



STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

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MECHANICAL, VENTILATION and ENERGY CODES COMMITTEE SUMMARY MEETING MINUTES

LOCATION: CenterPlace Regional Event Center
2426 N Discovery Place
Spokane Valley WA 99216

MEETING DATE: September 13, 2018

Agenda Items	Committee Actions/Discussion
1. Welcome and Introductions	Meeting called to order at 10:00 a.m. by Eric Vander Mey. Members in Attendance: Eric Vander Mey, Chair; Doug Orth; Duane Jonlin Members Absent: Andrew Klein, Jim Tinner Staff In Attendance: Richard Brown, Managing Director; Krista Braaksma; Ray Shipman, Lori Yantzer Visitors Present: Al Leach, Louis Starr, Chuck Murray, Randy Hastings, Mike Rosenberg, Jed Scheuermann, Robert Dixon, Brendon Mattis, Guy Miller, Micah Chappell, David Nehren, Kim Barker, Treasa Sweek, Michael Baranick, Steve Lehtinen, Dave Baylon, David Mann, Lisa Rosenow, Tom Young, Jeff Sloan, Kevin Myre, James Moore, Randy Vissia, Nick O'Neil, Mike Fowler
2. Review and Approve Agenda	The agenda was approved as written.
3. Review and Approve Minutes	The minutes of the June 7, 2018 meeting were approved as written.
4. Interpretations	
<i>City of Bellingham</i>	The City of Bellingham asked if dormitories required separate electrical meters. The proposed answer was yes, if they are set up as dwelling units. Eric Vander May mentioned alternate means/methods could be allowed on a case by case basis by the code official. Motion was made and carried to approve the interpretation as written.
<i>City of Bellingham</i>	The City of Bellingham asked if dormitories required separate water meters. The proposed answer was yes, if they are set up as dwelling units. Motion was made and carried to approve the interpretation as written.
<i>City of Bellevue</i>	The request from the City of Bellevue concerns identification of primary and backup heating systems and the language of the Total Building Performance requirements. The proposed answer is the code is clear the system with the largest installed capacity is considered the primary heating system. Mike Baranick with Hargis Engineers expressed concerns the way the code was written, it could discourage people from using high efficiency systems. Duane Jonlin thought the response from the State was correct. Motion was made to accept the interpretation as written and request staff look into options for fixing the language. Motion carried.

<p><i>Spokane County</i></p>	<p>Spokane County noted two sections of the IMC seemed contradictory in regards to the requirement for exhaust from auto repair facilities. The proposed answer clarified that exhaust duct extensions were limited to 10 feet and did not require mechanical activation. Randy Vissia with Spokane County was fine with the interpretation, but felt the amendment should be moved to venting section. Motion was made and carried to approve the interpretation as written.</p>
<p>5. TAG Report</p> <p><i>Public Comment</i> <i>Env013</i></p> <p><i>Env046</i></p>	<p>Duane Jonlin expressed gratitude for the many hours the energy TAG members spent modifying code proposals and resolving issues. Most of the proposals provided improved clarity. There are only 15 to 18 proposals that improve energy efficiency. He doesn't feel the Council will meet the incremental efficiency goal for the commercial code this code cycle. The floor was opened for public comment on the proposed code changes to the WSEC-Commercial.</p> <p>Duane Jonlin noted Env013 has potential small business impact. He requested staff reach out to greenhouse operators.</p> <p><u>Lisa Rosenow</u> - The purpose of this proposal was to address the concerns that we have been hearing from jurisdictions regarding greenhouse structures that were being provided with relatively high energy mechanical systems. So that was the purpose of the proposal, our primary was to address some jurisdictional concerns.</p> <p><u>Al Leach</u> – I'm with Energy Control. We are mechanical engineers, we do a variety of other things. One of them being blower door testing for air barrier. A heads up, the new levels that you are requiring are too high for certain building types. We have done some 60 air barrier tests on different types of buildings. We've had three or six years with requiring pressure testing, which has given the contractors a chance to realize they've had to up their game, which they really have. It has been a learning curve for all of them, and they've all gotten to the point of being able to meet, up until now, the standard of leakage. However, in this new code cycle, you are proposing that they actually have to pass the test, and that's for the first time, to get their C of O. And you're also changed the standard. Now they have to pass it and you've raised the bar. We went back and looked through the jobs that we have to see how many would actually pass that level. Certain building types, like concrete tilt ups, they were super tight and would all pass. CMU block buildings with flat roof with rigid insulation, most would pass easily. Crane buildings are a hit and miss, and we noticed that prefabricated metal buildings, none of them would pass. Just a heads up on our experience, that you may have created a problem. I don't know what's going to happen come C of O time. We do energy code plan reviews and inspections as well. We've always recommended to don't even try to use the C406 air barrier level, if you're up on the crane building doors, or the pre-manufactured metal buildings. Next time, with what you're proposing, they won't have a choice. I'm not sure what's going to happen come C of O time. I am assuming, per the building officials, there will be some that will not pass. I would assume the local authorities will let the people occupy their buildings. I think you've created something that is going to be difficult to enforce on certain building types. I would suggest you don't raise that bar for the required base code, just to raise it for the C406. But I think you've raised</p>

the bar too high. Also from a mechanical engineering standpoint, we are on a diminishing return. We've got really tight buildings, and I'm concerned that we've created new problems with potential sick buildings. I believe it's a matter of time before we see that start showing up, and I hate to see that happen. We just need to call it good and move on to other parts of the code.

Duane Jonlin - I just want to say, we had this debate in Seattle at the last code cycle. I had proposed to move to 0.25 and the contractors and testing firms in the room looking at each other in the room saying no. They did settle on 0.30 and felt pretty comfortable with that. That was still with the pass option. Something needs to happen, somehow we need to resolve it.

Al Leach - The other thing is, that by the time the test is done, which is typically at the end of the job, it's not feasible...it's very rare, we go find certain things but so much is covered up, it's very difficult to find them at that point. We really try to push for us to do the inspections as well, because then we can inspect that air barrier along the way. We are pretty confident about what's going to happen when we do the test, but a lot of times that's not the case with the pressure test at the end. I've seen jurisdictions where there is nobody doing inspections along the way. I just foresee a problem coming up with raising that bar and requiring it to pass.

Duane Jonlin – Be aware that the Corps of Engineers have been doing this for 12 years now and you have to pass 0.25. Their buildings are not as heavily architected as Seattle high rises, but there are some extreme buildings that have passed.

Chuck Murray - I'm certainly in support of moving this particular code change forward as it applies to residential construction. The proponent did a particularly good job in documenting projects where this has been effective and the energy savings that go with it. He consulted with contractors first, to make sure they had a good cost basis for their economic evaluation. I think this certainly deserves to move forward into the package as proposed. A unique feature of this, is that they are trying to improve the indoor quality in apartments. There's a great deal of uncertainty about how well apartment ventilation systems work, and this proposal moves to help solve indoor air quality issues associated with apartment buildings.

Dave Baylon - I'd like to reiterate Chuck's point. This actually has a positive effect on building indoor air quality. By using tightness and then by meeting the IMC Code, which of course you need to do prior in any case, this has the effect of making it so the distribution systems and ventilation systems are much better and not subject to large leakage in random places around the building.

Lisa Rosenow - I'd also like to make a comment in support of the proposal, and highlight that this particular requirement in the energy code has a broader benefit. It improves the energy performance, but it also addresses the envelope durability because of water passage via a leaky envelope. That can greatly impact envelope durability so has a broader effect that it addresses both of those concerns.

EM050

Randy Hastings - The first thing is, when you get into the second paragraph, it talks about how this will be a simplified approach. I've read this thing five or six times, and have had a number of other people read it five or six times, and we can't find the simple part of it. It's very complicate, very hard to understand. I don't think there are enough people in our part of the state that are involved in this, that have enough input to make it viable across the state. Come to Spokane in January, and you'll find it's a totally different environment than you have on the West Coast. I showed this to Al Leach with Energy Control, one of the engineers in town that does a lot of work and the indirect reviews, and he hadn't even seen this yet. We are missing a lot of input, at least from our part of the state on stuff like this. In this economic impact data sheet, and some of the items on the spreadsheets, there is only one example. I think there needs to be a lot of further study done on this, because there are hundreds of different types of systems and buildings that we run into and not just one system. The other thing is, it's based on one set of building design loads. And there again, we have a number of variants of loads across the state, along with different energy costs, which we only plugged in one scenario. I think there needs to be a lot more study done on this. I think there needs to be a core of information put out there to the public and let the rest of the state and engineers get involved with this. This is a huge impact, this is a huge deal for us. I've been doing HVAC since 1976, it's the only thing I've ever done, and I saw this and thought, Oh my God, what are we doing? We are trying to come up with a carbon footprint on a building to give it a factor. Are we really trying to then discourage them to go to natural gas? I talked to Avista Utilities here, and they are totally opposed to this. We are trying to force our customers or owners to go to a non-natural gas—to go back to electricity. What's going to generate our next series of electricity? We're trying to get rid of dams, so we don't want to go back to putting in nuclear plants to get our electricity. I think we are going backwards. I think we need a lot more information to come into this, and a lot more studies need to be done before we try to propose this or move it forwards. I just hope it doesn't move forward. I think we are missing a lot of information and need to look at the spreadsheets and some of the information that's in here. I see a lot of holes in it, all over the place. It just doesn't make a lot of sense. I think we need to study a lot harder, and have a lot more examples. That's really all I've got to say.

Doug Orth - What do you think the cost impact of this is?

Randy Hastings - It depends on the building. It's definitely going to have a cost impact on the end user, the building owner. You know, if he's going to look at this carbon footprint, and had to make a decision on whether to go natural gas or electricity, it's going to have a huge impact. To go back to heat pumps in this part of the country, to go back to heat pumps with electric heat, it's really not beneficial. Yes you can save money by using heat pumps, air source or water source heat pumps, especially on the air source down to a certain temperature. But when you get into December, January, and February, just last year we had -20 degrees here for a couple of days. Heat pumps just don't operate very efficiently. So now we have to go back to our backup heat. What do use for our backup heat? Electricity? Are we trying to push them away from natural gas by the way I am reading this here? Now utilities have to figure

out how to create this load back into the system into the grid to supply electricity. I think it's not only the costs up front, but I think it's the operating costs of the building and the efficiency of the building is going to go down.

Al Leach - Comment on the electric, it's about three times as for the impact cost to the owner as far as the energy. Heat pump is very similar, we are switching over to that in this state instead of strip heat. Oh, and another comment on the simplicity. I was just seeing this for the first time, and nothing about this is simple. From an energy code plan reviewer, inspector and designer, they do keep getting more complicated. This energy code, just in more general terms, has become so complicated it's driving some people out of the industry. Ed Fields did so many of the energy code reviews her retired early, because of the next code revision last code cycle. He would call us, as mechanical engineers, to try to help him understand the mechanical part of the energy code. I'm getting close to the age to retire, and some of this is starting to make me want to retire. Right now we are doing most of the energy code plan reviews and inspections in Spokane. If we shut down, I'm not sure who is going to do it. We need more planner reviews and inspectors. The complications of the codes each time...it just never gets simple; it just gets worse and worse. I would like to help by getting involved in writing some of this code now, only because I am getting to the point where I have time. But the part in the code that says it's simpler? I don't know where that came from, but I totally disagree with it.

Louis Starr - This is my proposal. One of the things I would like to say is... My background. I have been working for NEEA for about five years now. Before that I was a design engineer; I also did controls, I was also a commissioning agent for about 15 to 20 years. To this work, I am bringing practical things. It's not like I'm sitting in a cubicle and never have been out doing this work. I have a lot of familiarity with the energy code in practice and also in the actual construction and building things. One of the concepts about this particular proposal was, we were trying to make a... First of all the discussion of carbon. The intent that I had, is that there be no discussion, or the proposal was not intended to be or do anything with fuel switching or anything along those lines. It's supposed to be more about selecting really good systems. And so right now, one of the things you could do, you could put in a really poor performing system that complies with codes, or you could put in a very good system that complies with codes. And so what this does, it's just making a line, in that we are not going to let you put in the absolute worse system. We are trying to drive you to put in a little better system, and that kind of the intent of what we are trying to accomplish here. The thing about it, I think I will probably have Mike Rosenberg with Pacific Northwest National Labs talk about the complexities of the system and how that is. In general we are trying to make it to drive us to use better HVAC systems. Part of the deal is that there is a legislative mandate in Washington State that you've got to get 70 percent savings, over the 2006 code by 2031. If you think about that, we've kind of tweaked all we can, and now we have to have people selecting better systems in buildings. This allows a lot of flexibility in doing it. It's not prescriptively telling you, it's giving you the flexibility on how to get there. It's telling you, we are not going to let you put the absolute minimum in there. Raise the bar a little bit, and have

you choose many different ways. And so, I think I'd like Mike maybe talk about the level of complexity and the software and kind of the intent on that, and how easy or complicated that is.

Doug Orth - What's your response to the suggestion on the cost impact, economic impact was only based on one building type?

Louis Starr - I think what we tried to do, was select the one that we would felt would be the most conservative one, in terms that if we chose this one, for all the others the cost benefit would be better. So if you think about it, I mean, there would be endless parametric analysis and cost analysis you could do with it, so we tried to pick the one, and actually Mike can speak to that, we talked a lot about which one we could do, that would be the best representation of the cost analysis associated with that. That was kind of the thought process there.

Doug Orth - Did you consider the relative energy costs, east side/west side relative to temperature change? And how does that play in your analysis?

Louis Starr - Right. I'm hoping Mike can address that; it's been awhile since I've done that, but I would hope that we chose both of those prices, but it may have been. And I think it might be best to have Mike speak to that. It's the energy cost right? What you're talking about? Or are you talking about the construction cost as well?

Doug Orth - The energy cost and the system operation during colder months on the east side.

Louis Starr - Well, they are done on the various climate zones so the energy costs would be in there. The climate would be taken into account into the energy models themselves. It's really a question of energy costs used for both of those areas. It might be worthwhile to have Mike Rosenberg speak to those details.

Eric Vander Mey - During the TAG process, there was a lot of discussion of needing this requirement for baseline buildings, as opposed to making this for example, a C406 measure. Or would people choose that? How do you think this would be a part of all prescriptive buildings, or all the building types that are listed in the proposal, not all buildings but certain types?

Louis Starr - It has a little bit to do with, this is kind of the baseline for the buildings that were chosen, as the prescriptive ones. That is to some extent, the basis of that. I know that there are some slightly different ones for different prototypes, that Mike could speak to, but the reason you would want this in the prescriptive code as opposed to an option, your trying to get to that 2031, and if only a small portions of the buildings are doing this, and it's the ones that already comply, you effectively have a requirement that doesn't do anything. It's kind of like you drove by a speed limit that says, driving 55 is an option, how many people are going to drive 55?

Doug Orth - Did you do an analysis on the effect?

Eric Vander Mey - You don't think these building types will select this?

Louis Starr - I think they would select it if they were already doing it. In other words, the guy that has the poor performing building, he's not going

to choose an option he's not going to comply with. I don't think you would need to do an analyses to know that's the direction people would go.

Doug Orth - So you're saying this is so economically prohibitive you wouldn't select this as a part of the C406 process?

Louis Starr - No, what I am saying is, is that if you have legislative goals trying to get to efficiency....

Doug Orth - I am asking you specifically about the costs impact. If this was a C406 saying that nobody would choose it and I am assuming the reason nobody would choose it, would be due to the complexity and more likely the cost.

Louis Starr - Well, and I guess also, in other words, you're not getting a cost benefit there, you're just trying to put in the absolute cheapest building down, so you don't really care about the long term. If the first cost is all you're thinking about...then yeah.

Doug Orth - That's not a fair generalization to say everyone is looking for the cheapest building.

Louis Starr - Well, I'm telling you that the person who would not choose this as an option is, that's how they are looking at it. In other words, if they're just concerned about first costs, they wouldn't use it as an option because they want to put the absolute cheapest system in, and so they're already not looking at the long term benefits. Will this payback in two years? Will this pay back in three or four years? So if it's not in the prescriptive portion, it's not going to drive the market to choosing better buildings. To some extent, if we have to get to these goals, you have to have it across the board where everybody has to do a little better, not just some people. And that's essentially what you would get if you put in the options pack; some people would choose it, and the deal is they're probably already doing those systems anyway.

Doug Orth - It doesn't seem like this is similar to the air barrier testing, that you introduce this large seed change in the code, as a prescriptive requirement. It seems like this would have a very disruptive...In last code cycle, we had some things that would fall into that category, and it takes a while for the industry, community to recognize and flush out the challenging problems and parts.

Louis Starr - One thing I would say, is prescriptively they are already required to do these systems to some extent. In other words, it's the prescriptive ones that are in there, you're having to already do these given building types. So I wouldn't necessarily, like we've already reached that step in having to. So some of these building types are already reaching this limit anyway. So it's kind of like the market has been trained I guess you could say. The other think you've got to think about is the mechanisms for moving forward to higher levels in the future right? As the market gets trained on new things, so you can bring in new things.

Doug Orth - It's all tempered by cost effect and by economic effect, there's that balance and average.

Louis Starr - Well, and that's why I would say we didn't get crazy and select a level that was super high and wouldn't be cost effective. We

chose one that is cost effective. It's really just looking at. It's making a good decision for the owner, they perhaps pay a little bit more, but the cost benefits pays back. That's the concept anyways.

Duane Jonlin - I would like to respond to Doug's concerns. Actually this is like the center of this whole enterprise, almost. There are a couple of factors in play. One is its only when something is mandatory that we really start finding out what the issues are and fix those issues. But, otherwise, as long as it's optional, people can happily ignore it for decades. We have a split incentive problem forever, which is that who's designing and building the building is not the one who reaps the benefits of all these energy savings over time. Even in institutions, universities and hospitals the departments that build those buildings are often quite separate from the ones who pay the bills and reaps those benefits. And the other is just that, in order to have dramatically more efficient buildings, we have to have dramatic changes in the way that they are built. If we keep building the same things, we keep getting the same results. And change is really hard in this industry from a design and construction standpoint. We all resist it like crazy, because we are comfortable and know how to make a profit and build a certain way. That's why if we are going to aggressively be making better and better buildings, we've got to make it mandatory.

Mike Rosenberg - I just want to say that one of the reasons this got moved forward was to actually give flexibility. The last round they had the DOAS requirement and that kind of narrowed down what kinds of systems you could put in buildings. There's talk about even narrowing that down even more. And the intent with this proposal, is instead of doing that, we set a baseline system and then allow any design solution or a lot of design solutions, to meet that efficiency instead of keep narrowing down the choices. And as far as the complexity, those words in the appendix are very complex, but those are really just meant to be specifications to software. When this originally came through, Duane didn't even want to have that in there, he said "let's just require a certain piece of software". That was my idea. I said, well I think it's better to actually have those words in the code that describes what the software does. It'll still provide the simplified software, but we need to have specifications in the codes so if anybody else wants to create software, they could do this analysis, following the rules they can. So it looks very complicated but the intent is that it's not because the software that you use to implement it, is much simpler than for instance, say a whole building performance analysis.

Duane Jonlin - The TAG has seen a demo of the software.

Eric Vander Mey – Any more comments on TSPR?

Dave Baylon - I'm from the TAG, and I have a couple of comments. The first is, the way the carbon table works, its main design is to limit the advantage of inexpensive electrical resistances heat in places where that's done—commonly, most multifamily and VAV. It doesn't eliminate these things, it just puts it at a disadvantage against gas or heat pumps. It also changes the relationship between gas and heat pumps somewhat, but not significantly compared to our current standard which is a site energy standard. The cost advantage of gas systems will not be really affected

much by this, by this using the current table. I am completely in support of that table in this or any other part of the Code. I am concerned that the TSPR, as it's been presented at least through the TAG process, has not really shown the software to be that accessible. It may be that it is accessible, but I would encourage the committee and the council to be convinced that it is actually available. Not as a set of rules where somebody else might write software, but the actual software that is being used is available to the practitioners in the state of Washington. I'm concerned that's not completely true. But, I am ready to be convinced, if in fact it is available. The third point is, in the last round of the 2015 Code, we tried to put more restrictions on oversizing equipment. This proposal actually has the potential of making that much more enforceable than it has been in the past. And so in that sense, this is a good step if we can make it work.

Lisa Rosenow - I have a public comment. I would just like to mention as we have done with the DOAS provision, if this proposal is formally approved, NEEC will provide training and technical support to help the public understand how to utilize this tool and apply it to the project.

EM051

Jeff Sloan - I wanted to offer answers to some of the concerns I've heard here today. If anyone is looking for an economical and low carbon way to heat their building, they can put in a small data center, and I am serious, partway. I know it's not common in current practice. I think we as a society have yet to see what the end of the spectrum is, as far as small distributed use of the internet backload computers connect to our heating systems. That's part of the ploy behind this proposal, to have the state of Washington basically reference the new ASHRAE Standard 90.4. Which is a very different way to measure the efficiency of the data center. Compared to the code that we have now, which is a code that prescriptively requires economizers, which concerns me with the manufacture's efficiency ratings with the equipment that's uses. The 90.4 standard is proposed to become our state's indication data center efficiency. Basically it looks at the heating and cooling costs and the electrical losses within the data centers which can be significant. It prescribes a maximum ration based on the amount of the computer power that's it's designed for. You might see numbers such as 20 percent of the size of the computers, and it could be the size of the cooling and the electrical losses associated with that data center. Data centers are held at much higher losses than mechanical systems, and electrical systems, particularly older ones. Now the way that this proposed standard really hits the ground and affects structures in Washington state, is the current universe is basically computer rooms, which have a lot of different code angles for compliance. There are different standards referencing ways that computer rooms meet, with or without economizers, that comply with the code. This proposal would focus on the most highly engineered and large size data centers. Those with over 10 kW and more that 20 Watts per square foot. I mean, these are the large buildings that many of us have puzzled over. They are located out in the middle of the desert, basically projecting heat out into the cold winter sky. This proposal would confer a new method of compliance for those data centers It would also encourage them to recover portions of their heat, and see heat recovery systems are put in place and operating so that the heat could be used to warm nearby structures, and perhaps smaller structures could be

encapsulated within the structure. We added some definitions, and I want to really thank members of the TAG committee who helped with the wording on this language. There's been a real intense effort over the last few days. I see Louis here, and Michael nearby, Nick's on the phone... Thank you very much. I think we've got something that, we are all nodding our heads up and down, we've got some excellent language. Your comment?

Duane Jonlin - This seems to be a more rational way to do data centers, but for those that continue to not be built in a way that they could [inaudible] build, does this end up of being neutral or increase efficiency or decrease efficiency?

Jeff Sloan – It's intended to be neutral in terms of code stringency here at the onset. We are considering local numbers calculated precisely to match the stringency of the Washington State Energy Code. In other words for Eastern Washington and Western Washington, if a building had a rooftop that matched the code efficiency and the mandated air economizers, how much energy would that be both annually and on a hot day? Those were the numbers which have been proposed for use in the Washington State Energy Code so it really kind of provides a real gentle change, but to a new standard in a level road.

Eric Vander Mey asked if there was some action the TAG or Committee would need to take on the referenced new language. Krista noted she has not received any new modifications to the language. Duane asked if the people involved in drafting the revision came to complete agreement. Jeff noted Nick had a good copy of that. But it is not available today. Review would have to happen after the proposed rule is filed. Richard noted staff will get back to the Council on the correct process to properly address the corrections.

Louis Starr - I'll make it real short, we've been helping out Jeff. One of the things that Jeff didn't mention, is that he's got 30 years, I don't know exactly how many, 20 or 30 years of experience designing data centers. He brings a lot of experience. He's also on the 90.4 committee that started to think about regulating this. They've developed the standard, so he's actually someone that the technical person on the standard. We saw this as a great opportunity, some of these revisions we are looking at, and in the TAG we did this as well, making sure we are getting all of the benefits of the prescriptive requirements of our code, and also bringing in and overlaying these too. What we've been doing is getting that language dialed in. NEEA has been supporting people in developing code language. A lot of the time, people that develop the technical stuff don't necessarily have the code language. That's the part we helped out on. There's really nothing changing in the content, it's just kind of making sure we have something that's enforceable and that we took a long look at it. One of the things to know, is that data centers are one of the larger growth things coming up in the future, and thinking about the power of the future is very interesting and that we address this particular energy use. The other thing to know about data centers is that a lot of times these are being located in small communities, and that this could be part of the power grids and some other things. By designing data centers that are energy efficient, we are making use of some of the best of our resources. We're very thankful Jeff had the opportunity to work on it, and we were

also able to include some other people that know about data centers that we brought into the fold, so we would have a second set of eyes. We feel very good about this and encourage you to...we will get the revisions. Mike Kennedy was looking at them, he does a lot of code stuff, and has in the last 15 code cycles. He's on vacation so that's one of the last holdups. I wanted to have him go through it, and make sure it's copacetic with the rest of the code. You will all have a really good piece of code language.

EM062

Mike Baranick – I had actually written a minority report regarding this proposal, so am I supposed to present that now or do I do that later when we look at all the minority reports? This proposal, EM062, passed the TAG on July 20 of this year. In general I agree with the direction the proposal is taking, the DOAS section. There's been a lot of confusion over the last couple of years on what type of building spaces is required to comply. This proposal does a nice job of clarifying that. Even so much so, that I had a similar proposal myself that I withdrew, because I liked how this one was laid out. The one thing however, that I don't necessarily agree with, is that in addition to offices, rental, classrooms or education, libraries, fire stations, what this proposal did was add assembly occupancy spaces to a space that now requires DOAS. What my recommendation would be, would be to accept the proposal, but remove assembly spaces before final approval. A couple of different reasons I have for this. So this proposal was submitted on the short form, which is supposed to be editorial and doesn't include any substantive energy or cost impact. So my first argument is that by requiring DOAS for assembly types is actually a pretty big change that will actually have energy and cost impact. So at the very least, I think this should be resubmitted on the long form. The second argument is that, we've done a lot of analyses with assembly type spaces, for example, say gyms in a school building or multipurpose rooms in a school building. What we generally find is that requiring DOAS for those type spaces would actually not only increase energy consumption, but increase energy costs, increase first cost, maintenance cost and ultimately the 50 year life cycle for those space types. So I provided a lot of the background analysis to support that statement. But in general, the main reason why that is, when you install DOAS with energy recovery you're not required to have demand control ventilation for that system. So what that means is, a space that is only partially occupied, your still providing the full amount of ventilation air to that space. Albeit you have 50 percent recovery so in effect, you're cutting the ventilation in half. We see a lot of cases where these type of spaces are occupied, well under 50 percent on average occupancy rate. So if that's the case, we find that a non DOAS system that incorporates DVC, which is required by code, actually performs much better than the DOAS type would. Again, there is a lot of background and information. We tried to be as transparent as we could with the cost information, and how we did the energy modeling, maintenance and lifecycle. I urge this council to review that in more detail just to ensure that we do want to require or, we want to make sure that we want to require DOAS for this assembly type space. And lastly, one additional point, (I apologize for taking up so much time) but based on other change proposals that have already been approved at the TAG, DOAS units would really be the only system type allowed in these space types. The high efficiency being the alternate has now been limited to 5

or more zones. In general, we usually see these type of spaces as single zones. If this is approved as is, there really is no other alternate system types that could be put in these type of spaces.

Duane Jonlin - Michael, I should let you know that it was resubmitted on a standard form at staff's request, with a cost analysis, and that's online.

Dave Baylon - I authored this proposal and the main impetus here is to clarify the occupancy requirements in the DOAS section, that's true. And I am pleased to hear that it's effective from other perspectives. I believe that we do have a method to make cost effective DOAS systems within the current code. Without actually dealing with the fact that a single zone VAV might be an appropriate response here as well. My main point here is, if a single zone VAV is to be used as alternate here, it needs to be addressed correctly in the alternatives that are used in the high efficiency VAV sections, which it is not. But I didn't write that change proposal, I would encourage others to write such a proposal, but in the meantime we have DCV and we can turn off the system, that's allowed under the DOAS. And we have an economic analysis that shows for at least some specific community centers and small assembly spaces, that this is not only cost effective, but at a fairly positive cash flow for the occupants.

Al Leach - After hearing this, the fellow that, the engineer that presented the minority report, I would have to agree with everything he said. We are involved on the design side, in some high occupancy spaces that are typically larger like banquet halls or hotel meeting rooms, large rooms, and in those cases a lot of times they are served by a single air handling unit. In those, rather than a single duct VAV, we could do those as well. I think you should differentiate between the small conference rooms, smaller than this even probably, a good application to have the DOAS in addition to a single duct VAV or whatever fan coil. But in the larger ones, it's a huge impact to the owner because you put in one air handling unit, or one rooftop unit for a meeting room, and in addition to that, now you've required to put in a separate DOAS for that one zone and you've doubled the cost for that HVAC at least. So I think in a lot of cases, there are huge financial impacts and I can't imagine any payback in a thousand years, let alone 10 years.

Eric Vander Mey - I think mechanical designers are all hoping the manufacturers will come out with some combined units so you can put in single units, not both DOAS. Anyway, we know those units are in process.

Al Leach - The last code cycle requirement to go to two speed fans on these larger units has gone a long ways to solving that problem. I believe that the whole push for DOAS is to save fan energy. You can't be off, you can just run your ventilation fan at 10 percent or 20 percent of what's the normal fan load which you would have, say you would have with a single zone rooftop unit, and you can save a lot of fan energy. But now that the code requires on 6 tons and above, and now it sounds like 4 tons and above, you go to two speed fans. That was a huge energy savings on the fan, so I think that you're hitting both of those, the DOAS and the two speed fans are going after the same energy savings. You've already taken care of it in a pretty cost effective way with two speed requirement. So I would agree with... I would recommend not requiring on all assembly

types if you're doing it on any at all. Dial in on very small meeting room type assembly spaces. Also on the large ones, we are on heat recovery a lot of the times, so it is built in. If you don't require a separate DOAS for doing a lot of heat recovery as well as fan energy savings, I think we add a lot of costs.

EL119

Dave Baylon - I'm concerned about this proposal because over the course of the TAG meetings that discussed lighting power, we actually have rolled back considerably in some building types. We've made relatively little progress in most building types using this lighting power table. I submitted yesterday, an alternative table that would actually about double the impact of the lighting changes, and others have submitted at least comparable tables of that sort. I would encourage the committee and/or the council to review those tables. They're not appreciably more complex than some tables, they merely change some of the targets, using essentially the good work done by the ASHRAE 90.1 Standard addendum for this and [California's] Title 24 which is an extensive review of lighting requirements on a space by space requirements in building types of this sort. Essentially uses target something more like 10 percent savings than the four or so percent that is represented by the current table.

Chuck Murray - I want to support the comments both by Duane Jonlin and Dave Baylon which is encouraging the higher LPA value. I think we need to recognize that the technology advancements in this area are significant.

Our last proposal was in 2014 or so, based on technology then. This will largely be implemented 10 years after that last examination. The lighting power effectiveness of this technology has probably by that time changed by 50 percent. To ask for a simple 10 percent upgrade as proposed by these two gentlemen, I think, is appropriate. Also I think that the fact that these proposers are leaning on some fairly significant work by ASHRAE 90.1 as well as the California Energy Commission work. I think it's probably much better work than the piece that was finally approved by executives.

Duane Jonlin - I'd like to briefly switch hats for a moment. The table that I came up with the TAG did not put forward. To write that, I went through and checked all the existing lighting values against 90.1 and the new California Code, and I came up with 21 space types where it looked like we had been too aggressive on the Washington Code, and I increased those. Then using that as a baseline, wherever ASHRAE 90.1's new table was at a lower value I used that. That came up with a 9 percent overall savings based on Mike Kennedy's calculations as opposed to 4.5 that we came up with. A few points on that, one was that this is not changing anything, it's already standard practice. This is the way people do buildings. LED, the owners love it, because you don't have to go up and change out stuff all the time, and have that guy running around with his cart all the time to fix ballasts. Seattle already has in its code, across the board 10 percent reduction, and we have the busiest construction market in the country still, I think. It's not a problem, nobody has a problem meeting these values. The efficacy and the cost per lumen for LED technology has been improving by several percent a year. 4, 5 and 6 percent a year for a lot of the time, and continues to. So for this code to go into effect two years from now, and stay in effect and actually be

effecting projects for another seven years...to stick with these really low values, is a little bit crazy.

Finally as well as encouraging better lighting, this is used as a workaround to make worse building envelopes, because everybody can do better than the lighting tables. So if you're doing energy modeling, you can use that to trade off for... use the phantom savings for the lighting to trade off for a worse envelope. For those reasons, I would like to take into consideration either my proposal or Baylon's proposal to double the savings we show.

Chuck Murray - I would like make a quick statement or comment. One thing that might be a worthwhile endeavor, that what Duane is suggesting, at the time the TAG was making a decision on the lighting power density, the public review draft of the 90.1 lighting power density tables came out. Literally a day or two before that. I think based on public comments that are coming in, it might be worthwhile to consider perhaps another option in light of that, would be my thoughts. Another thing Duane didn't really mention, potentially you could do a base standard if your concerned the lighting power densities, price coming down, products being available on the market so that's also another option.

Dave Baylon - I would like to add one more thing to my comments. One of the impetus in my table I sent yesterday, granted it's not here yet, nevertheless, is only slightly more aggressive than Duane's tables. The main thing that I did, was I checked the space by space calculations, using the IES weighting factors. I noticed in several cases, the space by space requirements in both the existing code and in the proposed code, actually delivers a lighting power that is higher than what we have in our whole building table even now. I actually changed a couple of cases using Title 24 analysis so that those particular building types have a more consistent relationship between the space by space method of calculating and implementing the lighting code and the whole building. It's actually almost a 50 percent number in the case of office, retail or schools.

EO125 No comments.

EP141 No comments. Eric did note, however, there were several items of written testimony and minority reports on the carbon emissions issue.

EC146/EC148 Al Leach - Cory and I are both professional mechanical engineers and have been designing HVAC systems for twenty to thirty years each. We also do commissioning. We don't do it full time as our sole source, because we do a lot of engineering as well as other things. We don't see where this saves anybody any energy by removing the ability for mechanical engineers to commission projects. We also feel mechanical engineers are every bit as qualified as a certified commissioning technician. We don't really understand why this has shown up at last code cycle and now this code cycle, to remove what traditionally mechanical engineers have done which is quite a bit of commissioning. Most of the large consulting firms over the years have had an in house or balancing commissioning agent who would not only go out and balance and commission their own company projects, but other projects as well. Especially in our case, if you remove the ability to do it... We combined have a lot of experience and knowledge in not only the construction side,

but in how these systems are supposed to work. I don't see anybody more qualified than mechanical engineers to provide commissioning services. We would recommend strongly to remove that change. As far as the industry goes, removing people from being able to do that, is going to be a cost impact on owners. At the end of the summer, they are always trying to commission schools, and there's never enough balancing commissioning agents to get the work done. It seems like there could be a cost impact as well. One less group of qualified people bidding those projects? I see no upside or energy savings to make that change so we would recommend not to do it.

Eric Vander Mey - Would you say this proposal has a disproportional impact on small businesses?

Al Leach - Yes, we are a small business, we are four people. There are some other engineers, I believe that Riley's may be certified, I don't know about other engineers in Spokane that do commissioning, but that would definitely impact us. To go out and get certified is quite an investment. All the testing I believe is over on the west side, there's just a lot of time and effort to go get certified. For somebody, a small business that doesn't do this full time, the payback for investing in that is probably not there, and we would drop out of the business, which in my view, was the intent of that change.

Louis Starr - This is not my proposal, it's actually Treasa Sweek. But one of the things I will say Al ... I'll give you some of my experience. The last job I did before I worked at NEEA, was that I was commissioning professional for a third party. I commissioned everything from large hotel projects down to little architectural office buildings. One of the things to know is that commissioning is a process. This isn't so much about whether you have technically the knowledge to understand it, but it's whether you understand the process of how things go in order to get something done in a certain way. I mean if you think about your job as, sitting on the board here, you don't necessarily have unique knowledge but there's a lot of process about how things get accomplished and that's very important too. I'm also a licensed engineer in five states, and have been a certified commissioning agents since 2011. One of the things is, that the process is very important and one of the things I find, is that people don't understand like for instance, reviewing the drawing is very important early on and actually to provide value to the commissioning that receives the things, but a lot of people don't understand that. The other thing is that I would mention is that you notice they talked about mechanical systems, but if you look there is a whole section on reviewing electrical requirements and lighting. They know a lot about mechanical, but what they don't know about is lighting systems. Like how they might tune in a lighting loop or how they might actually see how the photo cells work. That's a huge place where you get energy savings. It's not only all about the mechanical system, it's about the lighting systems as well, along with all the process. The last thing is about certification. Its \$250.00 to take the test. I needed to have three years of experience, assuming you are a licensed engineer, and then I needed some projects. So all they are doing is basically requiring you to have knowledge of the information, and then you also have some experience in it. Taking the test, if you've been doing this, your will not need to study for it, you will pass it. There

are questions on there about lighting systems. So one of the things, there are a couple of organizations, ASHRAE has a certification that meets this requirement. BCA and I think AEE is going to have something soon too. This idea that it's just mainly the opportunity to...what we are finding is a lot of the commissioning is done poorly and that results in you not getting energy savings. Requiring someone to have a basic level of knowledge regardless of whether they are a professional engineer or not, is pretty important about getting the savings...so I would encourage you to keep this change.

Eric Vander Mey - So the code doesn't require only one be on the project correct? It says "A building commissioning process led by a certified commissioning professional" it doesn't ever say you can't have a different person do your lighting versus mechanical.

Louis Starr - I think one of the things that's required, this is similar to licensed engineers. When you build a lot of the times, you'll have one engineer at the firm, and the rest of the people are not licensed...to some extent that's the way the certified commissioning profession is. You at least need one person at the company who understands the process and how it falls out. Maybe Duane or Treasa can speak to whether that's about...Ideally in my mind, you would like someone at every job that's kind of overseeing and responsible for the process. I would feel confident...I mean to my mind, what you really need is that every company, one person is a certified commissioning professional. I really don't see the hardship in doing this. I think it will actually give a standard of care that is necessary that isn't currently there. That's the value. The value you add here, is that you actually get people who are qualified to do the work. I mean, one of the problems now I see, is that you slap a metal sign on the side of your truck, and you too can be a commissioning agent. There's no quality control and it's not the about \$250.00 and going up to take the test, its having the experience and having that particular knowledge about doing the projects that have value added. And I think this guy would be fine, I bet he'd pass the first time. It requires... depending on the state right? California too, or here, but if you have your commissioning one and I think you need 3 years of commissioning with a particular...different phases of commissioning. The thing about it is, a lot of time a licensing engineer can say it, and after I hear them say what they can do, they leave out important parts of the process. It's one of those things where they don't realize what they don't know.

Doug Orth - The way it stands today, does it require a licensed engineer to be commissioned?

Eric Vander Mey - No, it's an option. It's one or the other. It either requires certified or a licensed engineer. There's a couple different commissioning certifications.

Doug Orth - So...I think I heard you say, essentially, that anybody that's got 3 years' experience as a licensed engineer is going to pass the test after paying some bucks. So...what do we really need...?

Louis Starr - I said that they still have to pass the test. They do have to have the experience right...and the projects and different phases of it. So it's not guaranteed. I mean maybe you're not good enough to pass the

test, and you won't pass the test. The point is, once you have the experience, the experience and the knowledge, that you will pass the test.

Doug Orth - I think we are kind of saying the same thing. It sounds like certification is...just creating certification is somewhat arbitrary. It's either required to be a certified commissioning agent, or a licensed engineer that licensed engineer has obviously got the experience and a degree...

Louis Starr - But not necessarily in what he's doing. Can he be a plumber too? If he's got a degree, can he be plumbing right?

Doug Orth - is he a licensed engineer?

Louis Starr - I'll tell you what, I'm a licensed engineer and I can't do nearly as good as a plumber. Just because you're a licensed engineer, doesn't mean you can do every other trade. And I look at commissioning as a trade. I would also say that these requirements...as a licensed engineer I had to pass the EIT right? And then I had to get four years' experience and then I had to take the FE exam. This is not too much different.

Doug Orth - Do you know how many licensed commissioning agents there are in the State currently?

Louis Starr - I do not, but I think there's a fair amount. Is Treasa on the phone? She may know.

Treasa Sweek - I am on the phone, but I do not know how many certified commissioning professionals are in the state, but I can get that number within a day if it's important. If I may, I'd like to add one more aspect to this. I agree with what Lewis has been saying. I want to call attention to the fact that three years ago, or maybe four, I don't remember, 2014 perhaps, the Department of Energy went through a process where they identified commissioning as a specific job. They went through a national effort to define what commissioning professionals do, called a job task analysis. There were several agencies included in that process and that is included in the energy code at this time. It is seen by the federal government, the Department of Energy as well as many other organizations as a separate type of task. You don't have to be a licensed engineer to do this work. It's certainly helpful, especially when you're commissioning the disciplines that you're licensed in. The energy code does require commission to include (depending on how you count it) three or four disciplines. The concern really is the engineering licensure represents a different expertise than leading and certifying the commissioning process.

Al Leach - To that point, we are the guys designing this, the HVAC, so we are the guys that know better than anybody, and it does not have to be the mechanical engineer that goes and commissions the lighting systems. You can get an electrical engineer to do the same thing. We've teamed up with electrical engineers to do that very thing. Most of the time however, the lighting is not that complicated and we have experience with that perhaps, because we do energy code plan reviews and inspections. We have to get involved in the lighting control. Another engineer in our office was commissioning a project and he actually....We engineers are geeks. We use the field as a lab. We'll go out there and experiment

probably a whole lot more than the commissioning tech that's going through a checklist, and just running through it to get to the yes and no approach. Whereas we will spend the time out there to make sure it works, to understand why it works, and often times to see how far we can push the limits of it. So I think engineers are very good at making sure things are working the way we designed them to. We are learning about it, it's a little bit different than our normal expertise. I think we have an [inaudible]. You said there were 4 or 5 areas of requirements, there's mechanical, there's electrical, and there's water heating systems which mechanical engineers also do all the commissioning on. I'm not sure if you're talking about envelopes since we do energy code planning and use it in inspections. We probably have more experience in that area as well. We inspect meters, engineering and mechanical engineering. So we are going to the guys that hopefully, if we are inspecting them out, we understand how they work. If we don't, it's a really good education in the field to experiment with it. The first job you get through, you probably know more than most people on the ...it's a crossover for education for engineers doing field work like that. It's not rocket science, we get through a project and probably understand it better than most and that's reality.

Treasa Sweek - I totally agree. But the test at \$250.00, you can actually take it at an electronic testing center. I'm sure there are several in Spokane. It just comes down to the fact that it's a different...The work that you were describing, being in the field, solving problems, identifying issues, that's not the same as being in the office developing drawings. And by including that licensed engineer as the definition of what a commissioning professional is, we're giving many, many people who don't do what you're describing, the ability to go out and not follow the proper process.

Eric Vander Mey - The commissioning process changes. I know that there is a minority report that's recommending some clarifications on this one that was submitted. Does anybody have any comments in regard to EC148?

Al Leach - One suggestion, we're viewing this here, we do agree it's nice and it would be a good idea for the design engineer to put on the plan that you need your commission and you need to spell out exactly where you need to commission and give a narrative of what we are looking for at least to a certain extent. And then the requirement to give us the more detailed commissioning plan once you're selected. What we kind of disagree with, and it seems some of that, maybe it's already changed, almost had...putting all of the codes on construction documents which seems ridiculous to me. We don't do that with the other codes, why do we have to do it with this code? But I do agree with putting that requirement on the construction plan and that requiring it is a good idea. It could be a narrative, something short, that you need to commission it. As far as naming who the commissioning agent is, a compromise might be, list three approved people or firms that you would allow to do the commissioning on the plans. If you really want to...Rather than one person or forcing the owner to choose that person up front. And that's speaking as a mechanical engineer and a commissioning agent.

<p><i>Motions:</i></p>	<p>Duane Jonlin moved to recommend the Council accept the TAG recommendations on proposals and modifications to move forward to the public hearings. Doug Orth seconded the motion. Motion carried.</p> <p>Duane Jonlin moved to recommend that two additional options be added to the modifications going to public hearing on EL119, based on public testimony from Dave Baylon and himself. Doug Orth seconded the motion. Motion carried.</p>
<p>6. Staff Report</p>	<p>None.</p>
<p>7. Other Business</p>	<p>None.</p>
<p>8. Adjourn</p>	<p>Meeting was adjourned at 12:41 p.m.</p>