



**DEPARTMENT OF FORESTRY & FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
Flammability Standards for Building Insulation Materials
(AB 127) Working Group Meeting Notes
March 20, 2014
Office of the State Fire Marshal Headquarters
1131 S Street, Sacramento, CA 95811**



CHAIRPERSON PRESENT:

Kevin Reinertson, Division Chief- Office of the State Fire Marshal (SFM) Code Development & Analysis Division

MEMBERS PRESENT:

Eric Banks, Technical Specialist- BASF Corporation, representing the Spray Foam Coalition of the Center for the Polyurethanes Industry (CPI)
Jesse Beitel, Sr. Scientist / Principal- Hughes Associates, representing the American Chemistry Council (ACC)
Rian Evitt, Code Compliance Officer- San Ramon Valley Fire Protection District, representing the Northern California Fire Prevention Officers Association (NorCal FPO)
Michael D. Fischer, Director of Codes & Regulatory Affairs- Kellen Company, representing the Polyisocyanurate Insulation Manufacturers Association (PIMA)
Steve Fischer, Ph.D. Chemist- Department of Consumer Affairs, Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation (BEARHFTI)
Gene Gantt, Interim Executive Director- CA State Firefighters' Association (CSFA)
Andrew Henning, Deputy State Fire Marshal- Office of the State Fire Marshal (SFM) Code Development & Analysis Division
Howard Hopper, Regulatory Services Program Manager- Underwriters Laboratories (UL)
Avery Lindeman, Science & Policy Associate- Green Science Policy Institute
Donald Lucas, PH.D., Combustion Scientist- Environmental Energy Technologies Division- Lawrence Berkeley National Laboratory
Justin Malan, Principal/Owner- ECO Consult, representing the U.S. Green Building Council of California (USGBC)
Walter Reiter, Deputy Director- Expanded Polystyrene (EPS) Industry Alliance
Lorraine A. Ross, President- Intech Consulting Inc., representing the Extruded Polystyrene Insulation Manufacturers Association (XPSA)
Adria Smith, Deputy Fire Marshal- Fountain Valley Fire Department, representing Cal Chiefs / SoCal Fire Prevention Officers Association
Paul Wermer, Principal- Paul Wermer Sustainability Consulting, representing the U.S. Green Building Council of California (USGBC)
Kevin White, CPAT Director- California Professional Firefighters

MEMBERS ON THE TELEPHONE:

George Combs, Senior Principal Scientist, Product Development and Technical Support, Rigid/Specialties and Raw Materials, Polyurethanes, Bayer MaterialScience LLC
Chris Martin, Assistant Legal Counsel- North American Insulation Manufacturers Association (NAIMA)
Lauren Nyer- Cal Chiefs / NorCal Fire Prevention Officers' Association
Steve Risotto, Senior Director, Phthalate Esters- American Chemistry Council (ACC)

Veena Singla, Staff Scientist- Health Program, Natural Resources Defense Council (NRDC)
John Woestman, Codes & Standards Director- Extruded Polystyrene Foam Association (XPSA).

GUESTS/SUBSTITUTES PRESENT:

Payam Bozorgchami, Contract Manager- Efficiency, Renewables, and Demand Analysis Division,
California Energy Commission

Tim Earl, Director of Fire Test Engineering- GBH International, representing the North American Flame
Retardant Alliance (NAFRA) and substituting for Dr. Marcelo Hirschler

Rian Evitt, Code Compliance Officer- San Ramon Valley Fire Protection District, representing Northern
California Fire Protection Officers Association (Nor Cal FPO)

Richard Lam, Ph.D., Toxicologist - Office of Environmental Health Hazard Assessment Cal-EPA

I. CALL TO ORDER

Welcome / Self Introductions: Chief Kevin Reinertson called the meeting to order at 1000 hours and the participating working group members introduced themselves.

II. REVIEW/APPROVE FEBRUARY 25, 2014 MEETING NOTES

Paul Wermer (USGBC) stated that the third sentence contained in Item E, “Individual Materials vs. Assemblies” on page 8 is ambiguous regarding Paul’s intent when he made the statement about his desire to ensure that the question does not pre-judge a conclusion; he clarified that the conclusion that he did not want pre-judged was that E84 testing needs to be continued as a pre-requisite. Steve Fischer (BEARHFTI) requested that the word “freeze” be changed to “release” in the third sentence on page 3. Veena Singla (NRDC) pointed out that the reference to the TB 117 Working Group’s website in the last sentence on page 8 is incorrect; the website was created by the Department of Consumer Affairs, Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation (BEARHFTI) which should be corrected in the minutes.

III. PRESENTATIONS/DISCUSSIONS

A. Paul Wermer’s Email Regarding: Paul Wermer discussed his email that he sent to Chief Reinertson regarding where he thinks the workgroup should focus its efforts. Paul thinks that the building envelope definition and whether flame retardant (FR) additives should be used exclusively for the purpose of meeting an E84 level should be a primary area of focus. Based on the aforementioned criteria, Paul thinks that the workgroup should be looking at the organic polythermal foam insulations and excluding the non-flammable ones (rock-wool, mineral wool, glass wool); there’s an issue of facings but they’re generally not treated and have to be shielded according to the insulation requirements. Aerogel insulations and foam or cellular glass are non-flammable and should therefore not be considered. Cellulose and recycled blue jeans, which are borate treated; wool which is either intrinsically flame-retardant or treated with borate; cork and expanded cork generally meeting the Euro Class E product data without categorizing flame retardants- in the U.S., the tests that have been done show a flame spread of 30 so there are no flame retardant additives. Various spray foams (EPS, XPS, polyurethane, poly-isos) and products used in panels or in boards as pre-foam products or spray foam insulation. Flame retardants that are used specifically for the flame retardant purpose- no other purpose.

Lorraine Ross (XPSA) stated that her group disagrees with Paul’s approach mainly because the law itself addresses flammability standards for building insulation and all of the products (she went through the ICC evaluation service) have to undergo E84 and she thinks that’s the real connection. The products

are being tested and are regulated using E84; whatever flame retardant they are or are not using is irrelevant. Lorraine attempted to read the MSDS sheets for each type of product and she also researched the Cellulose Insulation Manufacturer's Association and individual cellulose companies and they're using boric acid and ammonium sulfate typically and are highlighting the role of boric acid as a flame retardant. If the products were tested without that flame retardant, they would never meet the requirements that are in the code for E84.

Justin Malan (USGBC) advised the workgroup that three organizations, the U.S. Green Building Council, the National Resources Defense Council and the Green Science Policy Institute, sent Chiefs Hoover and Reinertson a letter on March 19, 2014 in which they explained that their members think that despite having held two meetings, the workgroup does not understand the bill's intent. The letter also states that the organizations' members disagree with the workgroup's assertion, as was reflected in the February 25th meeting minutes, that the appropriateness and validity of the E84 test is not in question and whether or not it's found to be flawed is irrelevant and is not a consideration in the workgroup's deliberations. Justin clarified to the workgroup that if those two issues are not satisfactorily addressed, then he's uncertain that the USGBC members will believe that the workgroup is heading in the right direction and will want to continue to participate in the discussion. The USGBC members will most likely not want to continue to participate in another six months of this workgroup's meetings if they believe that a basic tenet of the workgroup is flawed; they will need assurance that it isn't flawed in order to continue to participate.

Chief Reinertson responded that the workgroup can absolutely discuss the letter and all of its issues and he clarified his statements regarding the E84 test: it's the national standard and is what exists for this process and is the baseline; if there's an alternative to the E84 test, then what is it? If everyone is in agreement that E84 is a flawed test, which Chief Reinertson does not think is the case, then yes- looking at an alternative to E84 would be appropriate but Chief Reinertson does not think that this workgroup, California or the nation is all in agreement that E84 is a flawed test. Justin responded that after the last presentation regarding the E84 test, he got the sense that there were some inherent challenges if not flaws in the test that's been in effect for many years and his fundamental concern is that the workgroup is not serving California's interests if its work is predicated on a flawed test. Chief Reinertson stated that he does not know if the intent of the law is to create a new test but if that is the intent, then the bill did not give the workgroup funding to create a new test and SFM no longer has the labs that they had twenty years ago to perform their own tests. So, the E84 test is the national standard and the baseline that exists today, and it's possible that the workgroup can look at alternatives to the test but throwing out the current test and creating a brand new test is something that Chief Reinertson will leave up to the workgroup to discuss and decide how to proceed.

Chief Reinertson then stated that according to the California Building Standards Codes (CBSC) and based on the 2012 IBC, NPFA 1 and NFPA 5000, the E84 test is the baseline today and Jess's presentation demonstrated many years of history and changes to the test throughout the years which has resulted in the generation of much different test data today than that which was generated years ago. Jess Beitel pointed out that E84 is not a perfect test but it's not only used for insulation; it's used for everything in the interior finish of the building. So, if it's found that the E84 test is flawed for one thing, then it will be flawed for everything else, too. So, the test would have to be replaced not just for a specific product but for the entire general application that the test is being used for throughout the building codes. Jess mentioned that there's more data from a recent UL paper which proves that as the E84 flame spread test shows higher and higher results, there's worse performance in real full-scale type tests and worse performance with smaller ignition sources. The paper also demonstrated that there are some materials that achieve good results in the E84 test but don't perform well in reality; there are some outliers. The E84 is a comparative test to show how a material may perform; when any element of the item being tested is changed, such as the fire size or orientation, then the performance is changed. Many

people have looked for alternates to the E84 test for many years but nobody has found an alternate that's acceptable and ready to be used as a regulatory tool at this point in time.

Paul Wermer asked for someone to supply the data that supports that E84 is a capable metric for foam insulations and evidence that the data that it generates is actually meaningful to the real-world fire performance. Paul then stated that he understands that interior finishes are things on the wall- not things behind the dry wall. So, he thinks that it may be appropriate as a screening test for interior finishes but the quality metric is very important and should be examined to determine how well the test performs, both from an analytical and a predictive standpoint which has not yet been provided to the workgroup and which is critical information for the starting point of this discussion. Justin stated that if the workgroup decides to move on with the E84 test without making a recommendation to change or modify it or seek an alternative or at least explore the opportunity of finding ways to change it, then....(he did not finish his statement). Chief Reinertson reiterated that the statement that he has made thus far regarding the E84 test is that it's a baseline and unless there's a viable alternative test, then throwing it out is not an option other options can be explored.

Dr. Donald Lucas (Lawrence Berkeley National Lab) asked if it would be possible for SFM to state that the E84 test is inappropriate only in certain circumstances, a viable alternative has not yet been developed and to request additional funding in order to proceed with the research and testing that will be necessary to develop an alternative test. Chief Reinertson responded that the workgroup will have to develop the recommendations and that Dr. Lucas' suggestion could be one of the recommendations.

Chief Reinertson stated that he's received many emails and phone calls regarding voting and he wants to clarify that this is not a one-for-one vote type of issue but rather a discussion and he'd like to remove the term "voting" from future draft documents. This is a different type of workgroup; it's not going to be a this side vs. that side situation and he would like to temper the concern over the "vote" that hasn't taken place. Hypothetical, if there are ten people representing an industry such as the chemical manufacturers, then they're really just one voice and other people representing environmental groups are another voice but there's going to be a discussion that reflects both sides in the report; there's not going to be an up or down vote.

Paul Wermer asked the workgroup to make a clear statement regarding why the material test needs to be independent of the assembly test as part of the standard for installation; what benefit does the material test provide as opposed to an assembly test in terms of flammability?

Lorraine Ross (XPSA) stated that she would like to address two issues; firstly that the legislation directs the workgroup to look at flammability standards. Those standards can be changed but overall building fire safety must also be maintained. If E84 is somehow changed, then how can it be shown that overall building fire safety is also going to be maintained? How can the workgroup give designers, code officials and firefighters confidence that the workgroup is not making changes that will endanger lives? Justin agreed and elaborated that although he's not an expert and he relies heavily on the other workgroup members who are experts, as someone who works in the legislature which is a very imprecise field, it appears that the workgroup is predicating the standards upon the E84 test. Whether or not the E84 test is flawed, it's the basis for the establishment of the current and presumably, if no changes are made, subsequent standards. The potential fallability of the E84 test is worrisome to the USGBC members. A possible outcome of this workgroup is the presumption that a certain chemical(s) must be added to building insulation materials because the E84 test so indicates. The USGBC works closely with the fire prevention and firefighting communities and specifically wrote the language that's contained in AB 127 because they do not in any way want to see a diminution of fire protection and safety (which was stated several times in the bill). Not only the legislature but also Governor Brown has explicitly stated that the workgroup should explore ways of removing the added chemical(s) and finding

out if there's a better, more predictable and reliable test. If it comes out that it will cost \$20,000,000 to develop an alternate test, then the USGBC will be happy to go to the legislature and explain the predicament; they do not want the workgroup to come out with a recommendation that's predicated on what could be a flawed test because it's going to skew the whole discussion and distract the workgroup from what the USGBC members believe that the governor and legislature is mandating in AB 127.

Lorraine then discussed the second issue of importance to her regarding assembly and material tests. All of the assembly test standards require an E84 test largely because it's necessary to have assurances that there's a minimum performance that's necessary for the product to fit in the assembly. The UL Fire-Resistance Design Directory contains tens of thousands of assemblies and basic material tests must be conducted on every one of those products- even gypsum board.

Paul asked Lorraine if concepts such as change control don't apply to her product world to which she responded of course they do. Paul then asked if there's a change control protocol that narrowly addresses changes. Lorraine responded that E84 is the change control protocol. Paul stated that E84 is not a process change control; many of the workgroup members disagreed with Paul and stated that E84 is a process change control. Paul stated that it can be called a process change control but it's the weakest one on the market, and that's a separate matter. Paul understands that its part of the requirements that the E4 test must be completed before other tests are completed but what is the basis that justifies that requirement? What is it that shows the E84 test provides meaningful data that is unique and cannot be achieved in other ways? Chief Reinertson responded that if E84 is the wrong test, then what is the right test and where's the documentation reflecting that? Jess advised that he would electronically send the information that Paul is requesting to the workgroup members.

Paul stated that he understands that UL has published a paper that discusses quality assurance issues of tests; Jess responded that the paper contains real data. Howard Hopper (UL) clarified that his company as well as his competitors frequently use E84 tests not just for surface burning but also as part of their certification to establish initial ratings for materials- smoke develop and flame spread- and also as a third party independent quality control check to make sure that the key formulations and construction of those materials don't change. Surface burning characteristics don't only come into play here but also hourly rated assemblies; when a material has been classified, it's known that when one of the walls is tested and it has a two hour rating, regardless of whether or not it has a thermal barrier / whatever it has, it's known that the particular key elements inside won't change because they've been put through a test- in this case it's the E84- and there's an ongoing audit inspection of the formulations and materials to make sure that they don't change. This may not relate to some of the other concerns that workgroup members have with the E84 test but it's one of the aspects of any E84 certification. Paul asked Howard to provide a detailed method/process flow so that the workgroup members have clear documentation and are working from the same data set. Howard suggested that the workgroup members write a paragraph describing the method/process flow and add it to the position paper.

Chief Reinertson asked Justin Malan if he sufficiently clarified the statement that he had made regarding the E84 test. Justin responded that he's uncertain if it was clarified and he thinks that there needs to be a recognition and acknowledgment that there's a concern about the E84 test and to whatever degree the workgroup determines the test is or is not applicable and should or should not be used; whether it's segued out into compartments, should or should not be used is the basis for coming up with a new flammability standard which needs to be clearly stated in the report. Justin thinks that the workgroup has the right to test the integral process by which the safety is measured and if the test is questioned, then it needs to be made perfectly clear in the report. So, the USGBC's perspective is that at the very least, a recommendation could be that they have reservations about moving ahead because of the potential fallability of the standard which should be stated and then a caveat can be added that states the rest of the recommendation that the workgroup comes up with. Justin suspects that there's going to

be an internal struggle amongst the groups (USGBC, NRDC and GSPI) that have signed onto the letter that was sent to SFM if the E84 test is not addressed and they will not support coming up with standards based on what they see as a flawed test. Justin thinks that Paul Wermer has done a good job of providing what appear to be fairly credible reasons why the E84 test should be questioned and he has formally submitted those reasons to the workgroup members.

Lorraine Ross asked Justin if he maintains the same position on the other flammability tests that are currently in the code and reminded everyone that the law addresses flammability standards for insulation; should the other fire tests face the same scrutiny as the E84 test? Justin replied that all tests should be scrutinized; the belief that simply because a test has been in effect for thirty-five years means that all future work must be predicated on it is not science. If the science has changed as has our ability to better analyze and predict and determine impacts of certain things that have changed then we've got to move with it. If we're incapable because we don't have the resources or even the statutory mandate and if there's agreement that E84 needs to be tinkered with or changed or used only in certain circumstances, then the USGBC members would be happy to work with others to ensure that the resources are produced. Justin cannot imagine that the legislature, as imperfect a process it is, wants to be told that a process has to be followed even though the standard isn't good. Chief Reinertson stated that he keeps hearing that "E84 isn't good"; Justin responded that it isn't good in certain circumstances-not all circumstances.

Howard Hopper (UL) advised the group that he's been through this process before and he'd like to start focusing on the end game. He reminded the group that their duty is to advise Chief Hoover; provide her with information that she can use to make a decision. There will not be consensus on certain issues but the workgroup must give Chief Hoover the best possible scientific information using facts and studies on pertinent issues so that she can make the best, most well-informed and intelligent decision(s). There will be divergent opinions but both sides will be represented in the recommendation. The workgroup needs to include specific information regarding why E84 is a flawed test; it needs to be broken down into points that specifically explain each of the test's flaws. Howard thinks that neither side is going to change the other side's opinions, but both sides should accurately reflect their opinions in the report in a concise fashion; references should be put at the end of the report. Justin agreed with Howard and stated that the different viewpoints should be reflected with the necessary substantiation. Howard advised that he's seen recommendations move forward in other task groups when the presentations were minimal and the groups focused more on writing a report that clearly identifies the issues and took time between meetings to add new wording to the report. Howard explained that he inserted the information and documents that the workgroup members emailed to Chief Reinertson and him where he thought were the most appropriate places for them to be inserted into the report and also added a few of his own ideas and information which he thought was the most efficient way to complete the work.

IV. LITERATURE REVIEW

Dr. Don Lucas stated that he's uncomfortable with submitting notecard summaries as part of the literature review. He pointed out that words can be pulled out of context quite easily which he himself has done on a few papers that other workgroup members have submitted; if there's a 100 page report, sometimes all 100 pages must be read and digested which he perceives is not being done in this workgroup. Chief Reinertson agreed with Dr. Lucas and advised that when workgroup members provide a summary of a document, they need to include either an electronic or paper copy of the document. Dr. Lucas asked if someone from SFM or BEARHFTI, who's overseeing this operation, will be reviewing the documents. Chief Reinertson responded that it's the workgroup's task to review the documents. Howard Hopper (UL) advised that he's frequently seen people pick paragraphs out of reports and take them out of context in workgroups such as this one but if someone documents editorial

wording that the entire group agrees with then the essence of an abstract on a specific issue can be captured. If there are divergent opinions then they can all be reflected. It was stated that Chief Hoover will not be able to read thousands of pages of documents and is relying on the workgroup to put a summary in front of her. Dr. Lucas stated that he's concerned with the very large number of papers that have already been proposed and there will be more in the future and he's uncertain who in the workgroup is qualified to read through even a subset of the papers; he isn't qualified to read all of them. Reviewing literature about issues such as flammability standards and the toxicology of products and firefighter safety studies is a huge undertaking and he's uncertain that this workgroup has the bandwidth or expertise to complete the task. Walter Reiter (EPS) stated that if there's a quote or reference that someone disagrees with or has questions about, then he/she can call the person who submitted it and ask questions or for him/her to provide the rest of the report. If somebody reads a quote that they think is taken out of context, then if it's properly cited it should be easy to pull up the report and examine it for inconsistencies. Chief Reinertson advised that as the workgroup moves through the document, the members should be able to identify misinformation whether it be a summary or a direct quote; that the workgroup members' concerns are going to be vetted out through this process.

Avery stated that she thinks that the goal of completing a literature review is not going to be accomplished if the workgroup continues to proceed in the manner in which it has thus far. She is trying to think of a better method of accomplishing the literature review and will discuss the issue with Chief Reinertson outside of the meeting.

Walter Reiter indicated that he's not familiar with the some of the references that are cited in the working draft document (such as "Bates 2007") and therefore doesn't know if he will be able to locate them. Chief Reinertson responded that he sent out an email to each workgroup member during the morning of March 20th in which he included the PDF's / all of the referenced documents and he also posted them on the website.

V. WORKING GROUP UPDATES/REVISIONS TO WORKING DRAFT

- A. **CSFM Working Draft Document:** Howard Hopper (UL) explained how the prior CSFM Smoke Alarm Task Force worked on their draft report (which is being used as a template for this workgroup's draft report). They held a number of meetings such as this workgroup's meetings and people worked on the document on their own in between meetings and suggested that certain items be added to the report. All of the changes to the document were shown as track changes from top-bottom, first page to last and if the issue was good, then it was left in the report. The members did not argue if they disagreed but rather focused on moving the report along. They went through the track changes one by one, made comments and people volunteered to add something to the report and make minor tweaks but they primarily just accepted the track changes and added blanks to be filled in at a later time and tried to make progress with the document by the end of each meeting. The document would then be distributed before the next meeting and everyone had a chance to submit suggested edifications.
- B. **California State Fire Marshal Flammability Standards for Building Insulation Materials Draft Document:** Chief Reinertson introduced the draft document that he emailed to each of the workgroup members on March 20th, 2014. Howard Hopper advised that he took the foreword from the legislative abstract and it explains what the workgroup is charged with accomplishing. Justin Malan advised that the language that's contained in the Legislative Digest is not good language to use in this report because it's not always accurate in terms of the letter of the law. Justin stated that it may be better to restate what the bill says specifically (as was done at a later point in the document)

so that there can be no questions because the Legislative Digest is not supposed to be used for legal interpretation.

- C. **Draft Document Foreword:** Chief Reinertson read the foreword to the workgroup. Justin advised that because the law is the foreword, the language should be written verbatim from the law. The workgroup members started working on / editing the document. Howard Hopper then explained the logic behind the “Sources of Data” section that was borrowed from the Smoke Alarm Task Force’s report and then edited it to more closely cover building construction.
- D. **Issues and Analysis (Phase 1):** Howard explained his logic behind the “Issues and Analysis (Phase 1)” section; he tried to capture that the IBC and IRC form the basis for California Building and Residential Codes and he then brought in the purpose statement from documents. Although the wording may not be perfect, it at least describes the purpose of what’s in the code. Justin asked if it’s necessary to define the distinction between fire performance and flammability standards and some of the other terms. Justin’s legislative discussion went round and round and round regarding what is being asked to change; they consulted the SFM, the BSC and firefighters and they used the term “flammability standards” and he’s still uncomfortable with the term and is not certain that it’s been clearly defined. Jess stated that it may be better to use ASTM E176 definitions because they’ve gone through the consensus process; ASTM has standards for definitions of terminology for fire, including flammability standards, which have weathered through court cases. Those definitions were to be provided for further discussion and inclusion.
1. **Fire Performance in Codes:** Howard asked if it would be helpful to accept the changes that were made to this section and let workgroup members revise it during the next meeting if they think that it’s necessary. Paul stated that it should be left in the track changes unless everyone has agreed on the language because that highlights the areas where there’s more work to be done. Howard suggested accepting the changes because if they’re not accepted then the document is going to have nothing but track changes; if someone has a concern with it, then they can make a point, revise it and add someone’s initials. Chief Reinertson advised that every piece of this document including the commas, periods and every word is open for discussion and change until the workgroup finalizes the document. Paragraphs may be agreed to be perfect today and then revised a couple of months down the road; the document will always be a work in progress until it’s finalized. Howard mentioned that he added a reference to R1HH in Appendix B that states which section of the IBC was cited. Lorraine raised the point that the California Building Standards are being referenced; perhaps its fire performance in the California Building Standards but it really should be the California Building and Residential Codes are based on the IBC and IRC since we’re focused on California where changes to the IBC and IRC have been made because they’re model codes.
 2. **Fire Test Standards:** Justin asked Howard if in the context of the section that’s written (paragraph 2 on page 3), is the flammability standard the fire test standard (not a definition, but more of an explanation)? The bill references flammability standards but in this document, outside of the definition, there is no explanation of the issue. It’s a critical consideration and can also determine the scope of the workgroup’s inquiry. Justin does not think that the purpose of the workgroup regarding E84 is just to change the standard but to look at the fire performance in its broader context and the standards that relate to that (as opposed to just the test). So, it would be helpful to somehow tie the flammability issue into these or other areas. Chief Reinertson advised that there are two ways to handle Justin’s concern: 1) The workgroup can now discuss and create a paragraph to insert or 2) Justin can later provide the paragraph and send it to Howard to insert and the workgroup will edit it during the next meeting. It was explained that the text inserted in the Fire Test Standards section was that they only cover fire performance; not the materials; there

are no restrictions on the materials or whether or not flame retardants are added- that's at the discretion of the manufacturer. The initial text included is to form a basis for the workgroup to add to and revise; none of what is written is final or written in stone. Justin requested clarification regarding whether the Building Code referred to the flammability standards that the workgroup is discussing as performance standards, test standards or as flammability standards in the Building Code? The bill requires that if there's a determination to be revised, that's what the bill requires to be revised.

LUNCH BREAK 11:35 AM– 1:00 PM

Fire Test Standards Continued:

The discussion regarding terminology continued. Chief Reinertson started the discussion about definitions, terminology and flammability standards and what the code actually uses to reference those by pointing out that midway through CBC section 720.1, it says “where a flame spread index or smoke development index is specified in this section, such index shall be determined in accordance with ASTM E84 or UL723” so it's not coining something as a specific term.

Discussions of revising the term/heading “Fire Test Standards” section to “Test Standards Related to Flammability” because that's what the legislation says and instead of putting in examples of some fire test standards, it was suggested that listing all of the applicable fire test standards which Lorraine had done in her document (presented at the last meeting) since those are the tests that are related to the subject matter.

Chief Reinertson advised that Mike volunteered to incorporate Lorraine's document into the working draft document for the next meeting. Chief Reinertson advised that Lorraine's document will need further updates prior to inserting it into the working draft document; Lorraine volunteered to complete the necessary updates. Paul found the table contained in Lorraine's “CA Fire Tests for Insulation”: 2013 CBC document to be an extremely useful layout and requested that it be added to the appendix as a reference; Mike suggested to then cite the appendix.

- Toxicity and Building Materials:** Howard Hopper discussed this section of the working draft document. He wrote a general statement about toxicity and after looking through the CBC and the CRC, he could not find any restrictions that say these materials cannot be used. He thought that there would be an asbestos ban in the codes but there wasn't. Payam Bozorgchami (CEE) stated that there's a requirement in Title 20, Part 5 of the CBC that says urea formaldehyde can be used with certain criteria; it must be listed. Chief Reinertson advised that the requirement is not in the CA Building Standards Codes; it's in different titles / other regulations. Chief Reinertson then gave a brief summary of California regulations to help better understand the state's acronyms and codes. Paul asked if it's necessary for the workgroup to address the issue of toxicity of building materials in the working draft document since it's already been established that it's not the workgroups charge. Lorraine agreed with Paul. Chief Reinertson advised that he'd like to examine the language contained in Part 12 to see if it has any impact on this issue; if the text is mandatory and regulatory, then the issue may have to be addressed. Lorraine suggested deleting the reference to penta and octa-PBDE's in the Toxicity and Building Materials section because they have not been used in insulation for years.
- Firefighter Toxicity Considerations:** The workgroup's scope includes examining issues related to occupants of a building and firefighters who may be in a building during a fire so Howard included some thoughts regarding firefighter toxicity considerations. Firefighters wear SCBA's but are still exposed to contaminants. Paul stated that the issue of acute smoke toxicity has been

addressed but the issue of chronic toxics present at very low levels has not been addressed: polycyclic aromatics, halogenated organics that are relatively non-volatile and are absorbed through the skin and end up on the equipment unless there are major complex decontamination processes; the RPP requirements for lead cleanup are trivial compared to these. The issue of other toxics that the standard tests have not considered but are of serious concern to a number of firefighters may have been trivialized by the language that's contained in this section of the draft document thus far. Lorraine added that there have been a number of epidemiological studies (such as WHO's) done on toxicity exposure in the firefighting occupation. Richard Lam (Cal-EPA) advised that the issue of chronic exposure is not simple; firefighters are not only fully exposed to chemicals and by-products from combustion during firefighting but they're also exposed to other chemicals and by-products (that the general population is also exposed to) when they're not firefighting. Howard stated that Veena and Walter provided some wording on exposure to flame retardant combustion so there are three different inputs (including Howard's) that will have to be filtered down to a few relevant points. Avery pointed out that the R2HH references are not included in the document; Howard responded that he missed it and will add it to the document. Chief Reinertson advised that he will make many revisions to the draft document as soon as possible (including adding the R2HH references) and send it out to the workgroup members either on Monday or Tuesday. Howard suggested accepting all three sections on toxicity knowing that they will be revised; Chief Reinertson responded that he will add a note at the top of each section indicating that they need to be revised. Dr. Lucas stated that he would like to suggest that many changes be made to the document but he would prefer to make his changes outside of the meeting. Steve Risotto (ACC) advised that the National Institute for Occupational Safety and Health (NIOSH) recently published (in 2013) a mega epidemiological study pulling together the results from a number of studies on firefighters and they have a fair amount of information on what cancers may be more prevalent and what the exposures might be and he thinks those are more comprehensive references. Steve volunteered to send the NIOSH Study to Chief Reinertson. The workgroup continued editing the Firefighter Toxicity Considerations section. Howard advised the group that the references should be put in Appendix B; the Smoke Alarm Task Force used Appendix B to support claims that were made.

5. **Highlights of Jess Beitel's History of Foam Plastics Presentation:** Howard included this section that contains highlights of Jess's presentation from the February 25th meeting. Eric Banks (CPI) stated that he thinks it's important to include the concept that the workgroup didn't only discuss the history related to the regulations but also the testing. Jess volunteered to add clarification to the working draft document regarding the testing / the work that was done to get it into the codes.
6. **Building Code Requirements for Insulation:** Chief Reinertson asked if the workgroup members would like to include a summary and reference to Lorraine's *California Fire Tests for Insulation* document in this section of if they think that it was sufficiently covered in the Fire Test Standards section. Lorraine responded that in the earlier part of the document, the fire tests that are in the code were just going to be bulleted; this is more of a breakdown by type of insulation and what tests apply to which insulation. Howard suggested moving this section of the document underneath the Fire Tests Standards section so that it flows better. Lorraine volunteered to add something to this section.
7. **Code Considerations Related to ASTM E84:** Chief Reinertson advised that this issue was discussed a lot during the last two meetings and this is the perfect opportunity to continue the discussions. Howard explained that Paul's comments comprise the main portion of this section. Mike asked Paul if it's his opinion that ASTM E84 accurately predicts the performance of other building products; Paul responded that he has not looked at E84 data on other products. His

opinion is based on papers and data regarding foam plastics; not other materials. Chief Reinertson advised to accept the changes to this section and then revisit it at the next meeting.

Avery expressed confusion over the fact that last month's discussion indicated that literature should be submitted with a short synopsis; she asked where those synopses are going so that people know to review them. Chief Reinertson responded that the synopses should go into the draft document.

8. **Building Envelope:** A workgroup member asked how the CBC defines Building Envelope; various members responded that it doesn't. Chief Reinertson advised that the workgroup is going to define it and Paul covered what's specifically being talked about in his document but Chief Reinertson would like to further narrow it down from merely a discussion point to a defining term for this working group. The workgroup edited this section of the working draft document.
9. **Doors:** Chief Reinertson discussed this new section and asked the workgroup members if there's specific language that they'd like to add to this section. Mike would rather not have it be limiting; he'd prefer insulation and other building components or insulation and fenestration products. Chief Reinertson advised that everyone who utilizes the California codes will go straight to glazing if the term "fenestration" is used.
10. **What Flame Retardants Are of Particular Concern?:** Walter Reiter expressed his thoughts that health concerns regarding flame retardants have been strongly implied throughout this process. He disagrees with Paul that the other flame retardants can just be given a pass. The information that he provided the workgroup came out of the ETA Design for the Environment Program and the Pollution Prevention Database; the risk assessments cited are from Australia, Canada and Europe and address the underlying concern that's driving this issue. Avery stated that AB127 inquires about flammability standards and not individual chemicals. Jess suggested that the workgroup states that this issue is not part of their considerations. Walter asked the workgroup if there's any concern (without addressing toxicity) that the flammability standards that are in place right now are not doing their job. Avery stated that she perceives that AB 127 raises the question if certain materials need chemical FR's to meet the flammability standards and, if appropriate, can the standards be revised to maintain fire safety but give people a choice in how they meet flammability standards? Paul responded that it can be asked if it's appropriate for the government to have in place codes that, because of the way they are written, require common materials to use additional materials to pass the test even though those materials actually add no value. Lorraine commented that there's nothing in the code that tells chemical manufacturers what to put in their products and Jess' presentation on the history of foam plastics showed that all that was necessary in the early days were performance tests; chemicals could be formulated in any manner and poly-iso did not have FR's. There were CFC-11 blowing agents and then a transition to HCFC's and 141B was more flammable and now it's pentane. There was nothing in the code that said chemical manufacturers had to add this or that; they could formulate to what they needed to meet the standards. Lorraine stated that AB 127 is now asking why those standards are in the code and she thinks that the manufacturers have fulfilled that obligation and explained why the standards exist. Avery disagreed that AB 127 is just asking why the standards exist; it's not just asking for an explanation of the history of the development of the flammability standards. Avery doesn't think that the job is done but rather that further questions have been raised after looking at the history. Lorraine agreed and stated that if the workgroup is going to propose changes to the standards, then it must show how fire and life safety will not be compromised in buildings.

Dr. Lam thinks that AB 127 is concerned with adequate protection. Protection falls into two categories: physical or health. Thermal barriers, etc. fall into the physical protection category and the chemicals/toxicity issue falls into the health category. Walter responded that if there aren't toxicity concerns, then why is the workgroup addressing HBCD and not any other chemical? Avery responded that the workgroup is not addressing HBCD; she doesn't think that any of the members want to address specific chemicals by name- they just want to address flammability standards. Paul stated that the members had agreed during the first meeting that this is not the subject matter for this workgroup to consider. Walter then asked if a statement could be inserted into the working draft document that says the toxicity of HBCD is of no concern. The workgroup members replied no because it's irrelevant; the material / ingredient toxicity is not on the table for the workgroup to consider. Some toxicity is another issue that is of concern to this workgroup because of its direct relation to hazards to firefighters. If there's good data on the toxicity or lack thereof in the various brominated, chlorinated and mixed thermal chloro combustion products, then Paul would love to see it.

Lorraine asked if the entire question "what flame retardants are of particular concern, are all included in one bucket, evaluate one by one and can they be grouped or individually identified?" should be deleted from the working draft document.

Adria stated that she's thoroughly perplexed. If the intent of AB 127 is to look at the flammability standards, is the workgroup not looking at them because they're not concerned about the toxicology of certain flame retardants that are being used in foam insulation? How can the workgroup not pinpoint a specific flame retardant chemical because isn't that where the concern lies? Avery thinks that the motivation is that in many uses, it's possible that these flame retardant chemicals are not actually improving fire safety in which case, why have standards been written that lead to their use? Adria responded that the domino starts with E84 in that the standard cannot be met without the addition of flame retardants, primarily due to the pieces having to meet the flame spread individually. How can all of the aspects of that assertion not be addressed? If the presumption is that E84 is flawed and the workgroup recommends a change, then whether or not there are alternatives, how can the rest of what then occurs be ignored? E84 leads to flame retardants which lead to toxicology issues which leads to firefighter and resident safety; why are certain items being removed from the table when the only answer that's been agreed upon is that E84 needs to be revised but that's not a task that this workgroup can take on (other than making a recommendation to ASTM that E84 should be revised)? Avery responded that this workgroup is more capable of looking at the flammability standard and fire safety concerns than looking at chemical alternatives assessments; other governmental agencies have done that and she doesn't think that recreating that same information in this report will be beneficial. Chief Reinertson stated that he doesn't think the workgroup is recreating what's already been done; what's already been done is going to be put into the report but it's not going to be recreated. Adria stated that everyone at the table probably has a different interpretation of what they think that end result looks like which is part of the problem and why everyone just keeps circling around the problem. Without examining the issues and looking at the data that's already out there, she doesn't know what the recommendation will be because items are being ruled out which severely restricts the outcome possibilities.

Paul stated that there's definitely concern in general about the broad views of the halogenated flame retardants in their various forms. The history as a whole has not been good and we keep getting surprised because we don't have mechanisms of action. A precautionary principle approach says that if we don't see that there is a clear benefit, then does it make sense to use materials whose full impact in a life cycle assessment we do not fully understand. From the time they start extracting the raw materials to the time the raw material is made and incorporated into

a product to the time that product is in some way disposed of at the end of life; what is then the environmental fate of those products from their decomposition. It's a very long, complex chain. Some people assert that they've done a life cycle examination of a product and it looks fine, but what they examined was source-to-gate; they're not examining the life cycle further out. There's genuine concern about the broad class of halogen flame retardants in particular and this workgroup can spend a lot of time debating the merits or demerits of the studies that look at the hazard assessments for each chemical but that will take forever. One of the classic cases in epidemiology was the discovery that cold tar was a carcinogenic; that came about because chimney sweeps were being diagnosed with a very rare form of cancer- a small population was doing a very specific task and it was very easy to identify the coal tar as a carcinogen. Smaller signals and more subtle impacts such as behavioral disorders cause studies to become more and more complex; larger and larger samples are needed and there is more debate over the merits of those studies. Paul does not think that the workgroup contains enough of the correct types of experts to take on this type of analysis; it would need more toxicologists. That issue was debated extensively during the development of AB 127 and it was agreed that the workgroup would not focus on the toxicology aspects; that would not be productive. It was agreed that determining whether or not flame retardants actually provide significant benefits in terms of fire safety performance and whether or not E84 does that is what will move the ball forward. This sidesteps the whole complex debate/fallout that occurs after it's been decided that one chemical is bad so another one must be used and then another five-ten year study must be done to determine the impacts and then someone discovers something wrong with that chemical and the whole cycle starts over again. The EPA studies list on toxicology is constantly changing and growing. An infinite chain of substitution results instead of stating up front that the whole chain is not value added and does not provide any long-term benefit to anyone. From a toxicology perspective, Paul's sense is that it may be very satisfying to decide that something should not be done because it cannot be proven absolutely that something is hazardous but on the other hand, it has not been demonstrated that these things are benign. Paul thinks that a better approach is to let the consumers decide if they want an extra level of safety or if they're comfortable that the building protocols and assemblies and their tests provide an adequate margin of safety; move it out of a regulatory compliance regime and into a market demand based on demonstrated performance under certain conditions.

Mike Fisher stated that the workgroup is creating a report that has no value other than it can be used by the SFM to create proposals that will go to the CA Building Standards Commission. Mike understands that Paul would like to submit a proposal that says that ASTM E84 tests for products that are either protected by a conditioned or thermal barrier and foam plastic insulation is not and that should not be a mandatory test requirement. Paul responded that he would like to make a statement that E84 is neither necessary nor sufficient to provide safe assemblies. Does the data show that such a statement could be made? Mike asked what's the bar to say that fire safety is not being relaxed; what's the standard that's going to be imposed for that proposal?

Dr. Lucas asked if there's an assembly test that's more stringent than E84, then why is E84 required? He also asked if any FR's provide any fire safety benefit when they're added to foam insulation in contact with the ground underneath a slab? Jess responded that there's no data out there that can answer that question. So, the best set of knowledge that we have is what we need to proceed with; that there were problems with foam plastics that the FTC addressed and new test standards were developed in a materials test, a quality control test and an assembly test, but not every application is covered by those tests. That's the baseline and there's thirty-forty years of successful history of no fires due to foam plastics when they're used properly according to the code requirements. If someone now wants to remove one of those, how long will it take to prove that this is right or wrong? Adria stated that as Jess points out, E84 is the metric and although it's

flawed, how can the other side be proven? How do we get to the point where it's decided that it's not contributing greatly to fire safety?

Paul sees reports of the FR material igniting while it's being applied because of a spark or some other cause which calls into question if the E84 standard is really telling something substantial about the intrinsic safety of the material. Another workgroup member responded that E84 is not a combustibility test; E136 is the combustibility test. Paul responded that he understands that it's needed because it protects the material in transportation. Jess replied that nobody ever said that foam plastics don't burn; they might burn some in a building but could burn more or less depending upon the architecture. Paul asked then how is that burning different from the materials burning without having undergone the E84 test. Jess responded that E84 is not a panacea test; if the ignition source, orientation or exposure time is changed then the fire can change and that's just the nature of fire. Lorraine pointed out that fire science is not exact, precise or predictive. Jess mentioned that if there's a major change made to a test standard, then what happens to all of the work that's been done for that standard; is it now trashed? The code references only the latest standard which means that if a company has made a product for fifty years in accordance with certain requirements and when those requirements change, the product no longer meets the new test requirements. Another workgroup member asserted that the E84 test results in increased escape time during a fire; there's more time to escape before flashover.

Walter Reiter asked if the report will be acceptable without someone looking at the whole premise of the assertion of the toxicity of the FR's? If the recommendation is to do something, then isn't it going to be necessary to support whatever the recommendation is by looking at risk assessments, etc.? Chief Reinertson responded that's not what SFM has been charged with. Walter asked if the fire toxicity issue should be taken off the table, too? Paul responded that the firefighters are less worried about the acute toxicity than they're worried about the low-level, seriously nasty long-term chronic toxicity. Walter asked about the products that have a lot of Polybrominated diphenyl ethers (PDBE) in them? A few workgroup members stated that they see Walter's point. Lorraine advised that the Stockholm Convention initiated a ban on HBCD but there was an allowance for a five-year extension on that ban for HBCD use in building insulation because of the energy saving aspects and time to transition. Chief Reinertson advised the workgroup members to provide any information on this topic before the next meeting so that it can be added to the report if necessary.

11. **Are the Current Test Methods the Right Test Methods to Provide the Correct Level of Fire Safety?**: Chief Reinertson advised Paul (and any other workgroup members who have pertinent information) to insert his information in this section. Adria discussed formatting issues and stated that the placement of the recommendations in the report is going to be based on this section. Should the report include a table format or assertions and responses?
12. **Is There a Link Between the Required Test Results and the Actual Need in the Codes?** The workgroup members agreed that this is closely related to question # 11 above.
13. **What is the Criteria Used to Determine/Measure that the Level of Fire Safety is Maintained?**
14. **A Way to Judge the Economic Impact?**: Chief Reinertson advised to leave this question in the report and the workgroup may make a statement about the impact of the recommendation(s).
15. **Impact on Sprinklered vs. Non-Sprinklered Buildings?**

The workgroup added the following questions: “Will insulation products burn or ignite “greater” without compliance to ASTM E84?” (Placeholder PW to revise question), “Is there an alternative to ASTM E84 to create compliant insulation products?”, “Are there situations that ASTM E84 does not provide meaningful data regarding the suitability of material application/use assembly...?” and “What are the fire safety impacts on existing building undergoing construction?”

VI. ADJOURNMENT

Chief Reinertson advised that the next meeting will be held at SFM Headquarters (1131 S Street, Sacramento, CA 95811) on Thursday April 17th from 10:00 AM – 4 PM. Marcelo Hirschler sent Chief Reinertson an email indicating that the June 26th meeting is in conflict with an ASTM International meeting so the June meeting may be rescheduled. The other meetings are scheduled for Thursday, May 29th and Thursday July 24th.