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Evaluation of Electrical Feeder and Branch Circuit Loading: Phase 1

SUMMARY OF PANEL COMMENTS ON FINAL REPORT (VERSION DATED 15/DEC/2016)

Summary Last Updated: 21 December 2016

This is a summary of comments on the final report for the project on "Evaluation of Electrical Feeder and Branch Circuit Loading: Phase 1", and the disposition of these comments.

#	Commenter	Comment	Action
1	Yanniello	On Fig. 37, the Y-axis, the units of "kA" should probably be added to the legend.	Agreed. Added.
2	Yanniello	Section 8.3.5 – Required Building Documents and Information: this is certainly a very inclusive list. Upon seeing it, I question if we could ever afford to capture it for the number of sites we felt were needed for a statistically accurate sample size. This is more a question for the Panel & Sponsors to think about than Tammy.	I tried to include as much detail as possible. Phase II project personnel can omit details which are not considered important at that time. This is an important comment. I will add this as a footnote in Section 8.3.5.
3	Yanniello	Section 8.4.1 – a two month monitoring period for receptacle loads is recommended on page 86. If people are like the administrative assistant in our office, counter to intuition, she uses the space heater under her desk more in the summer than the winter. She said she "dresses for warm weather in the summer", so her dress and short sleeve blouses cause her to be cold. Maybe something to capture for future reference?	Thank you for pointing this out. I have changed the report, and added a footnote.
4	Yanniello	Section 8.5 – similar to my comment for 8.3.5, a very thorough and exhaustive list of analysis, but I question if we could actually fund such an exhaustive data analysis? Again, a comment more for the consideration of the Panel & Sponsors than Tammy.	This is an important comment. I will add this as a footnote in Section 8.3.5.
5	Yanniello	In the footnotes on pages 62 & 67, two n's in Yanniello (like I've never seen that before)	Corrected. My apologies.
6	Yanniello	And you must have one of my old business cards. I've since been demoted technically and promoted administratively since then. In the footnote on page 60, my current title is: VP of Engineering & Technology, Eaton's Electrical Systems & Services Group".	Corrected.

7	Wajnryb	Sections 8.3.5.2 and .3 – Suggest also obtaining the Operation and Maintenance Manuals	Agreed.
8	Wajnryb	Section 8.3.5.15 – Last Sentence – The corded equipment could change depending on what equipment different individuals have	Agreed in principle. But is unclear how best to reflect this, and no suggested text is offered.
9	Wajnryb	Section 8.4.1 - Page 85 – Second bullet point – Should Motor Control Centers be monitored if existing in the facility?	Agreed in principle. Good idea, but do you see this often? I didn't anticipate this in the type of buildings we have focused on. Added to list.
10	Wajnryb	Section 8.4.1 – In agreement with Bob Yanniello – Many times have come across space heaters in use in the warm weather and fans in use in the cold weather depending on the individual.	Agreed. Report changed, and added footnote.
11	Wajnryb	Section 8.4.2 – Paragraph after last bullet point. Based on personal experience, Figure 40 does not often occur.	Agreed. But ideal situation, and *should* exist in modern buildings designed to up-to-date energy codes.
12	Wajnryb	Section 8.5.3.2 – How will the receptacle inventory be obtained?	Agreed in principle. Was stated in report that inventory could be generated by employees working in building. (Tried to make it feasible).
13	Wajnryb	Section 10 – List the different appendices	Agreed in principle. Modified text to improve clarity.
14	Arno	This is an excellent report, detailed and to the point! Tammy you summarized the data collection section very well including options for power quality etc... I think it will be very beneficial and not too costly to add in the power Reliability and Quality. This data will be beneficial to many areas of NFPA and other organizations. Statistically speaking the selection process should produce solid results.	Agreed. I would like to thank you and others for your positive comments. Thus far, it seems that most of you feel like we accomplished our objective in this Phase I research project. Added a footnote, so both comments #4 and #14 can be considered by Phase II Project personnel.
15	Arno	I do have one concern minor in nature, I would target double the facilities for data collection in the anticipation of achieving solid data on 50. I know this will add additional cost but anticipating equipment failure, facility pullout, Murphy's law, this is an effort you will want to do only once with positive results.	Agreed in principle. I understand your concern for Murphy's Law. I am trying to embrace everyone's comments in the revised report. Your work suggests that 40 data samples provide a statistically sound data set. How about doubling 40, and recommending 80 sites? If Murphy's Law prevails at 50%, statistically valid data will be obtained for 40 sites. But I would like to believe, that in today's world, Murphy's law would prevail at a much lower rate, and well over 50 sites could deliver statistically valid data. Thank you for your assistance in this work, especially the day that you discussed the data collection plan with me and Mike. Without additional comment from Mr. Arno, I decided to leave the number of sites as is, but footnote his valid concern. Phase II organizers will have to determine

			feasibility based on Phase II project resources.
16	Anthony	(Sections 1-3). Education facilities up to K-12 are governed by safety codes that recognize the behavioral characteristics of the occupants. Higher education facilities are governed by commercial codes. It may come as a surprise that classrooms in higher education have a 20 percent occupancy rate; and that most of the square footage in higher education is devoted to administrative activity.	Agreed. Your statement is included as a footnote, with proper credit given.
17	Anthony	(Sections 4-6). Most federal and state building square footage -- whether owned or leased -- is commercial from a safety and energy conservation standpoint. This distinction is important to articulate in some fashion because it is a partial explanation for the out of step condition between the safety and energy conservation standards over time.	Without specifics and substantiation on your part, I do not want to include this as a footnote because the Code of Federal Regulations provides an energy code for federal buildings and PBS-P100 provides the design guidelines for a large number of federal buildings. Identifying and determining the appropriate codes for specific types of federal and state buildings would take expended effort outside the scope of this project. Please review the beginning of Section 2.2...which is as follows: Commercial Building Types and Specific Demographics [5] Sixteen building types have been identified by primary activity. This work will focus on five commercial building types: • Education (e.g., K-12 schools, universities, daycare, vocational training) • Healthcare, Inpatient (e.g., hospital, inpatient rehabilitation) • Healthcare, Outpatient (e.g., medical office, outpatient rehabilitation, veterinarian) • Lodging (e.g., hotel, dormitory, fraternity, nursing home, assisted living, shelter) • Office (e.g., administrative, professional or government office; bank; city hall; call center) I think every category of this commercial building types list includes state-owned/run building types, as well as federal offices.
18	Anthony	(Section 7). A “flashpoint” consideration: The conclusion that oversized transformers in the building power chain seems to suggest that all of the building flash hazard safety studies in building downstream transformers up to 300 kVA do not	The subject is broad and deep and far outside the Phase 1 project objectives. My handling of potential arc flash hazards in Ch. 7 was specific to low-voltage, in-house

		contribute significantly to safety. Our concern, of course, begins from the top down, as identified in the comments on building design.	transformers. I strongly encourage you to write an IEEE paper on this topic.
19	Anthony	I have a concern about how NEC can more optimally guide the design of the complete span of the power chain going forward. Interactive sources and sinks from net zero building power systems means we need a re-think that will likely cut across several NEC articles. I am not alone in this and many good minds are already working on it.	I respect your opinion that this is an issue, but it is outside the Phase 1 project objectives.
20	Anthony	Is it possible to craft language for 2020 NEC Proposals? Here is a link to background material for a discussion we undertook in March-November of this year in which we took inspiration from language recently installed in the Canadian Electrical Code: http://sites.ieee.org/icps-ehe/2016/11/29/canadian-electrical-code-recent-changes-to-section-8-circuit-loading-and-demand-factors/ The concept of "demonstrated load" was introduced as can be seen in this excerpt: http://sites.ieee.org/icps-ehe/files/2016/11/CSA-Groups-CEC-Section-8-Circuit-loading-and-demand-factors.pdf	Agreed in principle. However, research projects such as this conducted under the auspices of the Fire Protection Research Foundation do not generate actual code proposals, but instead provide the supporting information that allow others to take this action if they deem appropriate.
21	Anthony	(Section 8) am willing to continue searching for the funding of Phase II. With support from Rich Robben, Jim Harvey and my Standards Michigan colleagues -- I have had success with getting this grant funded and also funding for a grant which NIST awarded to the University of Michigan a few weeks ago: http://standardsmichigan.com/. The specifics of how this might be coordinated with the Research Foundation will have to be worked out in the near future.	Agreed in principle. The intent of this project was to provide a path forward in support of additional work (i.e., a phase 2).
22	Meyers	-The forward on Page iii, correct the sentence in the second paragraph from "provide a review the literature" to "provide a review of the literature"	Agreed in principle. This is in the Front Matter and handled by the Fire Protection Research Foundation, and thus this action is deferred to Foundation staff.
23	Meyers	-When listing out the sponsors in the report I would lump all folks involved together by institution. As an example, Jim Jackson and myself are not listed one after the other on the acknowledgements page nor on the Page vii sponsor listings.	Agreed in principle. This is in the Front Matter and handled by the Fire Protection Research Foundation, and thus this action is deferred to Foundation staff.
24	Meyers	-Is it correct list as 'The Ohio State University' rather than just 'Ohio State University'? I hear people pronounce it with 'The' included but I haven't noticed if that is correct when in print form.	The current text is correct, as confirmed by Brett Garrett representing The Ohio State University.
25	Meyers	-Section 1.1 – first paragraph, correct "utilities had close 150 million" to "utilities had close to 150	Agreed. This will be handled with the other editorial corrections.

		million". Also, last sentence of the paragraph on Page 1 change "must exceed billion" to "must exceed a billion".	
26	Meyers	-Section 1.2 – The explanation of heating and cooling degree days is confusing. I don't know how important it is in the overall analysis but perhaps revise explanation? Also Table 1 on Page 5 indicates thousands of CDD and HDD days which again I'm failing to understand. How can a climate zone have thousands of CDD or HDD days in a year? There are only 365 days in a year.	Agreed. This will be handled with the other editorial corrections.
27	Meyers	-Section 2.1 – first paragraph, fix this sentence to read more clear: "…which is contracted out and "has recently been in the tens of millions of dollars." What has been in the tens of millions???	Agreed. This will be handled with the other editorial corrections.
28	Meyers	-Page 8, and throughout document, "healthcare" is one word, not two.	Agreed. This will be handled with the other editorial corrections. But please note that the EIA CBECS – data and documentation presents the term as follows: "Health Care."
29	Meyers	-Page 8, remove the 's' from the end of the word buildings, so the sentence reads: "In fact, university complexes are communities with most, if not all, building types represented."	Agreed. This will be handled with the other editorial corrections.
30	Meyers	-Figure 9, the title has the word 'Commercial' incorrectly spelled on Page 11.	Agreed. This will be handled with the other editorial corrections.
31	Meyers	-Section 3.1, Page 20, the paragraph text below 'Space Heating and Cooling' bullet point needs to be right justified more.	Agreed. This will be handled with the other editorial corrections.
32	Meyers	-General comment – were distribution (aka oil filled) transformers discussed or analyzed as part of this report? I see lots of discussion about smaller dry type transformers but do those same efficiency charts and discussion points apply to distribution transformers? Since we act as our own utility on campus understanding the large distribution transformer best design criteria would be helpful and I wasn't 100% sure this was discussed.	Agreed in principle. Based on the wording of the RFP and interest in reviewing NEC Code changes, I interpreted the concern for transformer efficiency and related arc flash hazards to involve low-voltage (dry type) transformers inside buildings. Before this project, I had never been involved in electrical systems on university campuses -- except as pertaining to injury and fires of electrical origin. Consequently, I viewed the transformer at the service entrance within the purview of the electric utility provider, and not under the control of the building owner. This report does not address dry-type and oil-filled transformers which step down from MV to LV to provide LV power to buildings at the service entrance.