process to follow.

Dale Rossi, Chair, recalled that Kristin had also raised an important point in her comments. Who was the audience for this user manual. The answer that Don provided was specific to contracted services. If there was an in-house maintenance staff, replacement might already be a part of their responsibilities. Dale asked whether they should narrow the scope of this first user guide around contracted maintenance.

Kristin did not think their user manual should be restricted to contracted services. In-house maintenances would probably have some kind of decision tree defining what they were already authorized to do and at some point they would have to make a recommendation to a supervisor for approval before proceeding. She thought much of the same process was involved. Just where those dividing lines were which required approval would be the major difference.

Dale Rossi clarified that the process flow chart he'd prepared was like a yearly review, an overview of the process. There would be more detailed tables and steps between each. He pointed the group to the technician's second box from the left where he'd document tasks done, condition indicators and performance and then would report that up to the maintenance/service manager. The granular decisions like Kristin had described are details that would need to be spelled out in the implementation plan. They could probably break each of the related boxes down into far more detailed steps and points where approval was required. That would all need to be detailed out.



Dale believed that there would be entirely different processes for contracted services compared with in-house delivered maintenance. Each one of these boxes could probably have its own flow chart within it and for each type of delivered maintenance. He thought the process for what Kristin had described fit into that second technician box from the left. That included the day to day work and tasks. The next box to the right would contain the higher level, probably quarterly or semi-annual reporting of unit condition or performance, a record of what had been recommended and proposed for repairs, whether the decision had been approval or not or postponed until another budget period to address.

Bob Sundberg, WHPA staff, clarified that the CQM Maintenance Task Working Group (CQM MTWG) had dealt with each of those Standard 180 2012 tasks and tried to determine which ones or which parts of each were maintenance tasks and which were really service from the perspective of contracted services. They'd summarized those suggested revisions to the version of the standard Kristin had been reviewing in their Report to the full CQM Committee. That Report had then been delivered to the full Standard 180 for consideration for future revisions. He recommended review of that most recent CQM MTWG report to see how they'd dealt with that issue.

Dale Rossi asked Don Langston what % of the user manual he envisioned would deal with that granular maintenance task detail and what % would focused on the Section 4 process and maintenance plan development and detailing.

Don Langston thought the current task was to lay out broad strokes whether the maintenance was delivered by in-house staff or was contracted out. He saw the user manual dealing with the process of communication if the defined condition indicators warranted further attention and when they discovered repairs were needed. He wanted to keep to that higher level. Detailed examples could be provided in an appendix or other manual location. The user manual mainly would deal with Section 4 topics and issues and Section 5 details would appear in appendices. Communications about fault conditions was very important but a process for how that would be handled was part of what needed to be accomplished to develop a Section 4 plan. The standard is there, common, but each customer has a different prioritization of what they think is important - thermal comfort, energy efficiency and savings, reduced downtime and repairs, avoidance of premature equipment failure and replacement. We go beyond maintenance into service. The user manual can help point out how that could be communicated.

Dale Rossi asked others on the call for their comments.

Pete Jacobs, BuildingMetrics Inc., supported Kristin's notion that completing repairs was part of energy efficiency but that service and repair work was separate from maintenance tasks. It would be important to for the user manual to guide making that explicit.

Dale Rossi thought this was important enough that a flow chart of that second technician box would be useful. He volunteered to develop one.

ACTION: Dale Rossi would develop a flow chart outlining detailed processes within the second technician's box on the current overview flow chart.

Dale Rossi asked Don Langston for any other objectives that he wanted this group to achieve.

Don Langston thought that the document which Sandy had shared provided a good framework. If it included a table of contents, they could then dig into each chapter. He thought that the ultimate goal of the user manual would be for it to provide a guide for all the different stakeholders, what their different roles were and how to proceed with developing a maintenance plan.

Dale Rossi paraphrased Don's reply. The user manual was more about how to use the standard and far less about how to actually maintain equipment.

Don Langston clarified that he saw Section 5 as being focused on technician's delivering maintenance. There should be a part of the user manual that should address those issues. But, before that can happen, there had to be communication with the decision-makers at the building level. Contractors and other stakeholders needed to understand their obligations. There had to be agreement on just what would be a minimum level of maintenance and the process for delivering it would be clearly laid out.

Kristin Heinemeier, UC Davis EEC, asked whether Don saw this user manual as something an owner would read prior to entering into a maintenance agreement or as a document they'd use throughout that agreement.

Don Langston replied, definitely the latter. The user manual would provide a roadmap for the entire agreement timeframe. It would also be a resource to use when trying to compare different maintenance agreement proposals. How to compare different scopes of work. Helping owners understand what they should be looking for in maintenance agreements.

Process for Development of a User Manual or Guide - Sandy Clark

Sandy Clark, GWP, thought that Don's comments were very helpful. The mission for the user manual was to facilitate communication and provide a roadmap.

Dale Rossi stated that if this group could make that table of contents and address issues like which audiences this user manual was intended for, they'd have accomplished their initial goals. He asked Sandy to lead the group through a discussion. Questions which the group should answer in order to decide what their recommendations would be for the user manual. He asked Bob Sundberg to distribute Sandy's document to all WG members/guests. Completed during the meeting.

Sandy Clark's proposed process:
Step 1 - Confirm audience and discuss ideas for form with function
Step 2 - Define Scope
Step 3 - Determine User Manual Table of Contents
Step 4 - Determine Form/Media

Sandy suggested that they address and try to resolve a couple of assumptions before they tackled the table of contents.

<u>Step 1- Confirm audience and discuss ideas for form with function</u>
1. The Manager (facility manager, plant manager, contractor, account/sales manager etc.)

What motivated the manager?
The manager was accountable to the "responsible party." The manager was also obligated by their contracted service budget or department budget to deliver maintenance services within the budget that had been established. Dale Rossi agreed that the manager was motivated with the need to make a profit to remain in business. He thought that budgets should be thought of more as a limitation than as motivation.

What were the manager's responsibilities?

- Perform the requirements of the maintenance plan within the limits he had.
- He was responsible to make a profit.
- To also report back to the responsible party where there were limitations such as insufficient contract resources for expected tasks or for identified repairs or replacement.
- To educate the Responsible Party about Standard 180 and what their responsibilities were.
- Worker, technician competence
- Whether sufficient resources were available under the contract to deliver contracted services

Form with function ideas

- heavy focus on providing information on the standard
- benefits of the standard for the audience
- benefits of using the User Manual
- timetable for using the standard
- how to use the User Manual
- suggestions for discussion and planning between the Manager and Owner, Worker implementation and tools for implementation/compliance

2. The Customer ("responsible party," owner, CFO, corporate facility executive, property management firm representative)
What motivates the Customer?
Energy efficiency, thermal comfort and indoor air quality. HVAC equipment life.

What were the Customer's responsibilities?

- The Responsible Party determines their maintenance objectives and supplies the resources to accomplish them.
- Probably not aware of all that Standard 180 expects.

3. The Worker (in-house maintenance staff, contractor employed technician, service manager, etc.)

- Meet the requirements of their manager delivering maintenance services
- Report tasks completed to manager/customer

- Report additional condition indicators which would suggest additional services or repair/replacement requirements

Kristin Heinemeier, UC Davis EEC, questioned why this ASHRAE/ACCA/ANSI standard couldn't require that certain work be performed. She thought that performing all tasks in the tables would be required of a mandatory standard. She thought that Section 4 language should be tightened up to make these requirements clear.

Dale Rossi clarified that municipalities, states and even utility programs could enforce "mandatory standards" under their authority. But, Standard 180 itself was a voluntary standard, believed to be the first HVAC maintenance standard to be written. An owner couldn't be forced to complete recommended repairs or other services. Standard 180 allowed the owner/responsible party to determine what the maintenance objectives were and establish the ground rules under which decisions about what services would be performed as maintenance and which repair/replacement services were entirely voluntary on their part. Dale stated that Kristin was the Standard 4 Section 4 Chairperson and needed to

proceed with revisions as she saw fit. This working group was developing a user manual for the existing 2012 version of the standard.

There was a great deal of further discussion about whether and under what circumstances this standard was mandatory and in what ways. Code authorities as well as utility program implementation based on this standard were both discussed.

Staff:
The WHPA CQM Standard 180 Maintenance Task Working Group and CQM Standard 180 Section 4 Working Group provided several "reports" which included suggested revisions to Standard 180 2012 Sections 4 and 5. Links to those reports are provided for your convenience.

Standard 180 Section 4 WG:
http://www.performancealliance.org/Section4/tabid/438/Default.aspx
Section 4 Proposed Revisions - September 2014

Standard 180 Section 5 WG
RTU Table 5-11 - May 2014
http://www.performancealliance.org/Portals/4/Documents/Committees/Goal2/WHPA%20Work%20Product%20Summary%20for%20CQM%20Std%20180%20MT%20WG%20Table%205-22%20Report%2020140612%20no-draft11-28-14.pdf
Refrigeration Cycle Performance - System Performance Analysis - January 2015
http://www.performancealliance.org/Portals/4/Documents/Committees/Goal2/CQM/Report_of_the_CQM_Maintenance_Task_Working_Group%20-%20SYSTEM%20PERFORMANCE%20ANALYSIS%2020150114%20FINAL%20WW%20SD3.pdf

Statements in the Standard 180 "FOREWARD" and "Section 1. Purpose" portions of the current standard could shed further light on the intentions of the entire standard. These excerpts might prove helpful.

Taken from Standard 180 - 2012 FOREWARD:

This document describes the minimum acceptable level of maintenance for commercial building HVAC systems. Other standards or guidance documents may establish more specific or rigorous requirements that apply to certain buildings. Where applicable, those requirements should be followed or considered (if guidelines). This document

is not intended to limit the level of service provided or recommendations made by a service provider. Those delivering HVAC maintenance are encouraged to consider and recommend energy conservation measures or technology improvements that would help maintain or increase thermal comfort, the energy efficiency of the HVAC system, and indoor air quality.

This standard is written in code-intended language so it may be referenced or adopted by enforcement authorities as the minimum acceptable level of performance within their jurisdictions.
***Note:** This standard is specifically focused on the impacts of maintenance on occupant thermal comfort, energy efficiency,*

and indoor air quality. Additional maintenance program considerations related to equipment reliability, equipment robustness, and minimizing overall maintenance costs are also appropriate in order to support sustainability efforts, protect the HVAC capital investment, and/or minimize system downtime. These considerations, however, are outside the scope of this standard.

The meeting was extended by 1/2 hour to allow this discussion to be completed. Sandy Clark moved to her document section related to the table of contents, pages3/4.

Step 3. Determine the User Manual Table of Contents (TOC)
Sandy Clark, GWP, suggested the TOC begin with a brief overview. Other tools or sections could be devoted to the needs of individual audiences, like technicians. Those tools could be located in appendices in the back and pulled out and taken with one for meetings. She thought it would be most helpful to have one all inclusive document.

Kristin Heinemeier disagreed and thought it would be more useful to have different documents or manuals for each audience, like one just for technicians or the customer. She couldn't imagine one document could meet the needs for both.

Sandy walked the group through her initial layout which included an over, review of who would benefit, what were the benefits for each audience, a time table for implementing the standard and how to use the manual. Chapters with the content and a tools section toward the rear completed the general layout.

Bob Sundberg asked Sandy whether she and members might benefit by viewing the layout of the current standard and try to mirror its organization and layout. The actual standard could be shared online but not be distributed because of copyright.

Bob Sundberg brought his copy of the 2012 version of the standard into view and walked the group through an overview of its FOREWARD and table of contents.

Dale Rossi, Chair, indicated that he'd been studying this standard since 2009, over six years, and had concluded that it was not very easy to summarize was it meant. There were many specific questions it raised and the general nature of its language did little to make the intent clear or exactly how it was expected to be carried out. Section 4 on Implementation, Kristin Heinemeier was surprised to observe, was only about two pages long. That, Dale Rossi concluded, was, in effect, the reason there was a great need for developing a user manual. So it wouldn't take others six years to understand what it meant. Section 4 was the heart of the standard and the larger Section 5 should have

been an informative group of appendix tables. Very few people realized or had internalized that Section 4 described a process of developing and refining a maintenance plan and responsibilities of each party.

Sandy Clark returned the group to discuss who would benefit from using the standard and what were key benefits each audience party.

Dale Rossi suggest that there was a whole additional section to the user manual not mentioned yet he thought was critical. How to sell the standard. How the manager or contractor sales staff would present the standard to the owner or responsible party who was almost entirely motivated by economic factors. Dale provided an example using REITs (real estate investment trusts as building owners). If they saved energy, it went directly to the bottom line with lowered expenses. Energy saved = profit and increased their stock price.

Kristin Heinemeier questioned whether there was a downside to having owners see, in this manual, what the benefits were for the other players.

Dale Rossi didn't think there were any benefits for workers or the manager. This put accountability on them where it didn't previously exist. Thinking further, Dale stated that a Don Langston was using the standard to support his more expensive premium type of service. He was selling the benefits of the standard and believed he could profit doing that.

Time Table for Implementing Standard 180
Sandy asked whether there was really a time table for implementing the standard?

Dale Rossi responded that other than the frequency of maintenance tasks or time requirements within a utility program, he couldn't think of any other required time related requirements. In commercial maintenance the standard interval for tasks was quarters and the standard interval for contracts was years.

How to Use this User Manual
Sandy Clark next addressed how you'd use this manual. Would user scenarios or brief illustrations be helpful?

Kristin and Dale both thought those would be useful. Dale added that this group would make its recommendations to the Standard 180 Committee and onto the User Manual Subcommittee. They'd either use those suggestions or not. They also agreed that the overall User Manual needed to be a complete solution for at least one of their audiences and then expand from that foundation.

Sandy thanked everyone for their input. She thought she'd received a great amount of information. She thought that a major topic for their next meeting could be the user manual chapters. How much of the standard were they intending to address in detail. Tools could then be added, little tables or checklists tailored for specific audiences or groups. A tool that helped facilitate communications between the service provider/manager and the owner/responsible party. A checklist for the technician.

Member Feedback on Approaches to Producing a User Manual

Postponed.

Discussions About User Manual Examples Submitted by Members

The Standard 62.1 User's Manual was discussed above. The NASA and ACCA Standard 5 (Technician's Guide and Workbook for Quality Installation) were not addressed in this meeting.

Closing Comments/Adjournment

Dale Rossi summarized that in the remaining two 1 hour meetings, they didn't need the answers to those needs. Rather, they needed the suggestions. Ultimately, it would take a year or more to discuss those suggestions and define exactly what this user manual would be. The needed to produce a table of contents which could summarize these bullet point suggestions.

The next meeting was scheduled for Thursday October 22 at 10:00 am PT.

The Chair adjourned the meeting at 11:36 am PDT.

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ACTION Items listed on following page.

Action Items and Key Decisions (not referenced above)

Oct. 8 ACTION: Dale Rossi would develop a more detailed flow chart outlining detailed processes within the second technician's box located on the Basic Process Flow Chart.