

Standards Council Meeting

Wednesday, August 4, 2010

8:00 a.m.

Batterymarch Park

Quincy, MA

I N D E X

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2	Call to order	3
3	Item 14	5
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1                   THE CHAIR: Good morning. I'll call  
2 this session of the Standards Council to order.  
3 Thank you everyone for being here this morning. I'm  
4 going around the table to ask all Council members  
5 and staff to introduce yourself. Then I'll do the  
6 outside and ask everyone else to introduce yourself.  
7 I want to remind everyone this session is being  
8 recorded by the steno typist today. So if you are  
9 making remarks during the session please remember to  
10 preface your remarks with name and affiliation so  
11 it's attributed correctly in the record.

12                   I am Jim Pauley, chairman of the  
13 Standards Council.

14                   MS. CRONIN: Amy Cronin, secretary to  
15 the Standards Council.

16                   MS. FULLER: Linda Fuller, recording  
17 secretary to the Council.

18                   MR. BELL: Richard Bell, member of  
19 Council.

20                   MR. HARRINGTON: J.C. Harrington,  
21 member of Council.

22                   MR. SYNDER: Michael Synder, member of  
23 Council.

1 MR. McDANIEL: Danny McDaniel, member  
2 of Council.

3 MR. HUGGINS: Roland Huggins, member of  
4 Council.

5  
6 MR. JARDIN: Joseph Jardin, member of  
7 Council.

8 MR. MILKE: James Milke, member of  
9 Council.

10 MR. CARPENTER: James Carpenter, member  
11 of Council.

12 MR. LEBER: Fred Leber, member of  
13 Council.

14 MR. GERDES: Ralph Gerdes, Council  
15 member.

16 MR. CLARY: Shane M. Clary, member of  
17 Council.

18 MR. FARR: Ronald Farr, member the  
19 Council.

20 MS. BRODOFF: Maureen Brodoff, NFPA  
21 staff and legal counsel to the Standards Council.

22 MS. BEACH: Denise Beach NFPA staff.

23 MR. LAMONT: Fred Lamont, NFPA staff.

1 MR. DuBAY: Christian DuBay, NFPA  
2 staff.

3 MR. URAL: Erdem Ural, Loss Prevention  
4 and Science Technologies.

5 MR. GOMEZ: Manuel Gomez, U.S. Chemical  
6 Safety Board.

7 MR. MORTIMER: Frank Mortimer, EMC  
8 Insurance, chair of NFPA 58.

9 MR. CHASTAIN: Brian Chastain, Georgia  
10 Pacific.

11 MR. CHOLIN: John Cholin, J M Cholin  
12 Consultants.

13 THE CHAIR: Thank you. This morning  
14 our first hearing is Hearing Item No. 14. It's  
15 Agenda Item 10-8-6-b-1. This is dealing with NFPA  
16 58. And the appeal is uphold the floor action that  
17 accepted comment 58-49 and then ultimately failed  
18 committee ballot.

19 So fundamentally how we'll approach  
20 these hearings, I'll ask the appellants to present  
21 first their views on the appeal, and I'll give about  
22 10 minutes to do that. Then I'll ask for any  
23 statements, anyone opposing the appeal or any

1 committee statements. Then I'll take questions from  
2 the Council on that particular topic. Then we'll  
3 give about 5 minutes for both sides to give any  
4 closing remarks.

5 So who is speaking in favor of the  
6 appeal?

7 MR. GOMEZ: That would be me.

8 THE CHAIR: Take a seat at the end of  
9 the table. Is anyone else speaking in favor of the  
10 appeal?

11 Speaking in opposition to the appeal?  
12 The chairman. Anyone else. Thank you.

13 Mr. Gomez, you have the floor.

14 MR. GOMEZ: Thank you. If I had known  
15 or thought about it I would have tried to bring in 8  
16 or 10 other people to sit around the table.

17 Good morning. I am the director of  
18 recommendations for the U.S. Chemical Safety Board.  
19 I think all of you know, but just for record we are  
20 an independent federal agency model to the National  
21 Transportation Safety Board. We conduct  
22 investigations of chemical incidents. We also do  
23 studies of chemical safety issues, if you will, and

1 as a result of those we issue recommendations. I  
2 thank you for the opportunity to come here and to  
3 present this appeal as all of you know from the  
4 record we have had ongoing discussions with you  
5 about the issues that I'm going to talk briefly  
6 about. So I am very glad that you have given us  
7 this opportunity.

8 I am here to make a case for a change  
9 for the better in NFPA 58 the gas code. In early  
10 2007, and I am not going to give very many details  
11 although the report is available. I have a copy  
12 here with me. The CSB investigated a very serious  
13 propane gas release and explosion that resulted in  
14 the deaths of four people, two firefighters, and two  
15 propane technicians, and also injured seriously five  
16 other people and leveled the store at which this  
17 incident occurred. As our report indicates there  
18 have been, this is not only an unusual occurrence,  
19 not the particular circumstances of this one  
20 incident, but incidents involving propane gas so it  
21 is a substantial risk of concern.

22 A very important risk factor very  
23 important contributing factor to that incident was

1 the lack of knowledge on the lack and training of a  
2 young propane technician who had only been on the  
3 job for about, for only a few weeks. Based on the  
4 investigation of that incident, we issued a number  
5 of recommendations to multiple parties. One of them  
6 was to the NFPA to change 58, particular language of  
7 58, the gas code. And the way we think would be for  
8 the better in the sense that it would make the  
9 language clear, less vague, and more enforceable.  
10 And you'll see why I'm using those words although  
11 you probably know better than I. And by replacing  
12 it with clear criteria, not specifically  
13 prescriptive language but clear criteria for  
14 training and for the kind of knowledge that propane  
15 technicians should have before performing the kind  
16 of work that they do. We think that doing that  
17 would make the standard better and stronger and more  
18 effective for the users and also for the enforcers  
19 of that code. Standard code forgive me I will use  
20 the words because of my own background probably  
21 alternatively.

22                   Our recommendation in very brief terms  
23 calls for training requirements for propane

1 technicians that would include fairly, what we think  
2 are fairly modern criteria for that kind of training  
3 with clear circular issues like hazard recognition,  
4 hazard identification, specific competencies,  
5 supervise on-the-job training, and testing for the  
6 knowledge that they receive. And our report, not  
7 the recommendation but the report, also provides a  
8 benchmark against which such language can be tested  
9 so to speak, and that is the nationally recognized  
10 certified employee training program of the Propane  
11 Education and Research Council.

12           Now I say that it provides a benchmark  
13 we discuss it in the report and so on, but the  
14 recommendation does not call for that particular  
15 training to be adopted in some obligatory way. It  
16 does provide a way for users and enforcers of the  
17 standard to have a clearer sense of what this more  
18 general training criteria would be like to be  
19 sufficient. So that they are clear and enforceable.

20           The current code language in the  
21 findings of the investigation, and by the way I  
22 should probably have said at the beginning that I am  
23 trying to convey to you here, I am staff for the

1 Chemical Safety Board. All the decisions of the  
2 Chemical Safety Board, forgive me for the tangent  
3 but I need to make it clear. All the decisions of  
4 the Chemical Safety Board what is now a full  
5 compliment of five individuals who are appointed by  
6 the president. We as staff prepare material for  
7 them, prepare evaluations, so on, bit ultimately the  
8 decisions are theirs. However, what I am saying  
9 today I think very faithfully reflects because we've  
10 had a lot of discussion about this, what the board  
11 feels what the board's intent and so on with the  
12 recommendation and with the appeals that we've had  
13 underway. But ultimately the decisions are theirs.

14 But in any case, the current code  
15 language, the NFPA code language in contrast to our  
16 recommendation, calls for and I quote proper  
17 training. The word proper is what is used. The  
18 conclusion of the board, of the report, is that the  
19 use of this word is poor, for a number of reasons.

20 First, because it is vague to the users  
21 and to the enforcers, to the authorities that  
22 enforce the code. In fact, I would argue that it is  
23 relatively unenforceable as a shell because it is so

1 vague, proper. And most importantly, perhaps for  
2 the discussion here for the Standards Council it is  
3 at orders with the NFPA's own manual of style for  
4 clear and precise requirements.

5 I have it here with me, but if you look  
6 at Section 222 of that manual, and especially the  
7 table that goes with it, which is 223, forgive me  
8 for being so bureaucratic, I think you will agree  
9 that proper is considered in this language to be  
10 vague and unenforceable, in the context of the  
11 language of the code. In fact, proper is one of the  
12 words in this table that is listed as possible  
13 unenforceable and vague terms. And you know, and I  
14 quote from that style manual, the NFPA style manual,  
15 which says that if is such a term is used, quote, it  
16 shall not be used within the bodies of codes of  
17 standards if in the context it is vague and  
18 unenforceable.

19 So I want to close because I won't take  
20 very long. I'll be happy to take questions. I'm  
21 also very anxious to hear from the chair of the  
22 committee and so on. We've had a very good working  
23 relationship with the NFPA so we're making an

1 appeal, but that shouldn't detract from that  
2 relationship.

3 I will close by reiterating and  
4 emphasizing some key points. First the  
5 recommendation that we made is completely consistent  
6 with the technical content and message and intent of  
7 the code. We're not challenging the technical  
8 consent in any meaningful way. We think that we are  
9 making a proposal that would enhance and clarify  
10 that technical consent. Put another way, I think  
11 that we are not at odds with the need of training  
12 propane technicians. Adequate training. The word  
13 is proper. We're trying to make that word, more  
14 meaningful to users and enforcers. We believe that  
15 we probably agree very much that propane technicians  
16 need to have awareness of the hazards of what  
17 emergency measures are to be taken in the case of  
18 emergency arising, that they should supervised  
19 on-the-job training, that they should have training  
20 that tests for the competence and skills that they  
21 develop and so on. Those are fairly standard  
22 criteria for modern training, on-the-job training  
23 for hazardous jobs. We think what we're saying is

1 consistent with the technical content. Does not  
2 challenge it.

3           As I said, I think that our proposal  
4 would make the standard clear to apply by both users  
5 and authorities enforcing it, and as I emphasize  
6 consistent with the NFPA's own manual of style which  
7 rules out terms that might be vague and  
8 unenforceable, in the context. And of course, it  
9 goes without saying that we think that making this  
10 change to the code would enhance safety for propane  
11 installation type work for the work that propane  
12 technicians undertake which happens thousands of  
13 times around the country, and for which of us all  
14 around the table know, there are often untoward  
15 incidents some serious such as the one we  
16 investigated.

17           So in summary I am here to certainly  
18 answer any questions that you may have. I hope I  
19 can try to answer them. But to urge you to  
20 incorporate our recommendation into the actual body  
21 of the requirements of the gas code so that it can  
22 be an enforceable part of the enforceable shall  
23 language. And with that I thank you. Those are my

1 comments.

2 THE CHAIR: Thank you Mr. Gomez. Thank  
3 you. Mr. Mortimer if you would like to come up to  
4 the table and provide your comments, please.

5 MR. GOMEZ: Should I stay?

6 THE CHAIR: Sure. You can say.

7 MR. MORTIMER: Thank you, Chairman  
8 Pauley. I appreciate the opportunity to address the  
9 Standards Council and the motion before you that is  
10 presented by the CSB. I believe the Chemical Safety  
11 Board and the NFPA Technical Committee want very  
12 similar things. We want the work force in the  
13 propane industry that is trained and competent. And  
14 in determining if I should come before you, the NFPA  
15 58 Technical Committee held a teleconference meeting  
16 at my request, 21 technical committee members were  
17 in attendance. I knew the concerns, the motion  
18 presented for the insurance industry which is what I  
19 represent on the committee. But I wanted to come  
20 before you, I didn't want to come before you with  
21 only that perspective or only that focus. If the  
22 technical committee felt the same way, I agreed I  
23 would come.

1                   They were unanimous in wanting me to  
2    come before you to express our mutual concern that  
3    the Chemical Safety board wording is much broader  
4    than what should be placed into the code. The  
5    current wording focuses on the training the persons  
6    whose primary work duties fall into this code. That  
7    does exactly what Manuel has been talking about. It  
8    addresses the technician that works with propane  
9    everyday. The comment wording is being presented to  
10   you states all persons whose work activities with  
11   liquid petroleum that falls within the scope of the  
12   standard is much broader wording. This would  
13   include the casual worker at a Convenient Store or a  
14   Walmart that would ring up a 1 pound camping  
15   cylinder or a breakfast chef that would be making an  
16   omelette with a portable heating unit. With the CSB  
17   wording all of these would need to have testing and  
18   performance evaluation all for which must be  
19   written. By adjusting the Chemical Safety Board  
20   wording for who is required to have the testing and  
21   evaluation, those primary work duties fall within  
22   the scope of this code, I believe the Chemical  
23   Safety Board and the technical committee would be in

1 agreement. The NFPA 58 Technical Committee on the  
2 conference call again voted unanimously to agree to  
3 work with the CSB and put together a TIA that would  
4 satisfy both the Chemical Safety Board and the  
5 technical committees concerning this. Again, I  
6 believe we both want the same things. We want  
7 persons to work with propane to be well trained for  
8 their job duties, and with the current CSB wording  
9 this would not be accomplished. It would not  
10 accomplish the goal of the Chemical Safety Board nor  
11 accomplish the goal of the NFPA Technical Committee.

12 If you have questions regarding these  
13 particulars on the wording I would be happy to  
14 address those. Thank you.

15 THE CHAIR: Thank you, Mr. Mortimer. I  
16 open it to questions from the Council. Mr. Clary.

17 MR. CLARY: Sam Clary, member of  
18 Council. It's your position and the position of the  
19 committees that I, I have a propane tank in my  
20 backyard for my barbecue, that your feeling is this  
21 proposed wording from the Chemical Safety Board  
22 requires that even I would have to go through this  
23 training.

1                   MR. MORTIMER: No. The Chemical Safety  
2 Board does address those that at work but it says  
3 all the job duties that fall under the scope of the  
4 code. Not the casual worker that would come in  
5 contact with propane not as part of their regular  
6 work duties but if they're working and they come in  
7 contact with propane they would need testing and  
8 evaluation.

9                   MR. CLARY: Mr. Gomez, have you had a  
10 chance to look at this proposed TIA that the  
11 committee is working on.

12                   MR. MORTIMER: We're waiting to hear  
13 from you whether or not there will be a TIA. We  
14 have a unanimous agreement by the technical  
15 committee to agree to work with the Chemical Safety  
16 Board, Manuel, Jeffrey, Rachel, all of those who  
17 have been involved with this in the past. This was  
18 originally at the comment stage presented by Rachel  
19 and Jeffrey, and then at the report on proposals, it  
20 was addressed by John, forgive me his last name.  
21 And in each case the committee attempted to address  
22 the concerns. I believe at the comment stage we  
23 placed the information in the annex that dealt with

1 the certified employee training program and  
2 attempted to clarify that this or other similar  
3 programs would be a good way to get the testing and  
4 verification. When John addressed in the report on  
5 proposals the concerns, he focused primarily on the  
6 fact that there was the incident in West Virginia,  
7 the little general, and he wanted to be sure that  
8 the wording was a little different. We again  
9 addressed some of the wording in the code.

10 So what is being presented as a revised  
11 NFPA 58 code to the Standards Council included many  
12 adjustments that we had hoped would appease both  
13 parties. Evidently we did not hear from them enough  
14 to be able to address all of their concerns.

15 THE CHAIR: Thank you.

16 MR. GOMEZ: If I may, although I can't  
17 comment on the TIA which doesn't exist yet, I think  
18 I can speak for the board that it is not the  
19 intention of our recommendation to encompass or to  
20 require training to have a standard code that  
21 requires training of the casual barbecue user of a  
22 propane tank, of a breakfast chef, and so on. And I  
23 think in that sense we do have a common ground.

1 We're talking about people who do propane work for a  
2 living.

3 I used to work propane technicians that  
4 would not encompass the person. There are, you  
5 know, I think that finding the right formula to  
6 define that so it doesn't complex it. For example,  
7 small operations where people actually fill tanks in  
8 small convenient stores and they actual do that.  
9 They don't just take your tank and put it in the  
10 cage and give you a new one that this outfit provide  
11 them. Although they deserve some basic training but  
12 that is a different population.

13 MR. CLARY: Primary duties would not  
14 fall under it.

15 MR. GOMEZ: Right. That is not a  
16 population that is connecting and disconnecting  
17 tanks and doing the kinds of things that appear to  
18 pose most of the hazards. So I agree.

19 MR. CLARY: So your concern is the  
20 truck driver driving the large propane tank truck on  
21 the freeways going to the filling station to fill up  
22 the tank that is in the back, correct.

23 MR. GOMEZ: That's right, and people

1 who routinely do installations of appliances and  
2 devices that use propane and so on, but again,  
3 rather than for me to try to make that definition  
4 here, I think that discussions could achieve that,  
5 and clearly separate the wheat from the shaft so to  
6 speak. And I think in that we do, we can find  
7 agreement. It's protecting both those who do that  
8 kind of work on a routine basis and they connect and  
9 disconnect and carry large amounts of gas and so on  
10 they're not barbecuing and not frying eggs, but they  
11 are supplying the material that goes into it.

12 I think the other important aspect is  
13 there was a modification which was welcomed by the  
14 CSB, but it was in the form of an annex. And the  
15 annex, it's a good thing because it provides  
16 guidance to users enforcing authorities but an annex  
17 is not a shall. It's not a requirement. So that's  
18 an important issue as well. To raise the level of  
19 the training for that population to if you will a  
20 modern standard. But I'm hearing common ground.

21 MR. CLARY: Thank you. Mr. Chairman I  
22 have no more questions.

23 THE CHAIR: Mr. Harrington.

1                   MR. HARRINGTON: J. C. Harrington,  
2 Council member. Question for Mr. Mortimer and  
3 following on the point that Mr. Gomez just brought  
4 up about the annex, is it the view of the committee  
5 that the training requirements are already dealt  
6 with in the comprehensive manner that Mr. Gomez is  
7 trying to achieve and also dealt with in the body of  
8 the document or is it more so addressed in the annex  
9 as he indicated.

10                   MR. MORTIMER: Let me preface that the  
11 committee recognizes that the NFPA 58 has had  
12 training requirements for over 50 years. We have  
13 attempted to address the concerns of the CSB in our  
14 putting some of this into the annex, we also forgive  
15 me but get our fingers slapped occasionally if we  
16 put too much into the code that requires them to do  
17 this and focus on a particular type of training.

18                   So we were trying to be cautious. We  
19 looked at some of the other codes to see some of the  
20 wording they had. One of those was NFPA 54. We  
21 tried to be sure that we were addressing those whose  
22 work duties fall within the code or primary work  
23 duties. So yes, we felt we had addressed the

1 concerns of both cases, the reporting comments and  
2 the report on proposals. But obviously not.

3 THE CHAIR: Ms. Brodoff.

4 MS. BRODOFF: I notice in the  
5 balloting, this is Maureen Brodoff, the ballot was  
6 pretty close, but you lost a couple of votes. It  
7 looks like because of the removal from your proposal  
8 of a requirement of training at least every 3 years  
9 some kind of interval requirement and also a  
10 requirement that the training be documented, was  
11 that something delivered that you removed, you  
12 wanted to remove from the standard, Mr. Gomez, or is  
13 that something you all, you may be able to address  
14 in terms of a TIA.

15 MR. GOMEZ: You know I think we try to  
16 make our recommendation, especially this type of  
17 recommendation, not be so specific, that we set  
18 ourselves up as the people who should decide whether  
19 it should be every 3 years or 4 and so on. That is  
20 why we tried to, I referred to there is a benchmark.  
21 We tried to outline both in the report and in the  
22 recommendation language itself of the general  
23 criteria that we think are part of modern training

1 for hazardous jobs.

2           My personal opinion in answer to your  
3 question is that probably one of those criteria  
4 should be initial training and then refresher  
5 training. I would add that I believe that  
6 recommendation speaks of documentation as well, but  
7 I think again that is a common criterion these day  
8 for training that you do training and that you in  
9 some way both confirm that there is some learning in  
10 the training and also keep a record that you did it,  
11 and that, you know, that's just a good thing to do  
12 in any safety system or safety program. So I don't  
13 remember the details of withdrawing it and so on.

14           But meeting some basic criteria for  
15 good training is what we're looking for. And I  
16 think the exact content is ultimately something that  
17 the experts on this committee can look at existing  
18 models and so on. I mentioned one and come up with  
19 things. This way users and enforcers can understand  
20 what proper training is.

21           MS. BRODOFF: I just want to suggest as  
22 you go back to this committee should the Council not  
23 issue the language itself, that you may be able to

1 pick up a few votes by reintroducing those two  
2 concepts into the TIA because it seems like some  
3 people according to the ballots I read on the  
4 committee were actually concerned that the language  
5 was reducing the training because it was eliminating  
6 any requirement of regular training.

7 MR. GOMEZ: We certainly didn't want to  
8 do that. I hear you.

9 MS. BRODOFF: Should you go back that  
10 may be a way to bridge the gap by increasing the  
11 level of objectives that you're looking for.

12 THE CHAIR: Jim Pauley, chair of the  
13 Council. Mr. Mortimer, I want to follow up on that  
14 point and see if you had any comments on the  
15 committee's perspective on that issue of did some  
16 language come out on the interval and what sort of  
17 happened from the committee's perspective? There  
18 are some votes that do indicate it looks like things  
19 were lessened. I sort of felt that was probably the  
20 intent of it.

21 MR. MORTIMER: I appreciated the votes  
22 in the favor of the way I went. I believe they were  
23 in error and I believe Miss Cronin is just dying to

1 tell you that the sections that were voted on  
2 separately from this one will include the testing  
3 and documentation into the next edition.

4 THE CHAIR: Can you clarify.

5 MS. CRONIN: I was just going to say it  
6 looks like the concerns of training and  
7 documentation were resolved. So it was some  
8 misunderstanding and it is covered in the document,  
9 is that correct.

10 MR. MORTIMER: That is correct.

11 MS. BRODOFF: I'm just curious, where  
12 is it? It doesn't look like it's in the ballot.

13 MR. LEMOS: Ted Lemos, NFPA staff.  
14 What happened, the reason we have this confusion is  
15 confusion, nothing was deleted. There were two  
16 proposals in the ROP affecting this subject. One of  
17 the proposals split the paragraph into a main  
18 paragraph and subsidiary paragraph. When we  
19 balloted this appeal, the only paragraph in question  
20 was sent to the committee. So it gave the  
21 appearance that something wasn't there. When we  
22 became aware of this, we as staff sent information  
23 to the committee saying that we received several

1 votes. This has been deleted, in fact not explained  
2 to the committee and we did get several votes  
3 reversed but not all. So because of two separate  
4 actions there is no deletion of other requirements.

5 MS. BRODOFF: Is that in the record,  
6 the communications you had?

7 MR. LEMOS: In the committee file, yes.

8 MS. BRODOFF: In this agenda material.

9 MR. LEMOS: I don't know.

10 THE CHAIR: Thank you. Additional  
11 questions? Jim Pauley chair of the Council. I just  
12 wanted to go back and revisit, it sounds like in  
13 listening to both of you there are some  
14 opportunities to probably bridge this gap. I  
15 appreciate the fact that the committee chair is  
16 indicating that the committee and the CSB are really  
17 after the same thing. It's a matter to getting to  
18 the right language to ensure that it's covered.  
19 Should the Council not uphold the appeal and this  
20 moves forward, it would appear that we're going to  
21 go back to previous edition text, and I just want  
22 any comments from both of you. Putting the TIA  
23 possibility aside for a moment, is that the right

1 place to go. Is going back to the ROP text a better  
2 situation than going all the way back to previous  
3 edition out of this. This is one of our cases where  
4 what tends to happens on items pass on the floor  
5 don't pass ballot that normal default action goes  
6 all the way back to previous edition. I'm trying to  
7 if the interim spot at the ROP is more suitable than  
8 going all the way back. I realize it doesn't  
9 accomplish where the CSB wanted to go, but I'm  
10 trying to see if we're moving in the right direction  
11 either or both of you, please.

12 MR. MORTIMER: For my own sake going  
13 back to the NFPA 2004 edition wording is probably  
14 better than adopting the failed wording and there  
15 are a number of problems with the current proposal  
16 before you wording. To mention a couple, they  
17 discuss the all persons, they discuss the liquid  
18 petroleum which throughout the code we've never  
19 referred to it or defined liquid petroleum. It's  
20 always liquified. It refers to the code as a  
21 standard in a couple of spots. So those things  
22 aside, would we be better off with the 2004 wording,  
23 much as I hate to lose all that we've accomplished

1 with the adjustments from comments and the ROP, it  
2 would be better than adopting what you have before  
3 you today.

4 THE CHAIR: Let me rephrase my  
5 question again. Perhaps I wasn't clear. I am  
6 looking specifically the comment that in question  
7 58-49 was on proposal 58-46. Proposal 58-46 the  
8 committee actually accepted in principle and is  
9 where they added some annex word. Because of the  
10 actions that have occurred from the floor and the  
11 failed committee ballot, it would appear that this  
12 will all go back to previous edition text. So my  
13 comment was is the proposal stage where the  
14 committee was, that wording that the committee put  
15 into the annex, is that something that would make  
16 sense to retain at that time versus going all the  
17 way back to the previous edition. I'm trying to see  
18 if the interim work that the committee did is a  
19 better point than going all the way back. Not  
20 talking about the failed comments or any of those  
21 things.

22 MR. MORTIMER: I will focus more on  
23 your annex text question. The committee at our

1 teleconference that was held I believe July 16th  
2 maybe. The date escapes me. We asked the technical  
3 committee members that were in attendance on that  
4 teleconference that exact thing. And would we want  
5 to retain the annex attached to A 4.4 and  
6 unanimously the members want to retain the annex  
7 text. So those editions would at least go forward.

8 THE CHAIR: Mr. Gomez same question to  
9 you. If the annex text would stay in, fully  
10 recognizing that it's ultimately not where you would  
11 like to be, but is it a better situation from your  
12 perspective than going all the way back.

13 MR. GOMEZ: Let me preface by saying  
14 I'm a little old government worker and some of the  
15 ROPs and at which stage and so on escapes me now.  
16 That doesn't mean I'm uninformed. But I just want  
17 to place it in context. All of the details of your  
18 discussion I would have to back.

19 But to get right to the chase. No, I  
20 believe that the board welcomed the annex. The  
21 annex was a good thing and we would wish to see it  
22 retained, but as you said, we are here to argue in  
23 favor of the concepts in that annex, if you will,

1 with some of the things that we have discussed  
2 incorporated into the body so that they are shalls  
3 and they're enforceable. I myself made the mistake  
4 of calling it a standard as opposed to a code.  
5 Again that is a mistake coming from being a little  
6 old government worker who doesn't use this  
7 terminology all the time.

8           So we would not like to see it go back  
9 to being stripped of the annex. I think that the  
10 board would think that that would be a worst  
11 intermediate outcome. What I hear is that it is  
12 possible to retain it with the annex and to engage  
13 in discussions that might permit the resolution of  
14 some of these, I'm calling them scope issues to whom  
15 this is applicable and perhaps some aspects, if you  
16 will, what the list of criteria for an effective  
17 training program are. I think those are the two  
18 issues that I heard. And I believe that would be,  
19 again I can't speak for the board, but I believe  
20 that I'm faithfully reflecting that the board would  
21 be open to that, and we would hope we could engage  
22 in that conversation as soon as possible. And I  
23 think we can iron it out, from what I've heard

1 today, I think we can iron it out. But no we don't  
2 want the annex dropped.

3 THE CHAIR: Very good. Mr. Bell.

4 MR. BELL: Kerry Bell, member of panel.  
5 Question for Mr. Mortimer. I think I understand  
6 you've indicated there appears to be the opportunity  
7 to create some common ground on a TIA. Is it also  
8 your sense there is strong support within the  
9 efforts from emergency agency standpoint considering  
10 where the text would land.

11 MR. MORTIMER: From a point blank  
12 question proposed by Secretary Linoff, yes, there  
13 is. He had concern for the same problem.

14 THE CHAIR: Miss Cronin.

15 MS. CRONIN: Amy Cronin, secretary to  
16 the Standards Council. You do envision if you were  
17 to do a TIA that that language would be in the body  
18 and therefore mandatory.

19 MR. MORTIMER: Yes. And hopefully do  
20 it before issuance of the 2011 edition.

21 THE CHAIR: Additional questions?  
22 Gentlemen, any closing remarks? Mr. Gomez, I'll  
23 allow you to go first.

1                   MR. GOMEZ: I reiterate I thank you  
2 very much. It's been a productive discussion. I  
3 think the committee, and the chair have taken our  
4 recommendations very seriously all along even though  
5 we have differed at times, and I also reiterate that  
6 the CSB has been pleased to work with the NFPA. You  
7 are a very important organization and we're in the  
8 same business of preventing bad things from  
9 happening. And I think I can speak for our board in  
10 saying that we want to continue to see that  
11 relationship strengthen and deepen for the  
12 improvement of safety for in our case for workers in  
13 the chemical industry. So I thank you very much for  
14 your time.

15                   THE CHAIR: Thank you. Mr. Mortimer.

16                   MR. MORTIMER: I appreciate the  
17 opportunity as well. I do think we have a common  
18 goal both the CSB and the technical committee, and  
19 while it would be regrettable to go back to the 2004  
20 it would be a better choice for wording than the  
21 proposal before you today. I really think we can  
22 work a TIA in advance. I know that's not something  
23 presenting for you today, but I appreciate the

1 opportunity to at least address the concerns of the  
2 committee and the verbiage that is before you.

3 THE CHAIR: With that we'll bring this  
4 hearing to a close. Gentlemen, we thank both of you  
5 for the time and effort. We greatly appreciate the  
6 full participation in the process and certainly we  
7 appreciate everybody rolling in the same direction  
8 of this issue and the way both of you have  
9 approached this. The Council does appreciate that  
10 cooperation.

11 I will advise you that response of the  
12 Council, decision of Council will be issued by  
13 written decision by Miss Cronin the secretary to the  
14 Council. No member of the Council or member of NFPA  
15 is permitted to permitted to convey any results of  
16 that decision. That written decision will be the  
17 only means of communication and well provide that,  
18 and with that, we'll bring this particular hearing  
19 to a close. And move directly into our next  
20 hearing. So thank you.

21 Agenda item 10-8-13-a-2 this is on NFPA  
22 654. Also involves Agenda Item 10-13-a-3 and a-7.  
23 All of these have to do with the floor action which

1 was to return in NFPA 654 to committee. Both in  
2 action that did pass on the floor ultimately failed  
3 committee ballot and so we have discussions I  
4 believe on both sides of this issue. So the default  
5 action of this would be to return. So from the  
6 appeals perspective who do I have speaking in favor  
7 which would be to return the documents. Please, if  
8 you will. Anyone else speaking in favor? Do I have  
9 someone speaking opposed to the appeal.

10 If anyone came into the room since we  
11 went on the record that hasn't introduced  
12 themselves.

13 MS. CURTIS: Martha Curtis, NFPA staff.

14 THE CHAIR: We are going to follow the  
15 same procedure that you just witnessed before. Give  
16 about 10 minutes to be able to present the appeal,  
17 give about 10 minutes on the opposing side to  
18 describe that. Then we'll go to questions from the  
19 Council. Remember to state your name for the record  
20 before beginning your remarks.

21 MR. URAL: My name is Erdem Ural. I am  
22 with Loss Prevention Science and Technologies. I am  
23 here at the request of committee chair Walt Frank

1 who could not come to the meeting. He has sent you  
2 a letter saying as a self-employed consultant I have  
3 found that cost of participating both in terms of  
4 out of pocket expense and lost revenue opportunities  
5 it make it prohibitive. But the real reason why he  
6 is not here, as Mr. Chairman has pointed out, we  
7 have been, we understand that this is a default  
8 action, reject the committee opinion, and therefor  
9 this is some kind of futile exercise. We are going  
10 to present our case. But we were told not to be  
11 hopeful.

12           We have seen through this process that  
13 there has been some flaws in the association meeting  
14 process, and this is the case where the hard work of  
15 the committee has been hijacked by a single company  
16 and its affiliates and consultants. We have also  
17 seen that the appeal process is, we have seen the  
18 flaws in the appeal process, namely, most people  
19 didn't know that during the, for the appeal all you  
20 have to say was you intend to appeal and then you  
21 had until the day of the Standards Council meeting  
22 that you submit your paperwork. I think all these  
23 issues has to be addressed and the procedures for

1 the appeal process have to be documented in writing  
2 so everybody has a fair change.

3           The committee has done wonderful work  
4 and come up with the next edition. It went through  
5 the ROP process. During the ROP process most issues  
6 that are being debated today have been accepted by  
7 the committee by overwhelming majority. The votes  
8 were, it's in your records but the votes were 27 to  
9 1 or 26 to 2. I think I remember 26 to 3 so the  
10 overwhelming majority favored the changes. Same  
11 thing with the ROC. Some additional modifications  
12 have been made and those were welcomed by the  
13 overwhelming majority of the committee.

14           The new document, so you will find  
15 writings in the file, in your file. Then  
16 association meeting decided to return the document  
17 to the committee, and the committee chair says the  
18 NITMAMs, the discussion and comments made by the  
19 NITMAMs were wholly unsubstantiated technically  
20 considered or just plain false. And the association  
21 meeting, I'm sure you know better than me, the  
22 members, the people present at the association  
23 meeting are just people who pay their dues so they

1 don't have any expertise in the subject. The  
2 committee members you have selected all of us, so I  
3 imagine you have selected people who are  
4 knowledgeable in this field.

5           So the association meeting's decision  
6 has been balloted in the committee, again, the  
7 overwhelming majority of the committee said no, we  
8 don't want the document back. Yet, the default  
9 action here is to send it back to the committee.  
10 Your decision.

11           Now what are the issues. Walt Frank  
12 has written documents and a lot of the people during  
13 the amendment motion has written comments. I'll  
14 just highlight in the interest of the time I just  
15 highlight a few things hopefully you'll ask  
16 questions and then we will get to explain more. The  
17 current edition is dated 2006. And there are very  
18 well-known problems with this document, with this  
19 current edition, and well known to the TC members as  
20 well as the combustible dust expert. This is the  
21 premier documents for combustible dust hazard  
22 reduction. So by returning this document to the  
23 committee, you will be allowing these flaws in this

1 document as well as unreasonably dangerous  
2 conditions in this document to be enforced and in  
3 effect for two more years, so that's a big  
4 responsibility.

5           There are also serious practical  
6 problems in implementing the methodology in this.  
7 Because this talks about what constitutes, what  
8 doesn't constitute dust explosion hazard, and people  
9 interpret in different ways. And if you like we can  
10 get into that. And I have examples of how the  
11 government, even the different employees for OSHA  
12 that is supposed to be enforcing the gist of this  
13 document approached the subject differently. So  
14 that's a big responsibility to let this go on for  
15 another 2 years.

16           In my substantiation for the return of  
17 the document ballot, I pointed out that the lack of  
18 clarity in the 2006 edition can't necessarily expose  
19 employees to recognize hazard that can potentially  
20 cause death or serious physical harm. So that's the  
21 part C in my ballot. Mr. Cholin is my colleague.  
22 He will be talking after me. He has given one  
23 example which was chilling. He is saying that we

1 are using this document for this particular paper  
2 handling situation. You could have 1300 buckets of  
3 combustible dust laying in the plant. That is what  
4 this document allows. And given that the paper  
5 industry is inherently more dust producing but this  
6 document allows them to operate more dirty than they  
7 have to. So this document is 1300 buckets of dust  
8 laying around the workers. This document will  
9 reduce that to 64 buckets.

10 4th item, there has been a discussion  
11 through the accumulation criterion based on layer  
12 thickness or layer mass. Again, this document also  
13 talks about the thickness and then the area and  
14 that's the volume of the combustible dust. In fact  
15 I just talked to an OSHA inspector. That's exactly  
16 what she said. She took the layer density, I mean  
17 the layer thickness and then the layer area and  
18 multiplied the two and came up with a maximum  
19 allowable combustible dust volume. That's what this  
20 document does. All these issues all these  
21 complaints are unfounded. 2006 edition is  
22 contradictory. There are serious contradictions in  
23 this document, and again the details if you are

1 interested in making the right decisions are in my  
2 write up. And there has been a discussion well  
3 there is no lost history to make these plans safer.  
4 Georgia Pacific had an explosion in a cardboard  
5 facility and then they ruled it out to explosion of  
6 something. We are talking about 1.32 inches of dust  
7 after an explosion after a fire after all the fire  
8 stream hoses, after the sprinkler operations. How  
9 are you going to see and find 1.32 of a dust  
10 explosion. I participated in these as a litigation  
11 support, and people come. Some say it was gas  
12 explosion. Some say it was a dust explosion, but  
13 you can see the dust explosion unless you had huge  
14 amounts of dust. That doesn't mean that it wasn't a  
15 dust explosion in that Georgia Pacific facility.

16 THE CHAIR: You can begin to wrap up.

17 MR. URAL: Okay. The new formulas are  
18 hard to enforce. There has been talk about the OSHA  
19 inspectors are not educated, they can't do these  
20 kind of calculations. As you pointed out they  
21 already do that kind of calculations. And we have  
22 OSHA representation in our committee but they are on  
23 the rule making side not on the enforcement side. I

1 got an email from an enforcement side of OSHA says  
2 our compliance officers are very intelligent with  
3 CIH, CSP and PEs. As a matter of fact one of our  
4 compliance officers has a Ph.D. from MIT with 30  
5 years experience in a refinery and several have  
6 master degrees. The formula is very simple. Even a  
7 4th grader could have been taught.

8           So what are we talking about? Were  
9 there any irregularities at the TC meeting. Yes.  
10 Mr. Chastain claims that the committee liaison has  
11 made error in scheduling the phone conversations. I  
12 kind of doubt it. I urge you to check that out.  
13 And as I pointed out, Georgia Pacific orchestrated  
14 the hijacking of this document, in my view, my  
15 personal view, and so that you should also check  
16 that.

17           THE CHAIR: About 30 more seconds.

18           MR. URAL: The new edition has other  
19 improvements such as air material separators  
20 incident investigation, use of separation, use of  
21 segregation, explosion protection, explosion  
22 isolation, pneumatic conveying systems,  
23 housekeeping, vacuum cleaners, intermediate bulk

1 containers, training and procedures, contractors  
2 subcontractors. So a lot of the stuff will not see  
3 the day of light if you decide to return this  
4 document for two more years. Thank you.

5 THE CHAIR: Thank you. Gentlemen  
6 speaking in opposition to the appeal come to the  
7 table. Both may come to the table at the same time  
8 however you'd like to do it, please. Either of you  
9 whichever would prefer to go first. Remember to  
10 preface your remarks by your name please.

11 MR. CHASTAIN: My name is Brice  
12 Chastain. I appreciate the opportunity to speak  
13 before the Standards Council today. I am  
14 representing Stan Lansey of the American Forest and  
15 Paper Association, the AF and PA employs about  
16 350,000 employees. Georgia Pacific is a member of  
17 that organization and have been for 20 years.

18 I am on 654 and the 664 committee, and  
19 I will say and talk a little bit about the equations  
20 and issues we have with the equations. But I am on  
21 the 664 committee. These equations were proposed  
22 for that committee and they were voted down. And I  
23 am not a member of 484 committee on metals, but I

1 understand the same thing happened there. I could  
2 be wrong but that's my understanding.

3 MR. URAL: You're wrong.

4 MR. CHASTAIN: Getting to the issues  
5 that Georgia Pacific has. We have been pretty much  
6 representing AF and PA in this effort. There are  
7 two simple equations and two complex equations. I  
8 call them simple and complex. Just a generic  
9 terminology for these equations. Two simple  
10 equations are simple algebra. You multiply .02  
11 times the floor area or you multiply .004 times the  
12 floor area times the building height and you get a  
13 mass allowance. It doesn't take into any  
14 consideration what kind of dust you're dealing with,  
15 the net heat of combustion, the energy of that dust,  
16 the type of dust. You can be dealing with the K S T  
17 dust of 300 or K S T dust of 29. You get the same  
18 value for mass. We don't think that's correct.  
19 You're penalizing people with -- users with less  
20 energetic dust as opposed to people who have or uses  
21 that have highly energetic dust. So the mass  
22 allowance is saying no matter which equation you  
23 use, whether the fire protection equation or the

1 building protection equation. We don't think that's  
2 right.

3           On the complex equations, I call them  
4 complex equations. It's been a lot made of these  
5 equations being difficult. It's algebra. A 6th  
6 grader has learned over and over to everyone a 6  
7 grader can do these equations. And I agree with  
8 that. We're not talking about the algebra. We're  
9 talking about the content that goes into the  
10 equations. These content that goes into the  
11 equation are complex concepts for most industry and  
12 a lot of industry doesn't have the infrastructure to  
13 deal with it. They would have to hire consultants  
14 to come in and provide them information of how to go  
15 about defining a dust hazard area. The complex  
16 equations have an entrainment fraction which is a  
17 value that was selected, that .25 value which is  
18 like 25 percent of your dust will go into the area  
19 during a deflagration, that value was established  
20 for by the committee for entrainment fraction.  
21 There is really no methodology for determining  
22 entrainment fraction. Erdem has a project that we  
23 also help find to develop a methodology on

1 entrainment fraction through the research foundation  
2 of NFPA. And I think that has a ways to go based on  
3 all the input I have seen so far. I think an  
4 accepted methodology entrainment, may be 2, 3,  
5 4 years away. And so right now, we're putting an  
6 entrainment fraction in an equation where there is  
7 no stand methodology that exists to substantiate  
8 that's the correct value. And so people are going  
9 to look at this and say how do I know if my  
10 entrainment fraction is 25 percent or a hundred  
11 percent or 40 percent or whatever. So there is a  
12 big question mark around the entrainment fraction in  
13 the complex equations.

14           Then there is design load factor which  
15 comes from NFPA 68. And NFPA 68 is not the easiest  
16 documents for most users to understand. It takes  
17 some work, some engineering background to understand  
18 how to apply the concepts in NFPA 68. That is my  
19 perspective as a user. So you have the design low  
20 factor in the equation as well that people have to  
21 deal with. The big problem I call them complex  
22 equations is the entrainment fraction.

23           Now looking at the practicality of

1 using these equations, the user has to use the  
2 equations and either determine a very conservative  
3 value from simpler equations or use the more complex  
4 equations with the question mark around the  
5 entrainment fracture to get another which is  
6 technically a little bit lower than the mass bay  
7 simple equations. And once I determine that mass,  
8 they have to determine if they're exceeding that  
9 mass, how would you do that. You'd have to use dust  
10 ignition proof vacuum cleaners that go in the  
11 facility, vacuum up the dust, weigh the dust, see if  
12 the weight of your dust compares to the mass of the  
13 dust that you've calculated. It costs Georgia  
14 Pacific \$10,000 an hour to shut down a paper  
15 machine. We have vacuum contractors come in  
16 regularly, while we're addressing combustible  
17 issues, it takes sometimes 6 to 8 hours to vacuum  
18 all the dust out of a building. Or more depending  
19 on the size of the building. Some of these paper  
20 machine buildings are 400 feet long, 60 feet in  
21 height. It's going to take hours to vacuum out,  
22 every time you change a paper package with different  
23 constituency in the paper more than likely you have

1 to reestablish what your mass has changed or not.  
2 So for variable processes you have to go back and  
3 vacuum and weigh, vacuum and weigh to establish  
4 whether you're over or under your mass allowance.

5           Also from a regulatory perspective you  
6 have regulators go in a building, fire marshal,  
7 OSHA, go in and say okay we need to weigh your dust  
8 or we are going to stop your process to weigh your  
9 dust. I don't think that's a practical way to go.  
10 You can't estimate dust but I think that's the way  
11 we got into these equations. So it's these issues  
12 with estimating hills and valleys on surfaces where  
13 you're trying to measure thickness of dust. Georgia  
14 Pacific has already taken over 200 density  
15 measurements in 12 paper mills across the country of  
16 the last year. We haven't had issues with measuring  
17 cell bulk density and establishing what our  
18 allowance criteria is. Very simple, very  
19 straightforward. You go in, you look, for instance  
20 a 2-pound per cubic foot density dust allows you an  
21 inch, an inch and a quarter of paper dust or more,  
22 if you go down to one pound per cubic foot you can  
23 allow 3 or 4 inches. We think that we should put a

1 cap on these low dust like no more than 1 inch of  
2 dust and that's what we've done at Georgia Pacific.  
3 We established the 1 inch criteria, and we can go in  
4 and look at a paper machine building and if we're  
5 over 5 percent of the area, over one inch of dust or  
6 10 percent of area and half inch of dust it's time  
7 to clean up. That's the type of processes we have  
8 been putting into place to address the requirements  
9 of the present edition of 654.

10 We think the present edition of 654 is  
11 workable, it's practical, easier for the users to  
12 understand and utilize and establish whether we have  
13 an issue or not with dust. It's going to be easier  
14 for the regulators and it's easy for the regulator  
15 to come in eyeball the situation and say you know,  
16 it appears you have a dust issue in this area  
17 because it looks like 30 percent of this building is  
18 covered with an inch of dust. And so the  
19 practicality of the present standard is there. The  
20 impracticality of these new equations is not there  
21 and the conservatism of the equation is not  
22 justified. There is no lost history to say we need  
23 to be more conservative with these new equations.

1 They haven't been demonstrated in the industry that  
2 they're better than the present method. There is no  
3 loss history if a company complied with the  
4 provisions in 654 of the present edition, there is  
5 no loss history they ever had an explosion. Why are  
6 we going to go with the more complex equations that  
7 haven't been fully validated from this entrainment  
8 fraction, and make it more difficult for users to  
9 use and regulators to enforce.

10 That's AF and PA position, and Georgia  
11 Pacific's on it. And again I think there is some  
12 more issues that John Cholin has on the equations,  
13 and I'll let him talk about those. And again, there  
14 has been some allegations that we've hijacked this  
15 document. We haven't highjacked anything. We  
16 represent users on this committee. That's what we  
17 were asked to do. If people on the committee  
18 disagreed with what the users are thinking and  
19 saying, well, we should be able to compromise and  
20 work it out through the committee not make  
21 allegations.

22 And so I think that the committee  
23 should, I think the Standards Council should go by

1 the floor vote that happened in Las Vegas. The  
2 overwhelming majority of members voted there their  
3 hands raised to return this document back to  
4 committee for the reasons I just described and the  
5 reasons John Cholin will describe. Thank you very  
6 much.

7 THE CHAIR: Thank you. Mr. Cholin.

8 MR. CHOLIN: Good morning. John Cholin  
9 from JM Cholin Consultants. I'm representing only  
10 myself. I have written a certain amount regarding  
11 these issues, and I don't have a whole lot to say  
12 other than what I've already put into the written  
13 record. I have a balance statement that I appended  
14 to my committee ballot on the return to document of  
15 the document, and I believe that statement probably  
16 articulates my position as well as I might.

17 I think this entire issues hinges upon  
18 the edits to Section 6.1 which abandon a simple all  
19 be it relatively simplistic depth measurement  
20 methodology for assessing risk and puts in place a  
21 couple of relations that on the surface are just  
22 simple algebraic relations but at least the detail  
23 relation hinge upon the numerical value for an

1 entrainment factor, aida sub D. I take issue with  
2 the fact that an aerodynamic entrainment is the only  
3 method by which dust is disbursed during a dust  
4 deflagration event. I have interviewed dozens, many  
5 dozens of witnesses and victims, and routinely I'm  
6 told, I heard a boom, I felt the building shake and  
7 the lights went out. Or the lights went dim. And  
8 then a fire ball comes rolling through the room.

9           These people are not lying. They are  
10 telling me exactly what they perceived. But when I  
11 look at the printout from the PLCs, I see that the  
12 energy to the lights did not go out until the fire  
13 department pulled the fuses on the pole. It is the  
14 dust shaken from the building structure that is  
15 between the lights and the victims and witnesses.  
16 And they're describing the fact that they are seeing  
17 a reduced light transmittance due to the dust. So  
18 that there is a mechanical or acoustic impulse that  
19 is also disbursing dust. So if we use just an  
20 entrainment factor from the pressure front we're not  
21 counting the dust that was shaken from the building  
22 during the initial event. If we characterize aida  
23 sub D as a dispersion factor to encompass both

1 mechanic and aerodynamic entrainment then the test  
2 methodology being worked on isn't going to give us a  
3 number.

4 I ran through my records just a few  
5 events that I've reconstructed. Malden Mills 6 to  
6 7 inches of dust none was observed after the event  
7 but there was an operating sprinkler system so we  
8 don't know for sure. Rochester Shoe Tree 2 inches  
9 of dust, zero was remaining after the event so that  
10 is a hundred percent entrainment factor. West  
11 Pharmaceuticals 3 or 4 inches of dust no data on how  
12 much remained. Interfine, 4 to 8 inches of dust  
13 from seen photographs taken before the event, zero  
14 after the event. I was there. I measured it.  
15 Gaylord Michigan, particle board plant, 2 to  
16 3 inches of dust before the event, half an inch  
17 after the event. I measured it. About 80 percent.  
18 Albany Organ particle board plant 4 to 6 inches of  
19 dust, half inch after the event about 90 percent  
20 dispersion. Yon Foundry 4 to 6 inches of dust  
21 witness statements half to 1 inch of dust seen  
22 documentation photographs that is about 75 percent  
23 dispersion. Deltic Lumber, 4 to 6 inches of dust 0

1 to 1 inch after, close to 90 percent. Hayes  
2 Lamerge, 2 to 3 inches, not documented how much  
3 remained. Imperial Sugar Refinery 6 to 12 inches at  
4 best, less than 1 inch, I measured it.

5 So this notion that 25 percent  
6 entrainment factor is appropriate is just wrong.  
7 The reality is that in all the investigations I have  
8 done had the facility complied with the 2006 edition  
9 the incident would not have occurred. I've yet to  
10 find any report of any incident where there was  
11 propagating deflagration through a building where  
12 the building was in compliance with NFPA 654.

13 I have got one client who I will call  
14 0808, my project number. They've had three  
15 deflagrations in two of their facilities, all  
16 recorded on videotape. Their facility complied with  
17 the limitations established by the current edition  
18 of 654 and in none of those buildings was there a  
19 propagating deflagration through the interior space.  
20 We have a few bits of data, the data currently  
21 suggests that the limitations established by the  
22 current edition are sufficient and I've got data to  
23 suggest that the methodology in the proposed

1 document is based upon an erroneous value for this  
2 entrainment factor.

3           Consequently in good conscious while I  
4 would love to see the document go forward because  
5 there is a lot of good work in that document, I  
6 think we have to preserve that good work and have  
7 committee go back to work and fix the problems in  
8 the document. Thank you.

9           THE CHAIR: Thank you. I'm going to  
10 open it up to questions from members of the Council.  
11 Mr. Gerdes.

12           MR. GERDES: Ralph Gerdes, Council  
13 member. This issue of hijacking the document has  
14 been brought up and we've got a memo I believe from  
15 Mr. Chastain talking about committee members having  
16 a relationship with Georgia Pacific. During the  
17 committee discussions did any of these people  
18 identify their relationships with Georgia Pacific.

19           MR. URAL: No.

20           THE CHAIR: And for the record your  
21 name.

22           MR. URAL: Erdem Ural. Speaking for  
23 the committee chair, during the meeting it was not

1 disclosed, I mean during the committee meetings it  
2 was not disclosed and Mr. Chastain made the mistake,  
3 he also I guess listed me as a Georgia Pacific  
4 consultant. And in reality I am not. I have never  
5 been a Georgia Pacific consultant. I worked on the  
6 Georgia Pacific case but I represented the victims  
7 not Georgia Pacific. It's true Mr. Chastain asked  
8 me to provide them a quote for my services, but  
9 since I was doing this NFPA research foundation  
10 project, I steered Mr. Chastain to response to that  
11 project I explained to him that accepting money from  
12 Georgia Pacific would be a conflict of interest for  
13 that purpose.

14                   The issues is in the committee meeting  
15 you have a valid point and should have been  
16 disclosed during the meeting. More important issue  
17 is it should have been discussed at the association  
18 meeting because at the association meeting  
19 Mr. Chastain was sitting in one place and Mr. Cholin  
20 was sitting in another place and then Mr. Lancey, I  
21 believe, Mr. Francis was sitting next to  
22 Mr. Chastain so it seemed like there was more  
23 parties. But if you look at the comments and the

1 appeals the writings of Mr. Chastain, Mr. Cholin and  
2 Mr. Francis are identical verbatim on several  
3 occasions, so they have certainly been working  
4 together and the appropriate thing to do would have  
5 been at the association meeting, because you have a  
6 bunch of people who don't any of us, to say my name  
7 is John Cholin I'm a representative. My name is  
8 Francis, I am a member AFPA, and Georgia Pacific  
9 president James P. Hannon is our vice-president of  
10 the American Forest and Paper Association. So I  
11 believe that was a mistake my colleagues made.

12 MR. CHASTAIN: Could I make a response?

13 THE CHAIR: Please.

14 MR. CHASTAIN: The only reason I  
15 indicated who was working for Georgia Pacific in any  
16 capacity is because of the allegations were made and  
17 really I have not come here to talk about  
18 allegations and to get into mud and that kind of  
19 thing. I think that's inappropriate, and I don't  
20 think the NFPA 654 committee should operate that way  
21 and I'm above that. So I am not going to get into  
22 that but I had to respond to these allegations. Our  
23 legal department required me to because of the

1 allegations made, and I wanted to make sure everyone  
2 understood there is people that are listed there  
3 that voted to keep the document and take it forward  
4 and there is people on that list that voted to send  
5 it back to committee. That's all I want to say.

6 MR. GERDES: I just want you to be  
7 aware we have a concern about process and due  
8 process and things, and I haven't scored how these  
9 people voted.

10 MR. CHASTAIN: There was a mix.

11 THE CHAIR: Mr. Gerdes, if you want,  
12 Mr. Cholin wants to respond to your question.

13 MR. GERDES: Please go ahead.

14 MR. CHOLIN: John Cholin, to respond to  
15 that issue. It is my understanding that working on  
16 committees and I have been doing this for a little  
17 over 30 years, that if I have been retained by a  
18 particular interest to express their view on the  
19 committee, then I have the obligation to disclose  
20 that to the committee chair. If I am serving on the  
21 committee and giving the committee the benefit of my  
22 experience based upon the totality of the projects  
23 that I happen to have worked on over the past

1 30 years, then it's not incumbent upon me to  
2 disclose all of the projects or all of the clients  
3 that I've worked for.

4 MR. GERDES: You read the regs but  
5 there may be a higher standard out there. I just  
6 want the information on the record.

7 THE CHAIR: Ms. Brodoff.

8 MS. BRODOFF: Legal Council, I just  
9 want to clarify that for an individual to ask  
10 someone to disclose their interest is not  
11 inappropriate within our system. Everyone has a  
12 duty to disclose information that might help others  
13 understand where they're coming from. There is no  
14 criticism in that.

15 As far as Mr. Cholin's remark, it is  
16 true that the guide for conduct requires people who  
17 are hired as consultants for an interest to disclose  
18 that interest if it's different than the one they  
19 are put on the committee for and to recuse  
20 themselves from voting on that matter. That does  
21 not relieve consultants from disclosing other  
22 interests so that the committee knows where the  
23 consultant is coming from on a given issue. So for

1 example if you were not hired, Mr. Cholin, to  
2 represent Georgia Pacific on the committee and were  
3 voting in your own professional judgment that's  
4 fine. But if you had Georgia Pacific as a client  
5 paying you for the other matters in a significant  
6 portion, I would think that ought to be disclosed  
7 just to give the committee members an idea of where  
8 you are coming from.

9           With that I'd just like you to discuss  
10 a little bit what your relationship is to Georgia  
11 Pacific, apart from, I assume that when you said  
12 you're speaking on your behalf that you are not, you  
13 haven't been hired to represent Georgia Pacific.

14           MR. CHOLIN: For the record that's  
15 correct. Georgia Pacific is one of 32 clients that  
16 I currently have open.

17           MS. BRODOFF: So Georgia Pacific is  
18 currently open.

19           MR. CHOLIN: I have repeat business  
20 from about 75 percent of my clients are repeat  
21 business. So consequently I have done work for  
22 Georgia Pacific over the past. I have worked for  
23 Michigan OSHA against Georgia Pacific. I have

1 worked for Georgia Pacific, I have worked for their  
2 competitors. Warehauser, for example. I've worked  
3 for federal OSHA, worked for state OSHAS. I have 32  
4 open I think it's 32 open projects right now.

5 MS. BRODOFF: That's fine. I don't  
6 imply any criticism whatever, but I do think it's  
7 important that participants know that people should  
8 discuss their interests just so that the committee  
9 members and the Council whoever is listening to them  
10 have some idea where they're coming from so they can  
11 evaluate that information in that light, and I thank  
12 you for your response.

13 THE CHAIR: Mr. Gerdes, does that --

14 MR. GERDES: Yes.

15 THE CHAIR: Further member from the  
16 Council?

17 MR. HUGGINS: Roland Huggins, Council  
18 member. This is directed to Mr. Cholin. In general  
19 since you identified some seemingly significant  
20 issues on entrainment and so forth, in your opinion  
21 how far back if this returns, do you think it needs  
22 to go regarding proposals versus comments in order  
23 to fix your issues, your concerns? Do you think it

1 needs to go back to a point where we're starting at  
2 the proposal stage since so much work has already  
3 been done versus starting in the middle like at the  
4 comment stage? Did that make sense? I'm trying to  
5 get a feel of how much it might take to fix the  
6 problem.

7 MR. CHOLIN: There was discussion of  
8 that particular issue at the recent meeting of the  
9 committee when we were working on NFPA 655, it was  
10 tacked onto the agenda at the end and if memory  
11 serves me correctly, the committee voted to go back  
12 to the point where we were considering proposals.  
13 So that it gives the public the opportunity to  
14 submit additional comments on the document to go  
15 just back to the comment phase and have an ROC  
16 meeting without soliciting fresh comments would  
17 potentially put us right back here again in the year  
18 of 2013.

19 So I see Denise in the back of the room  
20 so she can correct me if I'm wrong, but I believe  
21 that we voted to go back to the point where we're  
22 going to have to solicit comments on the ROP and  
23 then process those comments so that we can expedite

1 the move forward. Because there is genuine  
2 improvement in the document. I don't want to  
3 mislead the Council here. The document has been  
4 improved immensely in a number of different areas.  
5 But unfortunately the hazard assessment portion  
6 which was critical to get straight, serves as  
7 essentially a Keystone for the rest of the document  
8 and until Section 6.1 can get fixed, the references  
9 and the rest of the document, if you just went back  
10 to the earlier edition, language wouldn't make any  
11 sense. So that's why the motion to return.

12 THE CHAIR: Questions, Mr. Harrington.

13 MR. HARRINGTON: J.C. Harrington,  
14 member of Council, question for Mr. Ural. Regarding  
15 the Chapter 6 and the entrainment issues we're  
16 talking about, how divided is the committee or how  
17 unanimous is the committee's view on that subject  
18 based on your most recent vote.

19 MR. URAL: I don't think the committee  
20 is divided. Let me address this in a couple of  
21 different ways. The entrainment fraction I  
22 understand Mr. Chastain and Mr. Cholin brought it up  
23 as a big item which is really not true because the

1 value of 25 percent was backed from the methodology  
2 that was given in the 2006 addition. So the  
3 25 percent came. They said everybody like this  
4 methodology because it's just thermodynamics. So  
5 nobody disagreed with the form of the equations and  
6 nobody disagreed with the equations need to be  
7 included. Then they said well why don't we take for  
8 this factor, they said why don't we, until we got  
9 more data just go to the same level of conservatism.  
10 So that's what the committee did. And it was give  
11 and take. It was a consensus process. There has  
12 been other comments.

13           The other thing I wanted to add is the  
14 committee recognizes, committee doesn't have much  
15 hope on the decisions you are about to make here, so  
16 that's why the committee recognized that it should  
17 be some TIAs to fix the dangerous conditions that  
18 exist in here. So there is a TIA subcommittee  
19 working on this and Mr. Cholin is also serving on  
20 that task group. And then the task group has  
21 several meetings and in fact it was Mr. Cholin who  
22 wanted to include the new equations in the TIA, and  
23 then the task group people said it would just be to

1 the face of the NFPA administration to try to get  
2 these equations. We don't want to sneak anything  
3 in.

4           So I think we are in agreement and I  
5 think the 25 percent just comes from this. And  
6 Mr. Cholin makes a deal about the mechanical  
7 shaking. First of all it's not in the 2006 edition  
8 so I don't know why it is an issue here. And he is  
9 an electrical engineer. I have a Ph.D. in aerospace  
10 engineering with emphasis on combustion. The  
11 science tells us in most cases that is not an issue.  
12 It's true that people after a thump they hear the  
13 dust comes down, but that is because of the  
14 aerodynamics because the primary explosion comes to  
15 blow on the dust and comes and I doubt that anybody  
16 can say dust came down it was because of the  
17 mechanical disturbance versus aerodynamic  
18 disturbance.

19           MR. HARRINGTON: Mr. Cholin is on that  
20 committee, I want to ask him then the same question  
21 from his perspective if he feels the committee is  
22 fairly divided on that subject.

23           MR. CHOLIN: I certainly find that I'm

1 in the minority on the committee, but I believe that  
2 there are sufficient numbers of individuals on the  
3 committee where this is an issue what needs to be  
4 resolved. And keep in mind that in the current  
5 edition under annex D they assume 50 percent of the  
6 dust is being entrained. So that we take the  
7 computational method that was proposed and we go  
8 from a 50 percent entrainment and then we back  
9 calculate backward and all of a sudden come up with  
10 a 25 percent entrainment. So that there is a  
11 disconnect between what is in annex D currently and  
12 what is in the proposed document. And I believe  
13 that the only way to get to these technical issues  
14 resolved is to send the document back and get the  
15 committee to perhaps cool off a little bit and then  
16 to get to the bottom of the technical issues.

17 MR. HARRINGTON: Thank you.

18 THE CHAIR: Mr. Snyder. Did you have a  
19 question?

20 MR. SNYDER: Mike Snyder, member of  
21 Council. And Mr. Cholin in your abstention on  
22 comment 654.17 you talk about a series of  
23 teleconferences that occurred after the ROC meeting

1 in what appears to be calculation methods. For the  
2 record can you walk through your concerns of how  
3 those teleconferences transpired.

4 MR. CHOLIN: The first teleconference  
5 was scheduled during the week of the society fire  
6 protection engineering professional development  
7 week. Matter of public record and it was a matter  
8 of public record for a year prior that I spent that  
9 entire week teaching so I could not participate in  
10 that meeting because I can't come home.

11 The second teleconference occurred, I  
12 did not get notice of it until the morning of the  
13 teleconference. I don't know how that happened but  
14 that's what happened. Unfortunately last fall I was  
15 suffering some health issues, I have this thing in  
16 my brain called could an hemangioma that messes me  
17 up from time to time, and I was in no position to  
18 participate in the teleconference. I got no other  
19 notices of teleconferences. I don't know whether a  
20 third one took place or not. The rumor was one did.  
21 The fact of the matter is sometimes as we age we  
22 have to deal with health issues and I was struggling  
23 last fall to maintain a consulting practice and to

1 get myself back.

2 MR. SNYDER: In your statement then you  
3 are alleging that significant changes were made to  
4 the calculation in 6-1 during those teleconferences  
5 that followed the ROC meeting?

6 MR. CHOLIN: Yes. Some changes were  
7 made.

8 MR. URAL: Was it to the equations or  
9 terminology?

10 THE CHAIR: Please. Questions are  
11 being directed to Council member where they want the  
12 question to go.

13 MR. URAL: Sorry.

14 THE CHAIR: Mr. Snyder.

15 MR. SNYDER: Were there changes made to  
16 the calculation methods that were prescribed in 6-1  
17 to the equations that you referred to earlier.

18 MR. CHOLIN: Yes. There were some  
19 changes made. The changes didn't fix the  
20 fundamental problem which is the equations rely upon  
21 a numerical value for the entrainment factor, and  
22 there is no test method by which I can determine  
23 what the entrainment factor ought to be. And there

1 is substantial data out there indicating that the 25  
2 percent number is not the most wonderful number.  
3 And I just don't think that's a good way to write  
4 standards that are going to be used as the  
5 nationally recognized standard of care for life  
6 safety in facilities where personnel are at  
7 substantial potential risk.

8 MR. SNYDER: From the technical  
9 committee's perspective, do you recall then a  
10 different series of events that occurred.

11 MR. URAL: I'll defer to our NFPA  
12 staff. He has been a very good person and very good  
13 to the committee, very capable person. I mean I'm  
14 new to the NFPA process. I love serving on the  
15 technical committees and I put the technical in  
16 quotes. This is really a new process for me. This  
17 part I don't enjoy that much. But the technical  
18 staff scheduled the meetings. So the  
19 teleconference, we scheduled the meetings. Usually  
20 we ask around and then try to accommodate the  
21 majority of people. And I have a different  
22 recollection than Mr. Cholin. I don't think the  
23 equations changed in the teleconferences. I think

1 his main beef was to use this terminology flash fire  
2 versus deflagration. I thought that was the change  
3 that he and Mr. Chastain was referring to. So  
4 perhaps we can defer to the NFPA staff whether they  
5 were in compliance. I don't know if there are any  
6 NFPA rules and regulations about the teleconferences  
7 but the thing was the document had to be processed.  
8 The ROC documented to be completed and we had a  
9 three-day meeting in Baltimore and we couldn't  
10 finish all things and that the meeting, it was  
11 discussed that we are going to be having a series of  
12 teleconferences and that's what the committee did.

13 THE CHAIR: Mr. Synder, does that get  
14 you the information.

15 MR. SYNDER: Gives me a better  
16 understanding, yes.

17 THE CHAIR: If you want to respond.

18 MR. CHASTAIN: What I recall we had the  
19 Baltimore meeting. We talked about 1 kilogram per  
20 square meter as kind of a default mass value. But  
21 what happened from that meeting with the several  
22 subsequent teleconferences before November that  
23 changed to the simple equations that I described the

1 .02 times the floor area .004 times the floor area  
2 and then the height. I also recall in the more  
3 complex equations there was a C op value that  
4 changed to the CW value and I sent some emails to  
5 Sam Rogers who was really the what I call the brains  
6 behind the equations and asked him questions about  
7 that. He tried to explain those to me. And then  
8 there was a question, the high values were  
9 established and some questions about that. I was  
10 out of the country for one of the meetings. I did  
11 ask the chair to schedule a meeting in the morning  
12 versus afternoon so I could attend another  
13 teleconference because I guess we had four or five  
14 teleconferences between September meeting and the  
15 November finale, and I missed two of those, and  
16 significant changes happened, I feel significant  
17 changes happened during that time period and it went  
18 right down to the wire from my perspective with the  
19 equations being finalized. And that's my  
20 recollection of the events.

21 MR. URAL: The C op versus C W that's  
22 just editorial change probably. It doesn't have any  
23 bearing on this. But the point is not everybody can

1 make all the committee meetings. That's why we have  
2 the process the ROC and you get the ballot, you vote  
3 on the ballot, and then there is the circulation of  
4 the votes, and then now you go talk to your fellow  
5 committee members, and if there is a mistake made  
6 you can ask them to change the words. So all these  
7 processes, he says he was out of the country.  
8 Because it was a teleconference it was an easier way  
9 of participating on it. He could call, I don't  
10 remember, one time he called from his boat.

11           The point is the process was accessible  
12 to all, and I like that part of the NFPA process  
13 because you do the recirculation of the ballot and  
14 then everybody looks at what others said and then  
15 why are they changing their mind. And then you can  
16 also call people and solicit, the right to influence  
17 their vote. So that is really a wonderful process.  
18 So all these were available to Mr. Cholin and  
19 Mr. Chastain.

20           THE CHAIR: I am going to sort of end  
21 that line of questioning on the teleconference. I  
22 think we have enough info about that. Mr. Milke.

23           MR. MILKE: Jim Milke, member of

1 Council. Mr. URAL, you've made a fairly serious  
2 allegation in the proceedings, actions of the  
3 committee were somehow hijacked, and I would like to  
4 get a rather specific description of when that  
5 happened? Was it at the committee meetings, ROP  
6 stage, ROC stage, teleconferences, when did sort of  
7 thing happen?

8 MR. URAL: I was referring to the  
9 association meeting and I spoke to that. It was an  
10 appearance that, the ROP, ROC they were a majority  
11 of the committee felt certain way and they voted  
12 that way. So there was no problem with those. At  
13 the association meeting it was on the west coast and  
14 not many committee members were able to go. So I  
15 was there and Mr. Frank was there and Mr. Chastain  
16 was there Mr. Cholin was there. Mr. Lancey --  
17 Francis was there. And so everybody all those  
18 people spoke so that gave the impression that it was  
19 maybe a committee was like hopelessly locked, but it  
20 wasn't true. The committee vote was a certain way.  
21 And then we also had these people from the  
22 utilities. They use coal. They came for the NEC  
23 meeting and I don't know if they came and spoke here

1 yesterday, but they had before the meeting, we had  
2 intelligence that they were coming there to vote  
3 down this edition of the NFPA. So they were  
4 instructed. The thing of it was, the industry uses  
5 coal and coal dust is excluded from this document so  
6 they didn't have any, they weren't going to be  
7 affected by this document. So that's what I meant,  
8 and I understand that you are going to vote the way  
9 you are going to vote. But some of my comments are  
10 hoping to fix the process for the future because you  
11 come to the association meeting and whoever is there  
12 and then the association meeting just as I said just  
13 members paying their dues, not necessarily have any  
14 knowledge on the subject. And then so that process  
15 or is a different bias on the outcome. And then you  
16 come to the Standards Council meeting and as we know  
17 there is a default for the Standards Council  
18 meeting.

19               So I'm hoping that we'll be able to fix  
20 those as we go to the future because NFPA is the  
21 greatest organization and these are two flaws that I  
22 have detected.

23               THE CHAIR: Mr. Milke, anything

1 further.

2 MR. MILKE: No.

3 THE CHAIR: Any further questions from  
4 members of Council?

5 Gentlemen we covered a lot of ground.  
6 I'll give you just a brief couple of minutes if  
7 there are any closing remarks of any items that you  
8 haven't already covered. We certainly have the  
9 written material and like I said, you covered a lot  
10 of ground with the question. So Mr. URAL, I'll let  
11 you go first. Any closing remarks that you might  
12 have.

13 MR. URAL: Just a few I'll bring to the  
14 attention of your Standards Council, work that was  
15 done by Factory Mutual. I worked in Factory Mutual  
16 for 16 years. This was done on July of 1983  
17 FMRCJIOF1R2RK, thus explosion propagation and  
18 simulated grain conveyor galleries. In that work  
19 Factory Mutual scientists found that you can have  
20 explosion -- well, according to this edition of NFPA  
21 for that particular dust they had maximum allowable  
22 layer thickness was .05, 1/20th of an inch for the  
23 bulk correction. The FM scientists were able to

1 find out a test was .008 so it's more than, less  
2 than 1,000ths of an inch could propagate an  
3 explosion. And in a small scale gathering large  
4 scale gathering it was 100ths of an inch that could  
5 propagate an explosion. They haven't tested any  
6 less. So the chances are even smaller could be. We  
7 have people saying they use one inch thickness and  
8 they relied on this. They are assuming a risk  
9 obviously.

10 But the issue is 1 point that was made  
11 a new equations, from simple equation does not  
12 differentiate between energetic dust and not  
13 energetic dust. Neither does this. This doesn't  
14 differentiate. In fact we have written a paper for  
15 marginally explosible dust and presented and it has  
16 been reviewed widely in the technical society and  
17 got the paper award. The new methodology do  
18 differentiate between more hazardous dust and less  
19 hazardous dust. It has been said dynamic load  
20 factor is unknown. Dynamic load factor is going to  
21 be between, we have proof that it's somewhere  
22 between 1 and 1 and a half. And the standard says  
23 by default use one and a half, and if you do a

1 little bit of analysis you can show one is more  
2 reasonable value. And entrainment fraction we  
3 discussed that quite a bit but entrainment fraction  
4 goes from 0 to a hundred percent obviously and the  
5 committee picked 25 percent just to match this.

6           Mr. Chastain says vacuuming is hard,  
7 but they have to clean these dust all they have to  
8 do is weigh or they have to measure thickness and  
9 then use that thickness to go to using the bulk  
10 density and you go to mass, and then he also points  
11 out there are hills and valleys and they are  
12 difficult to measure the thickness. Again same  
13 problem here you're trying to measure the 1 third  
14 second of an inch dust layer and you try to do that  
15 in the corner you see like a lot thickest dust  
16 there, so you have to sort of average. I will stop.  
17 Thank you.

18           THE CHAIR: Thank you.

19           MR. CHASTAIN: Representing AF and PA  
20 and Georgia Pacific. One thing that we have not  
21 talked about in one of the complex equation, there  
22 is a .05 multiplication factor. What that basically  
23 means is that we sacrifice 5 percent of the people

1 in that area using the debt value. This is an  
2 equation developed by Erdem, debt factor was  
3 developed by Erdem accepted by the committee. I  
4 don't know if it's NFPA's position to accept  
5 5 percent out of a hundred loss of people based on  
6 using that number. Maybe that's something that we  
7 overlooked discussing, but I think that's an  
8 important value to think about. Also as far as the  
9 hills and valleys and the difficulties in measuring  
10 those hills and valleys, we haven't had that issue  
11 but over 200 cell book density measures we made  
12 across our Georgia Pacific mills over the past  
13 2 years. I also like to make a comment on if there  
14 is so many issues that existed with problems with  
15 the current edition of 2006, why are they now just  
16 being brought up? We have been using this document  
17 now for over, almost 3 years now trying to address  
18 dust issues in our industry, and we felt that this  
19 was the proper way to go about using this document.  
20 Now we're finding out that there is all kinds of  
21 problems with this document. Why weren't TIAs done  
22 or whatever mechanism NFPA has for addressing these  
23 problems with this document when they were realized.

1 Why talk about them now to promote putting in these  
2 new equations that haven't been fully validated yet.  
3 And also finally I'd like to ask that the Standards  
4 Council honor the floor vote of the membership at  
5 the Las Vegas convention which was overwhelming in  
6 favor of returning this document back to committee  
7 to work out these issues that were described on the  
8 floor of the convention that all the members heard  
9 and voted on.

10 THE CHAIR: Thank you.

11 MR. CHASTAIN: Thank you very much.

12 THE CHAIR: Mr. Cholin.

13 MR. CHOLIN: The only thing I would  
14 like to ask the Council to review is the  
15 substantiation on my committee ballot. I would like  
16 to mention earlier that expresses my position.  
17 These are some pretty detailed technical issues that  
18 need to be revolved, and I think the only way to  
19 resolve it is have the committee get back to work  
20 and to fix the document. Thank you.

21 THE CHAIR: Thank you. I am going to  
22 bring this particular hearing at a close. I do  
23 while on the record, though, Mr. Cholin, there is a

1 series of additional appeals that we have on NFPA  
2 654 that a couple of floor actions passed but not  
3 balloted to the committee because of the return, and  
4 a couple of items that weren't pursued on the floor  
5 I just want to understand from your perspective do  
6 all of these items address what we just went through  
7 in this issue about why the document should be  
8 returned? I'm trying to get a good sense of how  
9 we're proceeding whether we're proceeding in trying  
10 to fix all of these things that were just raised or  
11 are these different sets of issues that if the  
12 Council chose not to return the document these are  
13 different sets of issues to be addressed.

14 MR. CHOLIN: At least one is a  
15 different issue, and that's the appeal to accept  
16 comment I believe it's 33 which relates to return  
17 air diversion. If the document is returned then the  
18 technical committee will be dealing with those  
19 issues I'm sure, and I'm confident that the  
20 committee will fix the problems. If the document is  
21 not returned, then these are outstanding issues.

22 THE CHAIR: I am going to, this is a  
23 good opportunity to actually take a break. We'll

1    come back on these items.  One thing I'll remind,  
2    for these remaining hearings on 654 and it may be  
3    that we can do this in somewhat of a consolidated  
4    manner, recognize that in order for the Council to  
5    proceed, we can proceed on the written documentation  
6    that has been submitted as well.  We don't necessary  
7    have to have a hearing in order to consider those  
8    issues that have been brought.  However I don't want  
9    to deprive anyone the opportunity to -- that issues  
10   have been brought to the Council to be able to  
11   discuss those.  What I would like to understand is  
12   is perhaps if we reconvene that is there a way that  
13   these can be, since we have written documentation on  
14   it individually if you're given the opportunity to  
15   sort of describe that package of what would need to  
16   go on if the Council would not return the document,  
17   not giving into the technical detail necessary but  
18   describe overall what the impact of that is would  
19   certainly give the committee an opportunity to  
20   respond to that.  Would we be able to handle those  
21   in sort of a consolidated manner?

22                   MR. CHASTAIN:  I think.

23                   THE CHAIR:  I'll ask both of you if we

1 come back do you want an opportunity to be able to  
2 do that on the record or do you feel like written  
3 submissions are adequate. Mr. URAL.

4 MR. URAL: I'm representing the  
5 committee chair here and he is on the record, says  
6 certain things that has been tabled during the  
7 meeting was tabled at the request of Mr. Cholin.  
8 Therefore if you look at the last couple of  
9 paragraphs of his latest letter to you it says Now  
10 Mr. Cholin seeks to appeal the very action that he  
11 proposed from the floor as to CAM 6546 and 654 A. I  
12 came to the technical meeting fully prepared to  
13 speak against these motions. I was denied that  
14 opportunity. Since I am unable to attend the  
15 Standards Council meeting I will again be denied the  
16 opportunity to speak against the motions should the  
17 Standards Council decide to consider them. I  
18 protest most vigorously any further concentration of  
19 these motions.

20 THE CHAIR: Given that in the written  
21 submissions I am gathering your perspective there is  
22 not really anything else to add from the committee  
23 perspective either the fact they weren't brought up

1 on the floor and not debated is the position the  
2 committee chair is raising.

3 MR. URAL: I can talk about certain  
4 issues. Especially this return air diversion issue.  
5 It's conflicting other NFPA standard and it's  
6 unreasonable, dangerous.

7 THE CHAIR: We don't have to do it now.  
8 We just need to understand, Mr. Cholin do you need  
9 an opportunity to sort of package this for the  
10 Council or are the written submissions adequate from  
11 your perspective?

12 MR. CHOLIN: I think my committee  
13 ballot on the return of the document is sufficient.  
14 It addresses that in one paragraph on my committee  
15 ballot about 65433.

16 THE CHAIR: Given where we are and  
17 we're in still on the record, I am in the interest  
18 of trying to save time, both participants and the  
19 Council, given Mr. Cholin's statement and acceptable  
20 to you, Mr. Cholin, I would like to give you  
21 5-minutes to describe what you just described so we  
22 have it on the record. That would go along with  
23 Mr. Cholin's written statement that we have on the

1 record. Then we'll sort of have a complete piece of  
2 that, and I believe we can probably then proceed  
3 without doing hearings on the remainder.

4 MR. URAL: We get to go home early.

5 THE CHAIR: You get to go home early.  
6 We on the other hand have to stay for a while.

7 MR. URAL: Let me point out the issue.  
8 The return air duct, I serve on the NFPA 69  
9 committee which is responsible for explosion  
10 isolation.

11 THE CHAIR: Mr. URAL, you're speaking  
12 for the two items that you raised were CAM 654-6 and  
13 CAM 654-8 which were items that were not pursued on  
14 the floor because of the return motion on the  
15 document. Is that correct.

16 MR. URAL: I am going to talk about the  
17 abort case and which CAM is that?

18 THE FLOOR: 6.

19 MR. URAL: I will talk about that one.

20 THE CHAIR: Fine. Simply as you can.

21 MR. URAL: Among all this paperwork I'm  
22 lost too. I may be permitted to proceed?

23 THE CHAIR: Yes, please.

1                   MR. URAL: I serve on a number of dust  
2 committees like NFPA 654 and the wood dust and the  
3 agricultural dust or metal dust. I also serve on  
4 NFPA 69 committee, but we have noticed after several  
5 events that the isolation of explosion or what we  
6 call deflagration management is becoming more and  
7 more prevalent and people are recognizing the value  
8 of that. In the wood industry I guess and maybe  
9 paper industry because that's kind of material, they  
10 tend to rely on abort gates to prevent the fire  
11 getting into the building. But the thing is that is  
12 a good thing to prevent like the fire products to  
13 get into the building but it doesn't do any good if  
14 there is a deflagration or explosion propagating  
15 into the building. In fact, NFPA 654 annex material  
16 says, in Section A 714, abort gates cannot be relied  
17 upon to manage the deflagration. It gives you the  
18 warning but gives you the warning in code books.

19                   We have started noticing that people  
20 are using these and the vendors are selling these.  
21 If you ask them do these protect explosion from  
22 entering the building they say so sure, but they  
23 don't. As I pointed out I worked at Factory Mutual

1 for 16 years as a scientist. I also managed test  
2 sites and did lots of experiments, and I can tell  
3 the science and the data and the knowledge that we  
4 have, these abort gates do not work for explosion  
5 isolation.

6           So that is why we, the committee  
7 recognized this and with vast majority in the voting  
8 process they voted to bring this caution into the  
9 main body of the standard so that everybody knows  
10 and then false claims cannot be made. And I am not  
11 saying that the abort cases are useless. They  
12 certainly add value, but people tend to get false  
13 sense of security using those. So that's why I  
14 don't, I'm against Mr. Cholin's appeal on this.

15           THE CHAIR: Thank you. And thank you  
16 for being precise. Is there anything you want to  
17 say on 654-8.

18           MR. URAL: I don't know what that is.  
19 What was it?

20           THE CHAIR: This is the definitions of  
21 deflagration hazard and explosion hazard so that  
22 requirements in Chapter 7 would have an explicit  
23 definition.

1                   MR. URAL: That one already taken care  
2 with the TIA. I will stand on the record with that.

3                   THE CHAIR: Is there anything else with  
4 respect to those other issues that you would like to  
5 say on the record.

6                   MR. URAL: (Indicating).

7                   THE CHAIR: Mr. Cholin anything?

8                   MR. CHOLIN: I just have to respond to  
9 a little bit of what my friend Erdem, Mr. URAL has  
10 mentioned. When it comes to protecting the  
11 occupants of a facility from the dust collector and  
12 that's what we're talking about, there are two  
13 hazards. The one hazard is that the dust collector  
14 catches fire and with the return air duct that fire  
15 is now being ducted back into the building and the  
16 occupants are being subjected to the carbon monoxide  
17 and all the other sorts of bad things that are  
18 involved in the smoke plus bits of burning material.  
19 In most cases and I don't have hard data but this is  
20 something that perhaps the fire protection and  
21 research foundation wants to pursue but in most  
22 cases dust collector explosions are preceded by dust  
23 collector fires. We light off a fire in the dust

1 collector, it's burning, and one of two consequents  
2 occurs. Either it continues to burn or the bag  
3 cleaning system operates creates a dust cloud and  
4 then it goes boom. An abort gate operates in about  
5 250 to 300 milliseconds. When you started fire,  
6 usually less than a minute after the fire has  
7 started oftentimes seconds after the fire has  
8 started, the abort gate transfers and diverts all  
9 the smoke and everything out to the outside. If the  
10 dust collector then subsequently explodes, the force  
11 of the explosion and the combustion gases from the  
12 deflagration that caused the explosion go out the  
13 abort gate.

14                   So when the technical committee changed  
15 the requirements, and on page 3 of my committee  
16 ballot I think I stated fairly clearly they decided  
17 to put their return air diversion requirements in  
18 with the requirement for air material separators.  
19 That's a good idea, but then they lost the need to  
20 have an abort gate. And if you don't have the abort  
21 gate, I don't care what kind of deflagration  
22 suppression system you install, a deflagration  
23 suppression system will not respond to a dust

1 collector fire, so you have got a fire of 10 to 20  
2 maybe 30 megawatts pumping smoke into the building  
3 and bits of burning material into the building. And  
4 the deflagration isolation system just sits there  
5 because it requires pressure to actuate. And I note  
6 in my committee ballot that Rochester Shoe Tree  
7 burned down the place twice simply because they  
8 relied upon deflagration isolation, and the  
9 isolation did not prevent the burning material from  
10 going through the return airline back into the plant  
11 and setting the plant on fire.

12 THE CHAIR: Thank you.

13 MR. CHOLIN: Thank you.

14 THE CHAIR: Did you have a response,  
15 Mr. URAL. One minute.

16 MR. URAL: You made me forget my  
17 comment.

18 THE CHAIR: 30 seconds.

19 MR. URAL: The deflagration, we are not  
20 talking deflagration suppression. We are talking  
21 about deflagration isolation system. You can make  
22 it respond not only pressure you can make it respond  
23 to flame, heat, you can make it respond to anything

1 you want. That is not true. And I also wanted as a  
2 point of information, the comment I made does not  
3 reflect what Walt Frank, my own comment from my  
4 experience and my work at Fen Wall as well as in  
5 NFPA 69 committee.

6 THE CHAIR: Thank you. Members of  
7 Council is there anything you need on these  
8 particular issues? Seeing none I am going to bring  
9 this hearing to a close. Gentlemen I want to thank  
10 all of you for your participation in being here  
11 today. The Council greatly appreciates the  
12 information, it is vitally important for us to be  
13 able to make the decisions that we have to make, and  
14 we do appreciate your participation in the entire  
15 NFPA process.

16 With that we'll bring this hearing to  
17 close. I will mention decisions on these issues will  
18 be issued by Miss Cronin the secretary of the  
19 Council as written decision. No member of the  
20 Council nor member of NFPA staff is permitted to be  
21 able to convey what that decision is or the details  
22 of that decision, written decision, will be the only  
23 means of communication. Thank you again with that.

1 We'll bring this hearing to a close. We'll  
2 reconvene with our next series of hearings at 10:15.  
3 Off the record.

4 (Recess.)

5 THE CHAIR: Welcome back from break,  
6 everyone. I am going to bring this session of the  
7 Council back to order. Currently going to go ahead  
8 into Hearing Number 20, a series of agenda items  
9 that we have on some amendments or NFPA 13, 13 D,  
10 and 13 R. I'm structuring this hearing just a little  
11 bit different in light of a presentation that we  
12 have on some data. So let me do a quick summary of  
13 where we're and lay out for you kind of how we are  
14 going to proceed with the hearing and then we'll  
15 move on.

16 Essentially the Council has in front of  
17 them six tentative interim amendments. There is a  
18 summary passed out by staff that I think does a good  
19 job for Council at bringing this together. A series  
20 of these TIA, 994, 995, and 1,000 all deal with 13 B  
21 13 R and 13 about banning any type of completely  
22 banning any antifreeze of being in the system. The  
23 series of TIAs 996, 997, 998 discuss 50/50 solution

1 of antifreeze as well.

2           And I am going to go around the room,  
3 have the Council introduce themselves again for this  
4 particular item, have everyone around the side of  
5 the room introduce themselves as well. And then  
6 what we're going to do is we're going to get a  
7 presentation that came out of the National Fire  
8 Protection Research Foundation. After that  
9 presentation I am going give Council members an  
10 opportunity to ask questions about the presentation  
11 itself. When that is completed I'll bring up the  
12 various appellants and involved parties on the TIAs  
13 and have a more general discussion about the next  
14 steps with respect to all this. Is everybody clear,  
15 is Council clear on how we are going to proceed?

16           Very well. With that introduction  
17 being done, I'm Jim Pauley, chair of the Council.

18           MS. CRONIN: Amy Cronin, secretary to  
19 the Council.

20           MS. FULLER: Linda Fuller, recording  
21 secretary to the Council.

22           MR. BELL: Kerry Bell, member of  
23 Council.

1                   MR. HARRINGTON: J.C. Harrington,  
2 member of Council.

3                   MR. SYNDER: Michael Snyder, member of  
4 Council.

5                   MR. McDANIEL: Danny McDaniel, member  
6 of Council.

7                   MR. HUGGINS: Roland Huggins, member of  
8 of Council

9                   MR. JARDIN: Joseph Jardin, member of  
10 Council.

11                   MR. MILKE: Jim Milke, member of  
12 Council.

13                   MR. CARPENTER: James Carpenter, member  
14 of Council.

15                   MR. LEBER: Fred Leber, member of  
16 Council.

17                   MR. GERDES: Ralph Gerdes, Council  
18 member.

19                   MR. CLARY: Shane Clary, Council  
20 member.

21                   MR. FARR: Ronald Farr, member of  
22 Council.

23                   MS. BRODOFF: Maureen Brodoff, NFPA

1 staff, legal counsel to the Standards Committee.

2 MR. BERRY: Denise Berry, NFPA staff.

3 MS. CARLEY: Lorraine Carley NFPA

4 staff.

5 MR. DuBAY: Chris DuBay, NFPA staff.

6 MR. PILETTE: Maurice Pilette, Chair

7 Residential Sprinklers.

8 MR. PARANAMANA: Buddhi M, Paranamana

9 NFPA staff.

10 MR. BEMIS: Richard Bemis NFPA staff.

11 MR. LAKE: Jim Lake, NFPA staff. Staff

12 liaison to the automatic sprinkler project.

13 MS. OLDMAN: Kathleen Oldman, Fire

14 Protection Research Foundation.

15 MR. FLEMING: Russ Fleming, National

16 Fire Sprinkler Association.

17 MR. LEVITT: Russ Levitt, Intelligent

18 Corporation representing Trinity Health.

19 MR. VICTOR: Terry Victor Simplex

20 Grinell representing Tyco.

21 MR. ISMAN: Ken Isman, National Fire

22 Sprinkler Association.

23 MR. CLOUSE: Matt Clouse, NFPA staff.

1 MR. GOMEZ: Manuel Gomez, U.S. Chemical  
2 Safety Board.

3 MR. GALONA: Guy Galona NFPA staff.

4 MR. HAGUE: Dave Hague, Liberty Mutual  
5 Property.

6 MR. SAEHR: Tom Saehr, Liberty Mutual  
7 Property.

8 MR. GEDES: Kyle Gedes, Code  
9 Consulting.

10 MR. LEVIN: Jonathan Levin, NFPA staff.

11 MR. CHASTAIN: Brice Chastain, Georgia  
12 Pacific.

13 MR. CHOLIN: John Cholin, J.F. Cholin  
14 Consultants.

15 MR. DePew: Ryan DePew, NFPA staff.

16 MR. WOLLETTE: Ken Wollette, NFPA  
17 staff.

18 MR. WOLIN: Steven Wolin, Code  
19 Consultant.

20 MR. McCULLOUGH: Bob  
21 McCullough, NEC, just an observer.

22 THE CHAIR: Thank you. We'll remind  
23 everyone that this entire session is being recorded

1 by our stenotypist. If anyone speaks please preface  
2 your remarks with your name and affiliation so we  
3 make sure we attribute that correctly on the record.

4 I'm getting ready to turn this over to  
5 Mr. Wolin who is going to do some presentation on  
6 items. Let me mention what we're about to hear is  
7 some recent testing that was completed with respect  
8 to antifreeze solutions in automatic sprinkler  
9 systems. For the benefit of Council and everyone  
10 recognize this testing actually occurred after the  
11 TIAs went through the committee. So what results we  
12 have of the TIA and the material we have on it as  
13 right now is without the committee's having the  
14 benefit of this research data that is about to be  
15 presented. With that context of it in mind are  
16 there any statements from Council members that we  
17 need to have on the record? Mr. Bell.

18 MR. BELL: Kerry Bell, member of  
19 Council, and I would like for the record that I am a  
20 member of the technical committees on residential  
21 sprinkler systems, installation of sprinkler systems  
22 and also technical correlating committee, and I have  
23 been active in submitting comments on the TIA

1 ballots. I was endorser of TIAs 994 and 995. And I  
2 have been intimately involved in developing  
3 information and data relative to this issue and my  
4 role and responsibilities of Underwriters  
5 Laboratories. But I do want to note that I have no  
6 client interest in this. The UL admission is  
7 testing for public safety, and I also want to note  
8 as Jim Pauley indicated there is new information and  
9 data that has been developed the ballot had been  
10 circulated. I just want to say that in reviewing  
11 this issue in totality and also looking at my  
12 obligations under the guide and conduct participants  
13 in the NFPA process that I concluded that I do not  
14 have any views that are or would appear to be fixed  
15 concerning the issues. I'm fully able to give open  
16 and fair consideration of this appeal and for the  
17 record therefore, I have considered the matter, that  
18 I believe that I can fully, fairly, and impartially  
19 fulfill my role as Council member on this appeal.

20 THE CHAIR: Thank you. Mr. Huggins.

21 MR. HUGGINS: Roland Huggins, member of  
22 Council. For the record, I am recusing myself on  
23 this agenda item. I will not participate as a

1 member of the Standards Council in the hearing  
2 deliberations or voting on this matter.

3 THE CHAIR: Thank you. Mr. Gerdes.

4 MR. GERDES: Ralph Gerdes, Council  
5 member. I would like to note for the record that I  
6 am a member of the technical committee on sprinkler  
7 system installation criteria. As a TC member I  
8 participated in consideration and voting on issues  
9 that appear to be related to this. I have therefore  
10 reviewed my obligations under the guide for conduct  
11 of participants in the NFPA process, particularly  
12 Section 3.5 D of the guide to consider whether there  
13 is any reason for me to recuse myself from  
14 consideration of this appeal. I have concluded that  
15 I do not have any views that are or would appear to  
16 be fixed concerning the issues and I'm fully able to  
17 give open and fair consideration to this appeal.  
18 For the record therefore, I have considered the  
19 matter and I believe that I can fully, fairly, and  
20 impartially fulfill my role as a Council member on  
21 this.

22 THE CHAIR: Thank you. Any other  
23 statements from Council members? Thank you. Mr.

1 Wolin, I am going to turn it over to you for the  
2 presentation. I would ask you keep in mind that the  
3 stenotypist is trying to keep up with you at the  
4 same time. So sort of remember that as you go  
5 through your presentation.

6 MR. WOLIN: I have got a lot of  
7 material that I am going try to cover if a  
8 relatively short period of time here. But I'm  
9 trying to speak clearly so you can get it all.

10 Thank you, Mr. Chairman, and thank you  
11 to the Council for your time today. I am not sure,  
12 and there was a brief introduction here on this  
13 matter, but what I am going to talk about is a  
14 research project by the Fire Protection Research  
15 Foundation to look into antifreeze solutions in home  
16 fire sprinkler systems. And that is the topic of  
17 this presentation. There are certain types of  
18 sprinkler systems that use antifreeze solution  
19 typically propylene glycol or glycerine but there is  
20 a couple of others permitted. And these have been  
21 allowed by NFPA 13 in one version or another for  
22 well over 60 years now.

23 There has been a couple of recent fire

1 incidents that have caused some concern with certain  
2 antifreeze solutions in residential occupancies.  
3 Code Consultants Inc. was hired by the Foundation  
4 earlier this year to perform a literature search and  
5 to develop a test plan to look into the use of  
6 antifreeze solutions in home fire sprinkler system.

7           It's taken on two phases. First was  
8 the literature test plan. The second phase has been  
9 testing that was conducted and actually just  
10 finished up on Monday at Underwriters Laboratories  
11 to look into this issue further. A photograph of  
12 really prompted a lot of this, a fire and alleged  
13 explosion back in August of 2009 in Truckee,  
14 California, and we'll look at this in a little bit  
15 more detail later. As part of the first and second  
16 phases of the project, CCI was involved as the  
17 engineering contractor to the Foundation. The  
18 second phase of the project Underwriters  
19 Laboratories was hired for testing services as part  
20 of that. As a Foundation project there was a  
21 project technical panel who reviewed the work and  
22 will be putting together a report to submit to the  
23 Council on the work as of now, and we have had

1 general review of that work by the technical panel.  
2 Research in the second phase was sponsored by, in  
3 addition to National Fire Protection Association but  
4 the A F S A, N F S A and Tyco Viking Reliable. In  
5 particular, Viking provided significant support and  
6 logistical support in the testing to allow it  
7 happen.

8           There was a phase 1 report that was I  
9 believe attached to the TIAs that you have that  
10 summarizes the literature view and the research plan  
11 that was developed for this earlier in May. So this  
12 is not something that antifreeze and springer  
13 systems is not something that got put in the code  
14 last year or 10 years ago or 20 years ago. Some new  
15 thing t hat all of a sudden there is an issue.

16           This is the 1940 edition of National  
17 Board of Fire Underwriters pamphlet Number 13.  
18 Mr. Lake was kind enough to dig that out for us  
19 which was the first indication that we saw of  
20 antifreeze solutions in NFPA 13. 1953 we ended up  
21 with tables that kind of look a lot like what is in  
22 the code now but there were some changes made back  
23 in 2002 to update some of the data. But as early as

1 1953 even, you'll see that glycerine and propylene  
2 glycol antifreeze solutions were permitted in fire  
3 springer systems by NFPA 13.

4           When I talk about this I am going to  
5 mention a lot of times NFPA 13 but the requirements  
6 of 13, 13 R and 13 D are very similar. I think in  
7 what we're doing here you can consider it  
8 interchangeable from what I'm talking about.

9           The table from NFPA 13 on antifreeze  
10 solutions that permitted for systems connected to  
11 potable water supplies, notice it permits glycerine  
12 solutions of 50 percent, 60 percent and 70 percent,  
13 and propylene glycol between 40 and 60 percent,  
14 currently. In terms of freeze protection which is  
15 the point of putting antifreeze in the system, we  
16 end up with for glycerine for instance 70 percent,  
17 freeze protection of 25, at 60 percent negative 40,  
18 at 50 percent negative 19, and at 40 percent all of  
19 a sudden it's real close to zero. Propylene glycol  
20 goes from a low freezing point at about 60 percent  
21 and negative 60, and if we get down to 40 percent  
22 it's negative 6. Real important to remember as we  
23 go through this because depending on this limitation

1 it's really going to change the applicability of  
2 these types of systems.

3           One thing to keep in mind and something  
4 that has become a little bit, I get a lot of  
5 questions about it is glycerine has a dip in the  
6 freezing point. So that pure glycerine actually has  
7 a freezing point that is well above zero. Pure  
8 water has a freezing point of 32 of course, and when  
9 you mix the two of them, the minimum freezing point  
10 occurs at about 60 percent. So the use of  
11 70 percent glycerine doesn't make any sense from a  
12 freezing protection standpoint. That even just  
13 freeze protection considered, no antifreeze solution  
14 should be, glycerine should be above 60 percent.  
15 For nonpotable water supplies you can also use  
16 glycerine propylene glycol, but there is also  
17 diethylene glycol and ethylene glycol. The research  
18 focused on glycerine propylene glycol because those  
19 are believed to be much more common.

20           There were some questions early on  
21 about the fire incident out in California on how the  
22 solutions glycerine propylene glycol mixed with  
23 water whether there might be pooling of the chemical

1 or pooling of that low in a system. So that, for  
2 instance, the water and the glycerine propylene  
3 glycol wouldn't be mixed and that amount of solution  
4 that comes out of the sprinkler system might be some  
5 higher concentration. This was part of the first  
6 part in the literature search. That's very, very  
7 unlikely and really not a possibility for a mix  
8 solution. Both glycerine and propylene glycol are  
9 missible in water and fully missible in water  
10 meaning if you mix a lot of glycerine and a little  
11 bit of water they mix evenly, stay mixed, that is  
12 not going to change unless there is some major  
13 chemical operation is done to it. And if you mix a  
14 little bit of solution with a lot of water same  
15 thing happens, mixes every evenly and stays mixed.

16           These are the molecular hormones for  
17 glycerine and propylene glycol. They are similar.  
18 The only difference is one oxygen molecule and they  
19 behave fairly similarly. When we look at some of  
20 the fire test videos, you'll notice these are both  
21 alcohols. So when they burn they burn with kind of  
22 a clear blue flame like you would see for ethenol or  
23 methanol.

1                   This research is focused only on  
2 residential sprinkler systems. Residential  
3 sprinklers are somewhat different from normal  
4 standard commercial sprinklers. They have a special  
5 water distribution pattern and you'll see that spray  
6 pattern from the sprinkler plays a significant role  
7 in whether the solution can ignite or not.

8                   There is special approval standards for  
9 residential sprinklers, and primarily UL 16 26 and  
10 FM 20 30. And they include tests that check the  
11 spray distribution in the sprinkler, also includes  
12 fire tests in a room enclosure with a specific fuel  
13 package that we'll talk about in a minute that  
14 evaluate whether a given residential sprinkler can  
15 control a fire condition and maintain tenable  
16 conditions within the enclosure.

17                   There is a couple of pieces that are  
18 very important to this. One is the droplet size  
19 distribution from the sprinkler system. And the  
20 other is how different droplet size distributions of  
21 chemicals burn. There is a difference between a  
22 pool of liquid and taking that same liquid and  
23 either -- and disbursing it or spraying it in the

1 droplets, and they burn differently and there might  
2 be a solution that is not easy to ignite when it  
3 pools, but when divided into small droplets becomes  
4 very easy to ignite.

5           There is a technique out there to look  
6 at the droplet distribution from sprinklers, but  
7 this is really an area of ongoing research. So  
8 there has been some work done at NIF. Work done at  
9 Underwriters Laboratories, and Andre Marshall, in  
10 Maryland really has taken that on as a major  
11 emphasis in his research to look into droplet  
12 distributions of sprinklers. But it's very  
13 complicated. So it's really an ongoing area of  
14 research in looking at the droplet size distribution  
15 of sprinklers and whether or not it creates  
16 something that can burn. State of the art is not  
17 quite there yet.

18           These are photographs that Doctor  
19 Marshall was kind enough to provide us for the  
20 droplet distribution from a specific sprinkler and  
21 how it works. One thing in our research we look at  
22 different orifice size sprinklers different K  
23 factors. But a K factor doesn't tell you everything

1 about what droplet comes out of a sprinkler.  
2 Another piece is how that deflector is designed,  
3 what operating pressure it is at, and if you look at  
4 different manufacturer's sprinklers and the same K  
5 factor you'll notice that these time slots, the  
6 design of this deflector changes and that changes the  
7 distribution of the droplets.

8           The other thing you will notice in some  
9 of these photographs, it's not a spray of all  
10 droplets that are one size. It's not a spray of all  
11 hundred micron, 2,000 micron droplets. There is a  
12 variety of size, concentrations that change  
13 throughout the spray. And there is a good example.  
14 These are photographs taken of two different  
15 manufacturers of sprinklers 5.6 K factor heads at  
16 the same operating pressure, and if you look at the  
17 spray pattern from this sprinkler versus this  
18 sprinkler, significantly different. Both work, both  
19 are listed, and both would control the fire system  
20 in a home, fire situation at home, and there is  
21 nothing wrong with either one, just different.

22           So in terms of looking at this, there  
23 was a thought in some fundamental research these are

1 the kind of droplet size distribution we get from  
2 sprinklers. These are the droplets size  
3 distributions that ignite and put those two together  
4 and come up with an answer. Well, there is some  
5 information lacking on both sides, and just a little  
6 bit too complex at this point to put that together  
7 real well.

8           The other side is the flammability of  
9 liquid. A lot of different properties and liquids,  
10 most of them are about pools of liquids or for gases  
11 and for vaporized liquid. Upper flammability limit  
12 lower flammability limit, the high end low end of  
13 concentrations of liquid that can ignite, flash  
14 points a common measure, auto ignition boiling point  
15 all these that are indicators of what a liquid is  
16 going to do. None of them tell us specifically what  
17 is going to happen with a cloud of droplets that  
18 ignite. The flash point, for instance which is  
19 probably the most common indicator of flammability  
20 of a liquid has no real relationship with the  
21 flammability of the mist or a vapor of that liquid.  
22 They don't correlate directly.

23           We looked at together and put together

1 a table of different properties that are available  
2 on these. And you'll see that there are some  
3 differences between each of the antifreeze pure  
4 antifreeze chemicals that are permitted by NFPA 13.  
5 The flash point varies from 210 to 390. You'll see  
6 that even though the flash point of glycerine is  
7 very high, it can still be ignited at certain  
8 concentrations out of a sprinkler system. Auto  
9 ignition temperature, boiling point. There is data  
10 but I don't think it give us a real conclusion.

11 So I'll talk about what we did as a  
12 result of that in a minute. In the meantime, we  
13 looked at and Chris DuBay I think did a fairly  
14 extensive search trying to look at, well, this has  
15 been in the code for 60 years plus. How many times  
16 have we had an incident with something like this.  
17 And Chris was able to find two fire incidents, two  
18 fire reports allege that antifreeze solutions in  
19 sprinkler systems caused some kind of explosion or  
20 other condition. The more recent one was in  
21 Truckee, California in August of last year. It was  
22 in an apartment complex. Allegedly the occupant was  
23 cooking onions in cooking oil. The oil ignited in

1 the pan. The sprinkler in the kitchen activated.  
2 And the best information that is out there I think  
3 is that there was about 71 percent glycerine in that  
4 system, and allegedly that glycerine ignited,  
5 exploded, and there was at least one fatality in  
6 that incident.

7           The other incident was in Monack, New  
8 Jersey, back in 2001. It was a restaurant seating  
9 area protected by an outdoor seating area with a  
10 canopy above it, protected by sidewall sprinklers  
11 contained propylene glycol water mix not exactly  
12 clear what the concentration was but had that in  
13 there. There was no initial fire from the report.  
14 There were heaters, gas fired heaters under that  
15 canopy and the feeling that activated the sprinkler.  
16 After the sprinkler was activated allegedly there  
17 was a flash fire as the spray hit the heaters.

18           So these are photographs of the  
19 incident in California last year. You'll see the  
20 window that was damaged. This is the fire room.  
21 The interesting part about it, so there is some  
22 areas that show significant damage. The windows,  
23 the door frame, the melting of the light fixture up

1 here, but for a fire scene that looks incredibly  
2 clean. The doorway that was allegedly blown out by  
3 the fire, photograph, that melted. A little bit of  
4 charring or deposits on the door but very, very  
5 clean. This is a photograph of the blast that was  
6 blown out from the incident.

7 More recently, and this was about  
8 2 months ago, there was a fire in an apartment  
9 complex in Harriman, Utah. The system contained  
10 glycerine water antifreeze mixture. The fire  
11 allegedly started by a child playing with matches  
12 who ignited a cushion in the living room. Sprinkler  
13 system activated and allegedly there was an  
14 explosion that resulted. And that's the photograph  
15 of the apartment complex. The fire started in the  
16 living room, sprinkler activated in several  
17 locations in the house. Photograph of the window.  
18 That's the fire scene where the cushions were and  
19 the lamp shade show some evidence of fire, but the  
20 remainder of the space looks very clean and very  
21 little damage. Photographs of the sprinkler. Drop  
22 down flap. That was K 4.9, I believe and the  
23 Truckee incident was also a 4.9.

1                   So we looked at prior research that had  
2    been done on antifreeze sprinkler systems to see if  
3    there was information out there to provide guidance.  
4    The major piece of research was done by SP the  
5    Swedish Technical Research Institute. There also  
6    has been some followup by Factory Mutual and UL  
7    provided some test data for testing it did in  
8    manufactured housing some years back. The SP  
9    research looked at different antifreeze solutions  
10   including propylene glycol and glycerine. They ran  
11   small scale tests with liquid fuel that ignited a  
12   small wood crib, left the wood crib get to a steady  
13   heat release rate and then had applicator nozzles  
14   that sprayed antifreeze solution on that crib at  
15   about .78 cpm. And they measured the heat release  
16   rate over the course of that application. Notice  
17   that they tested in terms of mass fraction at least  
18   39 percent glycerine 57 glycerine so that's about  
19   35 percent by volume, a little over 50 percent by  
20   volume glycerine. And they found that there was  
21   some increase in the heat released, emergency  
22   release from the fire condition when the antifreeze  
23   was applied in that small quantity.

1                   They concluded that the energy or the  
2 contribution of energy of the fire by the antifreeze  
3 solution may need to be considered in sprinkler  
4 systems in some applications. And that there were  
5 some increase in the heat release rate when  
6 propylene glycol and glycerine antifreeze solutions  
7 were applied. F M did further testing somewhat  
8 similar to the S P testing. On 35 percent and  
9 50 percent propylene glycol solutions and found that  
10 there was, for instance, the test with water alone  
11 they had a average heat release rate during the  
12 steady burning period of the crib of 7.72 kilowatts  
13 which tells you how small these tests were not a  
14 very big fire. And during the application of  
15 50 percent propylene glycol that went up to a little  
16 over 10. So they had an increase in the heat  
17 release rate and applied the antifreeze.

18                   They found that application of the 50  
19 percent propylene glycol solution raised the fire's  
20 heat release rate above the heat release would be  
21 there if there was no application of water or  
22 antifreeze solution at all. So just a free burn  
23 condition that the application 50 percent propylene

1 glycol was worse than that for this configuration.  
2 They found 35 percent propylene glycol solution was  
3 neutral and that it was very similar to the delay in  
4 application of water during a dry pipe system.

5           UL I think had the most direct research  
6 on this topic prior to what happened this year.  
7 They ran tests on manufactured houses for FEMA. Now  
8 these didn't use normal sprinklers either. These  
9 used a very small orifice sprinkler and the testing  
10 was done to look at the ability to suppress fires  
11 with very small water supplies.

12           The result of the test, very quickly,  
13 they found and they were trying to use small supply,  
14 a hundred gallon of water, 50 gallons of water and  
15 then a hundred gallon of 50 percent glycerine  
16 mixture, and they were not able to control the fire  
17 condition using the 50 gallons of water, but the two  
18 tests with the hundred gallons of water and the test  
19 of 100 gallon 50 percent glycerine solution were  
20 able to suppress the fire.

21           Based on the results of the literature  
22 served which was basically the project we just went  
23 through, we put together a research plan that

1 outlined a need for additional testing on antifreeze  
2 solutions in residential systems at various  
3 concentrations. The research plan really focused on  
4 two parts. The first part was look for a potential  
5 of flash fire from antifreeze sprays. That would be  
6 a very large fire event. That probably couldn't  
7 happen for any significant amount of time before it  
8 was a problem.

9           The second part of it was to look at,  
10 let's say that we don't have a flash fire. It's not  
11 a hundred percent or a 500 percent increase in heat  
12 release rate but say increases heat release rate by  
13 10 percent or 20 percent. Will that stop a  
14 residential sprinkler system from controlling a fire  
15 and maintaining tenable conditions. Even if it's  
16 not a big event, but small change, and small change  
17 enough to cause a problem.

18           As part of or during the time we were  
19 doing the literature search and research plan in  
20 phase 1 of this project, UL conducted, this was on  
21 their own, not part of the Foundation, conducted  
22 some preliminary tests of the propylene glycol and  
23 glycerine solutions. The tests, some were conducted

1 in the open, some of them were conducted in a  
2 three-sided enclosure with the four side open to the  
3 big lab, and the ignition source was a 12-inch pan  
4 of cooking oil. Test room looked kind of like this.  
5 The oil pan actually moved during the test to look  
6 at the effect of location. Sprinkler located in the  
7 center of the room, and the solutions of 50 percent  
8 glycerine, 60 percent propylene glycol and 70  
9 glycerine were tested.

10                   What they found is that the location of  
11 that fire condition with respect to the sprinkler  
12 played a major role in whether or not there could be  
13 ignition of the spray. And the major results of  
14 this is that 70 percent glycerine solutions with the  
15 cooking oil fire in close proximity to the sprinkler  
16 caused ignition of the sprinkler spray that  
17 basically engulfed the entire spray and flames and  
18 eventually the room filled with flames and flames  
19 extended out of the three sided enclosure at the  
20 lab. That was with the 70 percent glycerine  
21 solution. That fire continued and actually put  
22 other the initial fire. The initial fire in the  
23 cooking oil pan was extinguished. The fire in the

1 antifreeze spray continued until the sprinkler was  
2 shut off. There was a similar incident with a  
3 60 percent propylene glycol solution although that  
4 fire was a little bit different and continued for  
5 about a minute, and then went out on its own, but  
6 both 60 percent and 70 percent, 60 percent propylene  
7 glycol and 70 percent glycerine solutions were found  
8 to have very substantial ignitions under certain  
9 conditions.

10           The 50 percent glycerine solution was  
11 tested in the open with a pan of heptane, was tested  
12 in the enclosure with cooking oil pan and none of  
13 the conditions did the 50 percent glycerine solution  
14 exhibit that behavior. The research also provided  
15 good information but not only is fire source was  
16 very very important but also the type of sprinkler,  
17 the operating pressure, and the type of  
18 concentration of antifreeze solution played a role  
19 in whether a substantial ignition can occur. This  
20 further highlighted a need for additional testing.

21           And so the foundation put together a  
22 group of sponsors and CCI developed a test plan to  
23 look into antifreeze solutions and home fire

1 sprinkler systems. At that point a contract was  
2 awarded CCI, contract to UL to carry out that  
3 research. And just to point it out again, to be  
4 very clear about this, the first part of the testing  
5 refer to scope A was only a look at the potential  
6 for this large scale ignition of spray that we saw,  
7 70 percent solution UL prior had, and scope B was  
8 designed to look at if that didn't occur if we had a  
9 solution where we know that wasn't going to happen  
10 could that solution still control a fire condition,  
11 would there still be problems with that.

12           So the test plan put together looked at  
13 different variables propylene glycol solutions ended  
14 up being 40, 45, 50, 60 percent. Glycerine solution  
15 at 50, 55 percent. Range of heights, the sprinkler  
16 from 8 feet up to 20 feet and the thought was that  
17 most residential applications probably are 8-foot  
18 ceilings but there are some double height spaces in  
19 houses that might get up to 19, 20 feet so we wanted  
20 to see if that changed impact. We looked at  
21 antifreeze solutions in most cases that was in the  
22 80, 90 degree range, that was the temperature  
23 solution we had. We ran a test to look at what

1 happened if the antifreeze solution start at -- so  
2 there is sprinkler pipes in someone's attic that  
3 need protection in the winter. During the summer  
4 it's much hotter than the outside and maybe that  
5 solution is warm.

6           We considered the position of the fire  
7 with respect to the sprinkler which turned out to be  
8 very important in UL test by using ignition source  
9 that was very long. And here is a diagram of it.  
10 We had an ignition source that extended from the  
11 locations of sprinkler out 8 feet so that we could  
12 get several portions of the spray distribution in a  
13 single test.

14           We also looked at 6 different sprinkler  
15 models and we looked at the effect of the pressure  
16 on whether ignition had occurred. So when the tests  
17 were run the sprinkler spray was started at  
18 approximately 10 psi and ramped up during the test  
19 to 150 psi. And so we ended up getting a range of  
20 data on sprinkler flow rates pressure at a single  
21 test.

22           The first portion of the scope A  
23 testing was to look at ignition sources. And the

1 thought here was not to have, was to consider  
2 whether it was possible to ignite that spray. So we  
3 wanted an ignition source that was very strong and  
4 it wouldn't be put out when the sprinkler spray got  
5 to say 40 or 50 50 psi, but if it was at a hundred,  
6 120 psi the spray would ignite, and we never got  
7 there with ignition source. So what we wanted was a  
8 strong continuous ignition source that had the  
9 potential to ignite the spray if it was possible.  
10 There were two different pans of heptane that were  
11 looked at. 6-inch wide, 12-inch wide to see what  
12 the effect of that was. There was also a set up of  
13 electric range coils that were considered a  
14 potential emission source, heat up to a very high  
15 temperature and potentially vaporize the antifreeze  
16 solution causing ignition, and then a spray burner  
17 set up was used because it provided a very, very  
18 level and even heat release rate and it was designed  
19 with four nozzles to spread out the flames over the  
20 length of the discharge and then a metal grate above  
21 that to vaporize additional fluids.

22                   These are photographs showing each of  
23 the ignition sources that were investigated, and

1 this is the first set of data out of the analysis.  
2 And this graph, see a lot that look kind of like  
3 this, show the increase in heat release rate in  
4 kilowatts. And then over the baseline heat release  
5 rate of ignition source versus the flow rate through  
6 the sprinkler. Flow rate takes into account the  
7 difference of the flow rate and different density  
8 rate of antifreeze solution going through it. And  
9 what this shows is that for the 60 percent propylene  
10 glycol solution that from UL prior testing was going  
11 to have some concerns that we saw increases in heat  
12 release rate and we had initial fire that let's say  
13 was 60 percent, initial fire anywhere from 600  
14 kilowatts to say 1.4 megawatts, that increase in  
15 heat release rate to over 10 megawatts because of  
16 the emission of the spray.

17           Several of the tests were terminated  
18 early because the fires got very large and no need  
19 to run them any further, but you will notice that  
20 both of the heptane pans and the spray burner were  
21 all able to cause ignition to the 60 propylene  
22 glycol spray, electric coils didn't work out so  
23 well, they were cooled off by the spray and didn't

1 cause ignition. And you'll notice that the spray  
2 burner had a somewhat greater increase in heat  
3 release rate than the other fire sources.

4           This is a video of test with 60 percent  
5 propylene glycol solution, 6-inch wide by 8-foot  
6 long pan of heptane, and give everybody a feel for  
7 when I talk about ignition of the spray, this is 60  
8 percent propylene glycol, we knew from prior test  
9 was a bad actor, and this visually shows you what  
10 happened. This video has been edited a little bit  
11 it's about an 8-minute 10-minute test so I've cut  
12 off pieces of it and pulled it together to see the  
13 transition so we can get through this in a timely  
14 fashion. You can see the sprinkler which is located  
15 right about here, just activated. And the pressure  
16 of the flow through that sprinkler is being ramped  
17 up. The 6-inch heptane pan with the initial fire.  
18 This testing was conducted at UL large scale  
19 calorimeter so we got heat release data throughout  
20 the test.

21           This is a little bit later in the test,  
22 the pressure is being ramped up, and you'll see  
23 there was just a burst of flames that came out of

1 one side. There is flames that sprayed, ignite,  
2 flames break off. They continue through the spray  
3 of antifreeze solution.

4           So if you recall at the beginning the  
5 fire was about that tall or so, and now we have fire  
6 that is extending up above there. One of the issues  
7 brought to us was well could we have an explosion  
8 from this. And really in our research we didn't  
9 look specifically an explosion because whether this  
10 is a flash fire explosion depends on whether  
11 confined with an enclosure or not. So what we  
12 looked at in our research was potential for a large  
13 flash fire. If we have a large flash fire then  
14 there certainly is a potential to have explosion if  
15 it's confined.

16           And that's the sprinklers off and back  
17 to the original fire position. So then we tested  
18 50 percent propylene glycol and we started to see  
19 some differences between the performance with each  
20 of the ignition sources. You'll at the 6 inch  
21 heptane pan 50 percent propylene glycol solution not  
22 much of an increase at all. Pretty steady. And if  
23 we had a fire source, initial fire source that

1 reacted to water and actually went out, unlike the  
2 heptane which tends to be very, very difficult to  
3 extinguish, probably would have controlled that fire  
4 condition. The 12 inch heptane pan had initial  
5 increase of heat release rate up to a certain  
6 pressure, and then after that basically the solution  
7 won the battle and the fire started to go out in a  
8 large portion of the pan. Spray burner continued  
9 increasing in heat release rate over the full course  
10 of the test until terminated. So that sprinkler  
11 burner not only maintained a steady heat release  
12 rate, very produceable, but it was also capable of  
13 igniting the spray to be ignited over a range of  
14 pressures.

15           This is a video of the 12-inch wide  
16 8-foot long heptane pan, 8-foot high sprinkler  
17 located right here. That's the initial fire  
18 condition. And you'll see again this is going to  
19 skip through some pieces because I want to get this  
20 done in a timely fashion, you have the initial fire  
21 sprinkler activates, a little bit of spray coming  
22 out of it now. Fire size is going to increase,  
23 keeps increasing up to the point, and you'll see the

1 ignition and vapors coming out of the spray that  
2 ignite back there. After a certain pressure, a  
3 portion of the initial pan gets put out and the fire  
4 is just really located on the end. So it's one of  
5 those situations that shows the complexity of this.  
6 That certain operating pressures, low pressure  
7 performs just fine. At certain pressures we have a  
8 large increase in rate and higher pressures pretty  
9 well put the fire out.

10 We ran tests with several models to see  
11 what it is impact of the different sprinklers on the  
12 potential for ignition. You'll see that K3.1  
13 sprinkler, K4.9 springers were able to cause very  
14 significant ignitions of large portions of sprinkler  
15 spray. The sidewall sprinklers that were tested  
16 were somewhat less and seemed to trail off with  
17 pressure, and I think that was because of the  
18 momentum of the pressure started to put out that  
19 unusual fire at higher pressure, kind of what you  
20 saw in the last video with the higher pressure of  
21 the heptane pan. K7.4 sprinkler those particular  
22 tests went actually very well, showed very little  
23 increase in the heat release rate.

1                   We also looked at what the effect of  
2 height, is it possible 8 feet, is the worse case or  
3 the best case or what happens when we change the  
4 height. Well, really depends on the solution. For  
5 a real bad actor, one end of the spectrum, 60  
6 percent propylene glycol, 8 feet, 20 feet doesn't  
7 matter both of them ignite and fairly substantial  
8 increase rate. For 40 percent propylene glycol  
9 solution it performs very well, 8 feet, 20 feet  
10 again doesn't really matter because both of them  
11 have very little increase of heat release rate.  
12 That middle ground 50 percent propylene glycol  
13 solution is where we saw some difference. We had an  
14 8 foot test where the heat really started to  
15 increase very significantly. And a 20 foot test  
16 where there was some increase, but major difference  
17 between the performance at 8 feet and 20 feet, and  
18 really the spray, the sprinkler spray that hit the  
19 fire condition at 8 feet has a lot of momentum and  
20 it's a very different spray from what hits the fire  
21 from the sprinkler at 20 feet. From 20 feet looks  
22 like rain. It's really what it looks like. And  
23 there is a wide variety of concentrations and

1 mixtures of antifreeze droplets in the room and a  
2 lot of the moment gets dominated by the flow from  
3 the fire itself and the hot gases arising from that  
4 as opposed to a sprinkler 8 feet where all that  
5 momentum from the sprinkler really takes over the  
6 flow and just a very different condition.

7           We looked at the difference between a  
8 heated solution and unheated solution. I put this  
9 on the same scale as those prior so we can put it in  
10 perspective. There may be some difference between  
11 heated and unheated solutions over the temperature  
12 range that we're really interested in but it's not  
13 nearly as significant as the concentration of  
14 antifreeze or the sprinkler that is used or the  
15 operating pressure.

16           This is really, I think a very  
17 important slide for the TIAs that have been  
18 submitted and the deliberations that are going to  
19 happen. This shows the different antifreeze  
20 solution and concentrations that were tested under  
21 the same conditions. This is what the K 4.9  
22 concealed sprinkler 8 feet above the floor and we  
23 see a 55 percent glycerine solution which is the

1 yellow circles. A 50 percent propylene glycol  
2 solution, the red squares that have major increases  
3 in heat release rate. We had an initial fire that  
4 was about a thousand, 1400 kilowatts, and we get  
5 400 percent increase. So that's really something  
6 that's very bad. The 45 percent propylene glycol  
7 solution is kind of middle of the road. There is an  
8 increase that is not nearly as bad as the 50 percent  
9 propylene glycol, glycerine but still a fairly  
10 substantial increase. And the 40 percent propylene  
11 glycol and 50 percent glycerine solutions kind of  
12 hover around neutral. I think there is going to be  
13 significant discussion about the 50 percent  
14 glycerine solution. That's really in terms of  
15 freeze protection making something useful especially  
16 for home fires sprinkler systems with plastic pipe  
17 where propylene glycol is not appropriate needs to  
18 be a glycerine solution.

19           So I have put in a couple of graphs  
20 that show the worst case test with glycerine and  
21 instead of being increased in heat release rate this  
22 is the actual heat release rate measured during the  
23 test where we have an initial fire source that is

1 about 1400 kilowatts or so, and that fire source is  
2 not one that can readily be put out by the  
3 sprinkler system. So it's going to stay there and  
4 keep burning when a lot of other fuel sources would  
5 be extinguished.

6           This very severe scenario, we have  
7 increase in heat release rate of 150 percent or so  
8 but there is not large portions of the spray  
9 igniting. It's really just the water that hits that  
10 significant ignition source that burns. This is a  
11 test at 20 feet worst case for that, very similar a  
12 couple of peaks, but about the same result.

13           This last video I'm going to show is a  
14 test with the heptane spray burner, sprinklers at  
15 20 feet. A little hard to see but the sprinkler is  
16 all way up here. This is a very significant initial  
17 fire condition. The spray from the sprinkler just  
18 started and this is a 50 percent glycerine solution.  
19 So the test data we just looked at it. And what you  
20 are going to see as the pressure flow rate of the  
21 sprinkler increases there is going to be some change  
22 in the fire condition. There is a lot of velocity,  
23 a lot of momentum coming out of the sprinkler at a

1 higher pressure so it's going to blow around the  
2 fire. There is going to be mist filling the room.  
3 The mist is going to be all through the room,  
4 vapors, you see all this mist and vapor from that.  
5 The initial fire is consumed in that vapor, pushed  
6 around by it. But what you don't see is major  
7 extension of the flames. Away from there you don't  
8 see explosion in the room, the room didn't fall  
9 apart. It really had the fire enveloped in this  
10 mist. The fire burned like it was going to do  
11 anything and the mist stayed there. Didn't burn  
12 didn't get involved.

13           Based on the results of scope A we had  
14 a fairly good feeling that 50 percent glycerine  
15 solution 40 percent propylene glycol solution were  
16 not real bad actors in all this, that if they were  
17 put on a residential fire condition that there  
18 wasn't a likelihood of having an explosion or big  
19 flash fire from it.

20           The next question we answered with the  
21 scope B testing, okay, let's say when we saw there  
22 was some increase in the heat release of that fire  
23 condition with the 50 percent glycerine solution,

1 for instance, is that a little bit increase heat  
2 releasing enough to make the system not effective  
3 any more. And there has been some questions  
4 throughout this on will real antifreeze sprinkler  
5 systems not allow to have all antifreeze.

6 Antifreeze sprinkler system by definition has  
7 antifreeze for part of it and eventually there is  
8 water that backs it up.

9           So there has been a question there that  
10 maybe there should be a time limit or something like  
11 that. We ran a very conservative approach here. We  
12 looked at the scope B testing a continuous supply of  
13 antifreeze throughout the test. Looked at the two  
14 different solutions although the 40 percent seemed  
15 to be a little bit better so we only ran one test  
16 for that just to check it. Everything was looked at  
17 in the standard. UL 1626 configuration with 8-foot  
18 ceiling. We ran each of the sprinklers and each of  
19 the sprinklers at three different flow rates. 150  
20 psi real high pressure. 80 psi middle of the road.  
21 And then the low pressure was basically a minimum  
22 pressure, low flow required for 2 separate  
23 sprinklers if activated or if only one activated

1 basically the square root of 2 times the minimum  
2 flow rate based on hydraulic calculation. So it was  
3 the practical real world minimum flow that you would  
4 get out of the system.

5           We looked at three different sprinklers  
6 K 3.1 4.9, and we had some fairly significant events  
7 with those sprinklers in the scope A testing and we  
8 also looked at sidewall residential sprinkler. The  
9 majority of the tests were carried out with standard  
10 UL 16.26 fuel pack which we'll talk about in a  
11 minute, but there was also a desire to look in  
12 actual living room type configuration so we looked  
13 at that for comparison. UL 16.26 test set up and  
14 the test set up for scope B looks like this. There  
15 is 2 sprinklers located in the main part of the  
16 ceiling. There is a third sprinkler located just  
17 inside the doorway and that third sprinkler is used  
18 to evaluate whether the fire is large enough to  
19 activate sprinklers away from the initial condition.  
20 So might it overwhelm the sprinkler system by  
21 activating too many sprinklers.

22           So one of the criteria in the test,  
23 only activate two of the sprinklers in the room and

1 if three sprinklers are activated it's a failure.  
2 Fire source is located in the corner. There is wood  
3 paneling on the walls that can become involved in  
4 the fire condition to look at fire spread. There is  
5 a wood crib that is ignited by a pan of heptane  
6 below, and two simulated furniture ends, and the  
7 furniture ends have a piece of foam that get  
8 involved in the fire ignited by the wood crib and  
9 the heptane pan. It's basically shielded with the  
10 configuration of the foam is on this end. So  
11 basically it's shielded from the sprinkler spray. A  
12 photograph of the test set up wood paneling on the  
13 walls. Using the foam furniture ends and a wood  
14 crib and pan of heptane inside. Sprinkler located  
15 closest one located in this panel here. You'll see  
16 just barely thermal couples hanging down to measure  
17 in the space and certain prescribed locations. And  
18 this is a video of the 50 percent glycerine  
19 solution, K 4.9 pendant sprinkler at the low flow  
20 condition in that particular test.

21 This is just after ignition of the fuel  
22 package, the fire is growing in the corner the  
23 sprinkler is not activated just yet. This

1 particular test takes about 2 1/2 minutes for the  
2 sprinkler to activate, and I skipped ahead to where  
3 it's just activated, and we'll start to see a little  
4 bit of decay in the fire condition and the test was  
5 continued for a 10-minute period. And slowly but  
6 surely during that 10-minute period the fire itself  
7 is extinguished. And this is 50 percent glycerine  
8 solution it's spraying out onto the fire at very low  
9 flow rate. There is mist in the room, smoke in the  
10 room, but fire gets extinguished and in a minute you  
11 will see the temperatures.

12           So one of the criteria outlined in UL  
13 1626 is the temperature 3 inches below the ceiling.  
14 Temperature limit 600 degrees Fahrenheit and you'll  
15 see over all of the different tests run all the flow  
16 rates all the sprinklers that they are all well way  
17 below that limit. There wasn't a single test that  
18 was run that came close to exceeding the 1626  
19 criteria. And if you look between the tests with  
20 glycerine, the green bars, and the tests with  
21 propylene glycol the yellow bar, and the test with  
22 water really not much of a difference. Maybe one  
23 test one performed a little bit better maybe another

1 test another performed a little bit better, but  
2 overall there is not much of a difference.

3 In terms of the maximum temperature  
4 5 feet 3 inches above the floor enclosure another  
5 one of the UL 1626 criteria.

6 200 degrees is a maximum. And got a  
7 little bit over 125 in 1 case with both water and  
8 with the 50 percent glycerine so again, no  
9 significant difference between glycerine and the  
10 water and the UL 1626 scope B set up.

11 There is a 2-minute sustained  
12 temperature above the floor criteria. That one 130  
13 degrees sustained for 2 minutes, stayed below 110  
14 throughout all tests and that includes the criteria.  
15 The two highest test one was glycerine the other one  
16 was water. Temperature behind the ceiling material  
17 directly above the fire is another one of the  
18 criteria, behind the ceiling surface in back of the  
19 panelling. One thing I didn't point out yet is that  
20 the K 3.1 sprinkler is listed for 14 by 14 spacing.  
21 The enclosure that we had was 16 feet by 32 feet.  
22 So we were using that sprinkler a little bit passed  
23 the limit of its listing to see if maybe it could be

1 pushed over the edge by the antifreeze solution. It  
2 didn't happen. We had one of the water tests where  
3 it came close but the glycerine tests looked just  
4 about as good in most cases. And two of the  
5 glycerine tests that got a little bit higher, one of  
6 the water tests that got a little bit higher but  
7 overall the results were very similar. A number of  
8 sprinklers activated 2 in the test 2 out of three  
9 sprinklers, and 2 of the glycerine activated two  
10 sprinklers, one of the water tests activated two  
11 sprinklers. All were within the criteria and vast  
12 majority of the tests were controlled by a single  
13 sprinkler.

14 This table includes all the point data  
15 from the tests. For each of the tests you'll see  
16 that all of the data is well within the UL 1626  
17 criteria. And it's got a couple of extra pieces on  
18 it. One is UL was kind enough to provide some data  
19 that they had from a prior test where they ran the  
20 UL 1626 test, kind of, but without sprinklers.

21 To provide a comparison between what  
22 happens with each of these solutions with water and  
23 what happens if we didn't have a sprinkler system at

1 all. And that test was a little bit different than  
2 the enclosure we had. It was 12 by 24 instead of 16  
3 by 16. But otherwise it was the same fuel package  
4 wood panels on the water, similar arrangement. That  
5 test flash over space less than 4 minutes,  
6 temperature over a thousand degrees. And for any of  
7 our solutions that we tested the 40 propylene  
8 glycol, 50 percent glycerine and water the  
9 temperatures at any point never exceeded 250 degrees  
10 during the whole 10 minutes. When we take that out  
11 all of a sudden there is flash over a room more than  
12 a thousand degree temperatures. This is the  
13 comparison between the UL 1626 fuel package and the  
14 furniture fuel package. The furniture fuel package  
15 we used consisted of a couch, stuffed chair, end  
16 table, and a wastepaper basket that ignited. This  
17 is consistent with some other research that UL 16.26  
18 did, ended up being a pretty severe test. This is a  
19 comparison K 4.9 sprinkler, low flow 50 percent  
20 glycerine and the UL 16.26 fueled package was more  
21 severe than the furniture fire.

22                   So we were asked to do a literature  
23 search put together a research plan for antifreeze

1 solutions and home fire sprinkler systems. These  
2 are solutions that have been used in systems for  
3 about 70 years, more than 60, but we've had a couple  
4 of recent fire incidents that caused some concerns  
5 with these solutions. And as a result of that  
6 literature search and some initial testing that UL  
7 did on their own, there seems to be certain  
8 solutions that have major cause for concern.

9           The second part of the project phase 2  
10 research I just talked about, was run in two parts.  
11 The first was to look at well, do we have the  
12 potential for a large scale ignition sprays,  
13 something that causes a flash fire explosion. And  
14 that part of the research found that a 60 percent  
15 propylene glycol solution, 50 percent propylene  
16 glycol solution in certain conditions it's possible.  
17 55 percent glycerine solutions for certain  
18 configurations that didn't perform so well either.  
19 But for all of the different tests that were run and  
20 all the different configurations, both 40 percent  
21 propylene glycol and 50 percent glycerine solutions  
22 performed well. There was some increase in heat  
23 release rate but it wasn't enough to be considered a

1 large scale of ignition of spray and something to  
2 prevent the sprinkler from being effective with a  
3 normal fire source, with a typical residential fire.

4           Scope B testing to further investigate  
5 the effectiveness of these antifreeze solutions. So  
6 we looked at 40 percent propylene glycol, 50 percent  
7 glycerine and the ability to control the fire  
8 condition, maintain tenable conditions within the  
9 space. The testing results show the 40 percent  
10 propylene glycol, 50 percent glycerine solutions  
11 were very similar to water in their performance.  
12 Every single one of the tests was within the  
13 criteria laid out in the UL 16.26, and we had for  
14 instance the video that I showed significance amount  
15 of mist, vapor, steam in the room of each of these  
16 solutions, and not once did we see a flash fire  
17 resulting.

18           So it's good, very good confidence that  
19 these particular solutions are appropriate for use  
20 in the sprinkler systems. The other side of it is  
21 there are certain solutions that definitely are not  
22 appropriate and should be taken out. As part of the  
23 deliberation that happens as part of this, we saw

1 that there was a 50 percent glycerine solution that  
2 performed well, 55 percent glycerine solution that  
3 performed poorly, certain tests. And so there needs  
4 to be some consideration given for the appropriate  
5 safety factor on the value that is chosen for this.

6 In addition when we focused on  
7 propylene glycol and glycerine solutions because  
8 they're my understanding is a vast majority of the  
9 antifreeze systems out there, any actions taken  
10 should also consider that there is still permitted  
11 diethylene glycol and ethylene glycol solutions that  
12 have flammability properties that aren't all that  
13 much different from glycerine and from glycol. So  
14 even though we don't have specific test data on  
15 those, some action should be taken with respect to  
16 those also.

17 The end of my formal presentation.  
18 Thank you everybody for your time on this and I  
19 think maybe have some questions now.

20 THE CHAIR: Yes, thank you. We  
21 appreciate the presentation. I am going to open it  
22 up to questions from the Council members at this  
23 point to ask of the consultant that did the work for

1 any item that you have. Do Council members have  
2 some questions for MR. WOLIN?

3 MR. GERDES: Ralph Gerdes, Council  
4 member. Why the focus just on residential occuppies.

5 MR. WOLIN: That's where the fire  
6 condition that really brought this about was an  
7 incident in Truckee, California. And so with the  
8 major lack of data on an incident that happened  
9 prior to that, that was the focus this research that  
10 was given to us. In the future there certainly  
11 might be a need to look at commercial systems or  
12 other things.

13 MR. GERDES: Because you note the  
14 ESFR problem that was discovered a few years ago,  
15 and limitations on that. I'm just wondering is  
16 there a potential for parallel on other --

17 MR. WOLIN: ESFR is a little bit  
18 different, typically such a large orifice that the  
19 problems that they saw were increases in heat  
20 release rate but not big large scale spray. UL did  
21 their own research back in May. But for let's say a  
22 5.6 K factor sprinkler and typical commercial  
23 sprinklers, there is a need for further work.

1                   MR. GERDES:  Could you explain the  
2   tenability criteria of the UL standard.  You were  
3   measuring temperatures, is that all you were  
4   measuring.

5                   MR. WOLIN:  Yes.  The standard itself  
6   is based on measurements of temperature within the  
7   enclosure.  So it's been temperature at 5 feet  
8   3 inches above the floor 8 inches away from the  
9   sprinkler.  Temperature at the ceiling level,  
10  temperature behind the back of it, and there is back  
11  up research data in late 70s that correlate the  
12  temperature criteria to other tenable criteria.  
13  What was measured on the test was temperature but  
14  there was prior testing done back in the late 70s by  
15  FM to correlate that temperature criteria to other  
16  criteria such as carbon monoxide concentration.

17                  MR. GERDES:  Thank you.

18                  THE CHAIR:  Mr. Milke.

19                  MR. MILKE:  Jim Milke, member of  
20  Council.  A couple of questions, Steve.  The scope A  
21  test that you did, were the sprinkler arms oriented  
22  in the same direction all the time or did you turn  
23  them so that you had different orientations of those

1 arms in the spray pattern in particular.

2 MR. WOLIN: You'll notice that the  
3 fire, fairly sizeable fire was right below the  
4 sprinkler, and so we did get ignition or we got fire  
5 sources up around the spray pattern on several  
6 sides. But to answer the question directly the arms  
7 were oriented perpendicular to the length of the  
8 fire source. And they were all run in that same  
9 fashion.

10 MR. MILKE: My second question, with  
11 the diethylene glycol ethylene glycol the fact that  
12 you haven't tested those or included any of those  
13 there, you've suggested that you should limit  
14 somehow the solutions to these also. Can you draw  
15 direct parallels say 50 percent or 40 percent, or  
16 I'm not sure I would be so confident given the  
17 differences you've seen in these and what happens at  
18 freezing points.

19 MR. WOLIN: The real key to it is that  
20 the diethylene glycol ethylene glycol have very  
21 limited applications. Only for systems not  
22 connected to put a water supply so it's a very, very  
23 small percentage of the systems out there. So we

1 wanted to make sure that the glycerine and propylene  
2 glycol that are much more common got investigated  
3 more thoroughly since we really ran this whole  
4 research project this whole test plan in about  
5 2 weeks. UL did a hell of a job getting that done.  
6 So we focused it on that.

7           If you're asking what dose limit mean  
8 in this context I think that's what you're getting  
9 it. It could be that the solution is to say well  
10 unless there is further testing done, don't use  
11 those two and instead use the propylene glycol and  
12 glycerine in concentrations we know work, and maybe  
13 that's the solution unless there is more testing  
14 done to look at them.

15           MR. MILKE: Thank you.

16           THE CHAIR: Additional questions?

17 Mr. Jardin.

18           MR. JARDIN: Member of Council, I'm  
19 sure you've covered and I probably didn't process  
20 it. Can you explain how the typical furnished room  
21 test compared to the UL standard 16.26 test.

22           MR. WOLIN: Yes. The 16.26 field  
23 package has a wood crib and heptane fire together

1 that are very difficult to extinguish. And that  
2 really along with the shielding provided by those  
3 ends provides a difficult fire source the  
4 extinguisher to control. The test with the  
5 furniture was run with the wood panel on the walls  
6 and that same piece but it was two, sofa and couch,  
7 wind up in the same concern and furniture end but  
8 with the wastebasket to ignite them. In terms of  
9 comparison between the two, the results of the  
10 UL 16.26 field package test ended up being more  
11 severe than the furniture fire because the furniture  
12 fire was basically a lot more easily extinguished by  
13 the sprinkler. We didn't have the heptane fire and  
14 the crib there to keep the fire going during the  
15 sprinkler, to the same extent.

16 MR. JARDIN: Okay.

17 THE CHAIR: Question? Mr. Bell.

18 MR. BELL: Kerry Bell, member of  
19 Council. Would you care to comment on the safety  
20 factor as outlined in the test and how you were  
21 intending to evaluate that.

22 MR. WOLIN: The direction that we moved  
23 forward with initially was to look at in Scope A

1 find the solution limit to where we had successful  
2 operation in Scope A. So we find let's say a  
3 certain solution that ended up working out okay, and  
4 then the thought was to go below that limit where  
5 the 16.26 and the final determination. So the  
6 thought was that if there is a limit of a certain  
7 percentage in Scope A that could cause a flash fire  
8 that we want to make sure that there is in the  
9 original test plan 5 percent factor between what  
10 that is and what is finally used. Now we really  
11 ended up testing something glycerine that was a  
12 little bit close to the line, but it performed very  
13 successfully in Scope B.

14 THE CHAIR: Mr. Milke.

15 MR. MILKE: One more question. Sorry,  
16 Steve, for the additional one I guess. Keeping in  
17 mind residential sprinklers an awful lot of the  
18 applications will involve pressures well under a  
19 hundred psi not that there aren't exceptions to  
20 that, obviously. But there are a lot of systems I  
21 would think that are run at much lower pressures and  
22 at the low pressures you saw very few problems for  
23 any of the concentrations really.

1                   MR. WOLIN: We saw, I know we had an  
2 awful lot of test data and slides. When we first  
3 went into the project was maybe if you limit it to  
4 80 psi 90 psi something like that that it's okay.  
5 That worked out just fine until we ran a test where  
6 at 30 psi we had a flash. And that really gets down  
7 to the difference between models of sprinklers and  
8 deflector design and all that. You might have a  
9 certain concentration created with a certain  
10 sprinkler at 30 psi that didn't happen with another  
11 sprinkler at 30 psi. So we went into the thing  
12 maybe question draw a line. And that line kept  
13 moving down. And it really, unless there is going  
14 to be tests done for I think every single sprinkler  
15 to look at how this performs complete range of  
16 pressures, that's not such a viable solution.

17                   MR. MILKE: Right. Thank you.

18                   THE CHAIR: Additional questions. Jim  
19 Pauley, chair of the Council. Can you give me an  
20 idea at the 50 percent and at the 40 percent levels  
21 that you found what were the temperature ranges now  
22 with respect to freeze protection.

23                   MR. WOLIN: 40 percent propylene glycol

1 has of negative 6 Farenheit, 50 percent glycerine  
2 solution has a freeze protection of negative 19  
3 Farenheit. This might be a little bit different  
4 from what you see in NFPA 13 table right now a  
5 degree or two different. I had a different source I  
6 used on that. Somewhere right around negative 6 for  
7 propylene glycol and negative 20 for glycerine.

8 THE CHAIR: Thank you. Additional  
9 questions. Seeing none MR. WOLIN, thank you for the  
10 presentation. I'll ask you to stand by if you will.

11 At this point I am going to ask the  
12 appellants, for lack of a better description, that  
13 we have got, I would like to hear actually from all  
14 three appellants on the TIA and then sort of what  
15 your perspectives are relative to those TIAs that we  
16 have in front us, and in light of the data that has  
17 been presented. So I guess whether that's  
18 Mr. Hague, Mr. Isman, Mr. Pilette, if I can get a  
19 little perspective from all of you perhaps as  
20 submitters of the TIAs maybe on where you see this  
21 standing presently.

22 MR. ISMAN: Nobody wants to go first.

23 THE CHAIR: Would you like me to flip a

1 coin?

2                   How many other folks do I have that  
3 want to speak to the TIAs? Mr. Flemming.

4                   Gentlemen, whoever would like to go  
5 first.

6                   MR. ISMAN: Ken Isman with the National  
7 Fire Sprinkler Association. What you have before  
8 you are 6 TIAs that were all kind of balloted  
9 through the system simultaneously. Three of them  
10 basically banning all antifreeze systems, three of  
11 them were attempting to just ban antifreeze systems  
12 that were over 50 percent in concentration. The  
13 National Fire Sprinkler Association was concerned  
14 with the concept of banning all antifreeze systems  
15 basically for two reasons. We don't want to ban all  
16 antifreeze systems because there are some  
17 noncombustible antifreeze solutions that would have  
18 been affected by the ban.

19                   So there are at least two, and people  
20 are working on developing more frantically right  
21 now, non-combustible possibilities that if you just  
22 ban all antifreeze solutions you would be cutting  
23 out of the process. So we didn't want to see the

1 all antifreeze ban for that reason, but also we  
2 didn't want to see the combustible solutions, the  
3 glycerine and propylene glycol ban because we know  
4 there are some lower concentration solutions where  
5 we don't have problems. And we knew through the  
6 literature searching through our own experience and  
7 through real life experience with fires where  
8 antifreeze systems have suppressed or controlled  
9 fires that there were some situations where  
10 antifreeze solutions could be used. And we  
11 recognized that some research needed to be done to  
12 tie down exactly what those circumstances were, but  
13 we didn't want to see that direct ban on all  
14 antifreeze solutions go through.

15           So we put through the three TIAs that  
16 just would ban the solutions of concentration above  
17 50 percent as a stop gap TIA and then we really want  
18 to address this fully in the next cycle of NFPA 13  
19 where we would get into the meat of the issues.

20           The TIAs 5 of the 6 didn't pass ballot  
21 but the one that did pass ballot was the ban the  
22 solutions over 50 percent in NFPA 13, but for  
23 correlation reasons you couldn't do that in NFPA 13

1 and then ignore 13 R and 13 D. So you can't just  
2 pass that one TIA. Given the research there could  
3 probably be drafted a TIA that would just ban  
4 antifreeze solutions above 50 percent glycerine and  
5 above 40 percent propylene glycol and that might  
6 seem reasonable. But as someone just leaned over  
7 and whispered in my ear a few minutes ago, even the  
8 50 percent propylene glycol took a really big fire  
9 to create any problems. So we may need to analyze  
10 that a little bit.

11 My sense is if we slapped a revised TIA  
12 on the table right now you wouldn't be able to act  
13 on it anyways because you want the input of the  
14 technical committees involved. So at this point in  
15 time my suggestion to the Council would be don't  
16 issue any of the TIAs. They didn't pass ballot.  
17 The one that passed ballot wouldn't be correlative  
18 with anything else that is going on with the  
19 standards anyway. So don't pass any of the TIAs and  
20 give us a chance to digest all this data that just  
21 came in as of Monday morning Friday we got some of  
22 it and the rest of it today, and let us come back  
23 with a TIA relatively quickly that we can balance

1 through the system and try to work all together so  
2 there is one set of TIAs at this time rather than  
3 multiple. I'm hopeful other folks would be amenable  
4 to that philosophy that there is some concentrations  
5 of antifreeze that we can all live with.

6 THE CHAIR: Thank you. Mr. Hague.

7 MR. HAGUE: Thank you. Dave Hague,  
8 Liberty Mutual Property. I'm not sure I can add  
9 much more to that other than I don't think it would  
10 appropriate to totally band antifreeze at this point  
11 in time but certainly would be willing to work with  
12 Mr. Isman and Mr. Pilette in developing or  
13 determining what the appropriate levels would be.  
14 So I think I'll just leave it at that.

15 THE CHAIR: Thank you. Mr. Pilette.

16 MR. PILETTE: Maurice Pilette. I agree  
17 with Kenny and David on this thing that the  
18 committees themselves have to work further to come  
19 up with the appropriate wording but there is the  
20 concern I still have relative to the TIA prohibiting  
21 antifreeze going forward. To prohibit it at this  
22 time in 13 D and R because somewhat different than  
23 the 13 system. You're not mandated to use

1 residential sprinklers in 13. You're mandated to  
2 use it in 13 D and 13 R and with very few exceptions  
3 to that particular rule. Residential sprinklers  
4 have a total different spray pattern testing  
5 differently than the commercial sprinklers, and the  
6 issue of going forward to allow the industry to keep  
7 on doing antifreeze and 70 percent which is in  
8 effect if it's not acted on would allow that to  
9 continue. And then through the, at some point in  
10 time the committee themselves may be reversing  
11 themselves to say we are going to go to 50/50 but it  
12 doesn't say that now. So there has to be something  
13 that stops it from going forward. And the TIA, 994,  
14 995 relative to residential sprinklers which is  
15 getting a lot of momentum nation wide because of the  
16 promotion of residential sprinklers through the  
17 building code starting next year. Without having  
18 some sort of documentation, something in effect that  
19 says look, continue with the residential sprinklers,  
20 it's a life safety device, but there is an  
21 expectation by the homeowner, a person sitting in  
22 their kitchen or in their kitchen or in their living  
23 room if the sprinkler system ignites there is an

1 expectation that individual is not going to become  
2 part of the fuel package. So you can't end up  
3 having that happen.

4           Now, the research that has occurred  
5 through the foundation has gone on quite a bit of  
6 phenomenal information has come about in the last  
7 few months on this thing, and I was part of those  
8 panels but I still feel the same thing at this  
9 point, that especially for the 13 D and 13 R which  
10 these are life safety, predominant use of those two  
11 standards is life safety, not for property  
12 protection the way 13 is using high flow rates  
13 different type of sprinkler heads. You are kind of  
14 like narrowed down into these other documents. And  
15 then the safety factors concern, who knows, 50/50  
16 may be the right mixture but the committee hasn't  
17 looked at the appropriateness of the potential  
18 safety factors associated with this, and it may go  
19 down to 40 percent and can very well be, but the  
20 committee themselves have to look at these reports  
21 that just came about today. The first time that  
22 these things have been released the committees  
23 haven't even looked at it and still questions to be

1 raised. We all saw the videos. So these things  
2 have to be looked at. So the safety factors haven't  
3 been put together. The effects of the various  
4 sprinkler manufacturers and the deflector designs  
5 are all the contributing factors to what we've seen  
6 today. No risk assessment done between the validity  
7 of freeze protection which we all know needs to be  
8 in these particular systems but it hasn't been  
9 viewed against what we're seeing now that these are  
10 creating potential fire over life safety concern  
11 that may override that. So where is the balance?  
12 Who is going to make that determination of the  
13 balance? And the committee needs to see additional  
14 data through this next cycle to deal with that. The  
15 verification doing installation 13 D, very loose,  
16 has no requirement on that. You put the stuff in,  
17 no signage, no determination, no what occurs, how do  
18 you verify the correct mixture put in, at the time  
19 of the installation. Just not there. Different  
20 than what you see in 13. Even documentation 13 D  
21 doesn't require any plans to be drawn. So one could  
22 end up doing antifreeze on a whim anywhere in this  
23 particular country. So none of that documentation

1 exists of what is actually going into these 13 D  
2 life safety systems.

3           A promulgation of codes, building codes  
4 is the process codes can amend the various  
5 standards, can increase or ignore it. And we even  
6 have as we speak here in the New England state, one  
7 state basically ignored the alert bulletin put out  
8 by NFPA saying that drain your antifreeze take a  
9 look at it and replenish it with water. They took  
10 an exception to that and created their own rules and  
11 also you are going to end up having these  
12 jurisdiction all over the country to look at these  
13 differently and because of all these particular  
14 issues that are out there, something needs to stop  
15 it going forward. And I would ask the Council to  
16 prohibit the use of antifreeze 13 D and 13 R going  
17 forward till the cycle ROP, ROC process that we're  
18 in cycle now that the committee put together task  
19 groups with the TCC along with Mr. Hague's TIA and  
20 Mr. Isman's TIA that a joint task group look at  
21 this.

22           But to go forward and say go ahead  
23 still use antifreeze and 70, 30 percent is fine

1 after what we've just seen, I don't think is it an  
2 appropriate way to go. Because no action indicates  
3 that you still go forward using 70/30, and then I  
4 hate to be in my kitchen and all of a sudden become  
5 part of the fuel package if something goes off and  
6 in fact that's what happened. And then it would be  
7 interesting to note that all the burn demonstration  
8 trailers promoting residential sprinklers all over  
9 this country how many people sit in that little burn  
10 trailer on the first go around with 50/50 antifreeze  
11 and light it up to see if they're willing to  
12 basically sit in there and see, not knowing what  
13 will occur, or have some little kid stand up in  
14 front of the window and take a look at it and have  
15 the thing burn or glow out because the wrong mixture  
16 of antifreeze was put in there if it was being used  
17 and demonstrated upon.

18           So for those reasons I'm all in favor  
19 of working together with the various entities, but  
20 there needs to be something to put a stop to it  
21 especially in the predominant use of sprinklers for  
22 life safety purposes which is what 13 D is, and  
23 there is no other choices. So this is my position

1 both as a design consultant and also my position  
2 only as chair of the residential committees at this  
3 point that the Council give high consideration for  
4 this thing. We know we have a problem, but 50/50  
5 seems to be the method of utilizing because I think  
6 in the back of everybody's mind is that what do we  
7 do with all those systems out there now. There are  
8 hundreds of thousands of them out there, and if we  
9 tell people to drain them out, water is not the cure  
10 all for it. You have to put something back in.  
11 People can't take apart their roofs and attics and  
12 restructure the piping system. So I think that's  
13 the mind set to allow maybe a 50/50, but that's what  
14 we have now.

15 My TIA is to go forward, stop it right  
16 now, and then through the next cycle next 2013  
17 edition there will be more defined rationale and  
18 reasons and design parameters associated where is  
19 the antifreeze appropriately used, and we may end up  
20 having new technology out there that you end up  
21 having to use of noncombustible antifreeze, dry  
22 systems. One manufacturer just came out recently  
23 with a residential dry sprinkler head, so I'm assume

1 the other ones will follow. One manufacturer, there  
2 may be other ones, to release from what I understand  
3 the use of dry systems and plastic piping in the  
4 residential market. So quite a bit is coming  
5 forward. And then I'll say as a design in the last  
6 35 years I have designed a lot of residential  
7 sprinklers. I've never used an antifreeze system in  
8 this environment in the New England area protected  
9 from freeze protection. There are other ways to  
10 basically deal with the issue and it's quality  
11 control and design and installation. To allow  
12 antifreeze without knowing in the question behind it  
13 is the wrong way to go at the moment.

14 THE CHAIR: Thank you. Mr. Fleming.

15 MR. FLEMING: Russ Fleming, National  
16 Fire Sprinkler Association. I wasn't planning on  
17 speak to this issue today except that I picked up  
18 something in Mr. Wolin's presentation that I hadn't  
19 seen in earlier presentations. First of all I agree  
20 with Mr. Pilette in his sense of urgency on this. I  
21 think the Council does have an opportunity to do  
22 something especially with sort of the open ended  
23 NFPA safety alert out there. It would be nice to

1 have some direction from the Council immediately.  
2 You have two sets of proposed TIAs in front of you.  
3 One that would ban solutions over 50 percent, one  
4 that would ban them altogether. I think it would be  
5 a big mistake to ban them altogether. I think you  
6 heard from some of your fire marshal constituents  
7 who understand the significance of the enormity of  
8 the problem out there that would occur if you were  
9 to say or imply that all antifreeze has to be taken  
10 out of sprinkler systems. A lot would be shut off,  
11 frozen, and cause other problems.

12 I guess my main point I would like to  
13 leave you with is on this discussion of safety  
14 factor, don't under estimate the safety factor that  
15 is inherent with the choice of fires that was made  
16 in this program. These were very, very severe  
17 fires. Fires that could not be put out by sprinkler  
18 systems. Can't be handled by water. And that alone  
19 is an enormous safety factor.

20 The item I mentioned of Mr. Wolin that  
21 I picked up from his presentation dealt with the  
22 50 percent propylene glycol mixture. And if you  
23 recall, when it came to the heptane pan, this was

1 6 inches wide by 8 foot long. He said that if this  
2 were a normal fuel package that 50 percent propylene  
3 glycol would have been fine. In other words it took  
4 twice that, took the 12 inch wide by 8 inch long  
5 heptane pan to get the flash fire at 50 percent  
6 propylene glycol mixture. And then of course we  
7 went with the even worse fire 4 heptane spray  
8 nozzles.

9           The TIAs are emergency amendments.  
10 Emergency conditions out there. In a sense what  
11 we've seen from this test program we were testing  
12 very high pressure very small orifices and so forth.  
13 But what we're saying even if you had that small  
14 orifice sprinkler 150 psi you're probably okay if  
15 your residence has a 6-inch by 8-foot heptane pan as  
16 long as you don't go the 12-inch by 8-foot heptane  
17 pan because that would produce a problem with 50  
18 percent propylene glycol mixture.

19           When the committee deliberates they are  
20 going to look at this full range of data and they  
21 may decide to cap it at 40 percent propylene glycol.  
22 But in terms of this emergency situation it wouldn't  
23 give me heart burn to stick with that 50 percent

1 because remember this is 50 percent across the board  
2 on normal fuels that we're talking about, not  
3 talking about 8-foot square pan of heptane at  
4 150 psi with a 3.1 K factor sprinkler.

5           The one place where I think you might  
6 consider a tweak is the issue Mr. Gerdes raised.  
7 Mr. Pilette talked about residential sprinklers. I  
8 don't see this as a residential sprinkler. I see  
9 this as an antifreeze solution issue. And so I have  
10 the same concern Mr. Gerdes had. One of our  
11 incidents was in a restaurant. I am not comfortable  
12 with the idea of a baked Alaska or a flambe setting  
13 off a sprinkler over a party in a restaurant and  
14 having a fire ball come out of that sprinkler. In  
15 fact I am not aware of any occupancy in which I  
16 would like to see a fire ball come out. So I don't  
17 know why the TIA would restrict it to dwelling  
18 units. Thank you.

19           THE CHAIR: Thank you. I am going to  
20 open it up to questions from the member of the  
21 Council and before I sort of lose the momentum to go  
22 into that, I'm also going to ask that may perhaps be  
23 early to some of these questions. I am going to go

1 back, we heard from Mr. Pilette his view on sort of  
2 what to do now, and Mr. Fleming was able to respond.  
3 I want to circle back to that issue and have Mr.  
4 Isman and Mr. Hague both respond on the issue about  
5 there is a lot of discussion about let the committee  
6 go back in and so forth. The Council is sort of  
7 faced as Mr. Fleming points out the emergency  
8 nature, what do we do now at this point. I mean as  
9 I ask you to comment, I also want to ask Mr. Pilette  
10 to comment. He was really talking about next cycle  
11 and I want to come back around to whether the idea  
12 of is there enough information in a TIA whether it's  
13 one of these or another one that could be drafted  
14 quickly to be able to address this and take the data  
15 into account.

16 Mr. Isman, do you have some thoughts on  
17 the response to this? What do you do in the interim  
18 between now and even another TIA.

19 MR. ISMAN: As I see it you have three  
20 choices in front of you. You could pass on the TIAs  
21 that ban all antifreeze right now. You could pass  
22 the TIAs that ban the 50 percent solution, more than  
23 50 percent solutions as a package right now. Or you

1 could have us sit around right now and draft  
2 something else which I had actually prepared. I  
3 have a one page TIA actually three TIAs that you  
4 could take a look at right now if you want to pass  
5 something right now. But I got the sense that you  
6 would rather not try something new right now without  
7 getting some input from the committees.

8           So if you have those three choices then  
9 I would say the best choice would be to ban  
10 antifreeze solutions above 50 percent. You have  
11 that in front of you now. It's been balloted  
12 through the committees. It didn't do great but the  
13 committees didn't have the benefit of all of that  
14 test data that you've seen. So if you had to do  
15 something right now that would be the best of your  
16 three options, I think.

17           I kind of have a question to you. I'm  
18 not allowed to ask the Standards Council questions,  
19 but I wonder if we were able to develop something  
20 really quickly, if you would be able to issue it  
21 before the next Council meeting, if you can issue  
22 TIAs via conference call and if something could be  
23 balloted through a committee relatively quickly with

1    which can be done by email, I would be hopeful that  
2    maybe there is that compromise route where if you  
3    don't want to do the ban them above 50 percent,  
4    because they really didn't pass ballot, then maybe  
5    we can put something together really question.

6                    I think we can address Mr. Pilette's  
7    concerns of safety factors. I think that inherent  
8    in going to pre-mixed solutions we can deal with the  
9    issue of safety factors by not allowing contractors  
10   to make their own solutions and by using a quality  
11   control process in a manufacturing facility that the  
12   manufacturers tell us they can be very tight in  
13   their quality controls. I think we can handle that  
14   safety factor issue so that when you say 50 percent  
15   solution you get 50 percent solutions. I think we  
16   can handle Mr. Pilette's concerns relatively  
17   quickly. So I guess that would be my thoughts.

18                   THE CHAIR: Mr. Hague, any comment?

19                   MR. HAGUE: I would like to add that  
20   prohibiting the use of antifreeze systems would not  
21   be appropriate. I would certainly be more in favor  
22   of limiting 50/50 at this point in time. Certainly  
23   not in favor of encouraging the end user to convert

1 the system to wet pipe systems for fear some of  
2 those systems would not be addressed before the  
3 onset of freezing temperatures, so I'm not sure  
4 that is the appropriate action either. I would be  
5 very much in favor of 50/50 solution and not to  
6 exceed that. As far as Mr. Pilette's concerns I'm  
7 certain the committee can address those in future  
8 editions as far as quality control. Mr. Isman  
9 mentioned that and I've personally seen efforts to  
10 make antifreeze in the field and calibrate  
11 containers are not available so the mixtures are not  
12 very accurate. So I am very much in favor of a  
13 pre-mixed solution. I think that might lead to  
14 resolution of this problem.

15           Mr. Fleming also pointed out that the  
16 test fires that we saw this morning are very intense  
17 in nature and probably not what you would see in the  
18 common kitchen. So I think the testing was very  
19 conservative. So I'm not convinced that that is as  
20 much of an issue as we first thought. Probably not  
21 going to see that intensity in most situations. I  
22 think we do have some time to address the issue.  
23 This is not strictly a residential issue as well.

1 It's an antifreeze issue. I don't want to encourage  
2 my policyholders to spray a combustible atomized  
3 mixture on their personal and real property as well.  
4 So it should not be limited to strictly residential.  
5 So I think we need to do something across the board  
6 including NFPA 13.

7 THE CHAIR: Mr. Pilette, from your  
8 earlier comments, do you believe that given that  
9 Council has TIAs in front of them and understand  
10 your point on this, that if another TIA somewhere in  
11 between all this, you're talking about going to next  
12 cycle, do you believe this could be done on an  
13 interim or on a quicker basis by the committee.

14 MR. PILETTE: There is probably a  
15 possibility of that. Things can move rapidly. But  
16 it wouldn't require to go through a particular  
17 process to do that. It's not about freeze  
18 protection at the moment. The TIA that I submitted  
19 is about the flammability and the contributor of a  
20 commodity within a piping system that contributes to  
21 fire. So we all know the freeze protection part of  
22 it and there is no way to basically stop the amount  
23 of antifreeze that is out there in storage by

1 sprinkler contractors and they're going to continue.  
2 Hey, I have to get rid of this stuff, and it's not a  
3 matter of big pre-mix. The contractors buy the  
4 nonpre-mixed stuff because of the cost factors and  
5 they mix it themselves.

6           So basically it is not an exact science  
7 of 50/50 or 70/30. The stuff goes in the more the  
8 better. I have to get rid of this stuff. I don't  
9 want to take it back to the shop. But there is a  
10 supply of that stuff. And the industry should be  
11 told at this point in time going forward. It's not  
12 about the systems that are out there now. Maybe  
13 50/50 is a solution to fix the problem. That's an  
14 NFPA 25 issue possibly but 13 D doesn't address that  
15 issues on how to deal with that.

16           Plus there is an alert bulletin out  
17 there that basically says get rid of the stuff at  
18 the moment. You know, the solution that NFPA alert  
19 bulletin put out may not be the best solution that  
20 was put out there. There was issues associated with  
21 that, but going forward you can sure as hell design  
22 a residential sprinkler system without the use of  
23 antifreeze. That can be done. And it's just a

1 matter of do you care about where you locate the  
2 piping. Do you care about the insulation. Do you  
3 care about the coordination aspect of it. So all  
4 these things need to be taken into account. And it  
5 can be done by a prudent designer and the  
6 contractor. It's just that the industry as a whole  
7 doesn't like, kind of like decision making process,  
8 take the easy way out, and that's what occurs. The  
9 high pressures, even in this a state here, cities  
10 just like north of here have a hundred 70 psi in  
11 some of these residential sprinkler systems going  
12 in. Antifreeze is being utilized.

13                   There has to be some sort of stop  
14 action gap here saying don't go forward, don't use  
15 antifreeze. Whether or not the Council wants to go  
16 forward and ban it altogether in 13 that's a  
17 different issue. It's options. No mandate to use  
18 the antifreeze of residential sprinklers in those  
19 dwelling units. It's an option. It's not an option  
20 in 13 D. In 13 R basically allows something other  
21 than a residential sprinklers but that option is  
22 seldom used. The TIAs to ban antifreeze was lost by  
23 less than a vote, 18.75. Last time I saw those

1 numbers was in my daughter's bank statement when she  
2 pays the credit cards. That is what you end up  
3 seeing. So the vote margin was 19, 18.75 came  
4 through. So here there is an issue that the  
5 committee based on the information that it had  
6 wanted to go forward to ban the use of antifreeze  
7 going forward.

8           Now the cycle process, we're talking  
9 about a 2-year type thing but a lot of issues have  
10 to come about. The charts are going to have to be  
11 rewritten. The committee is going to have to  
12 examine do we use antifreeze for freeze protection  
13 and also write criteria to avoid the combustibility  
14 of this fluid in there. The testing and  
15 maintenance, the documentation of it to see where it  
16 is. This can't be done overnight to have a few  
17 people sit down and try to develop a TIA. Possibly,  
18 but it's another band-aid approach. And what we  
19 don't need is all of a sudden to say do nothing and  
20 we need another Truckee or Utah incident that  
21 occurs. If that should occur and people are still  
22 using antifreeze going forward then we have a severe  
23 problem in the United States on this issue. That

1 will be a huge issue for the sprinkler industry. We  
2 can't afford another fire incident involving  
3 antifreeze where NFPA itself and the committee did  
4 allow to do nothing and just only found a Band-Aid  
5 approach.

6                   So it's still my contention that the  
7 Council should make the right decision, ban it going  
8 forward, and then I'm sure there will be other  
9 options and other types of antifreeze, different  
10 mixtures, safety factors will be put forth in the  
11 next edition of the residential committees to allow  
12 in some form or fashion or maybe ban it altogether  
13 in the residential 13 D systems.

14                   THE CHAIR: Thank you. Mr. Gerdes.

15                   MR. GERDES: Ralph Gerdes, Council  
16 member. I guess the question I want to throw to you  
17 three gentlemen, if we chose to reballot the  
18 committees what do you think the chances of success  
19 might be. Before I give you that question, when I  
20 look at the results of the ballots, I find it  
21 interesting in the 13 D and 13 R you had more votes  
22 for a total ban.

23                   MR. PILETTE: Right.

1                   MR. GERDES: Than a 50/50 ban, and I  
2 didn't see the logic or reasoning behind that, but  
3 those two committees think a total ban is a better  
4 way to go.

5                   MR. PILETTE: That's what I have been  
6 indicating, that I lost my listing of vote on this  
7 issue, and the committee, technical expertise of the  
8 committee, saw this as an issue. And the technical  
9 aspects of the committee should be looked upon by  
10 the Council. That's where it lies. That's our  
11 entire process. Looked at the data, looked at the  
12 issues, and summarize it and went forward. And if I  
13 had one individual that kind of like voted on this  
14 thing that elected not to vote, it would have met  
15 ballot. And you look at the emergency nature of it,  
16 it was almost overwhelming a hundred percent. One  
17 descending vote that this is an emergency.  
18 Something has to be done. The whole committee  
19 itself 27 out of 28 members voted something has to  
20 be done. And it came within a quarter of a percent  
21 of meeting the 3 quarters vote on this issue.

22                   MR. GERDES: You're a hundred 80  
23 degrees from the 13 committee which is going to pose

1 an interesting challenge for the correlating  
2 committee.

3 MR. ISMAN: I want to clarify the 13 R  
4 13 D are written by the same committee. One  
5 committee that writes 13 R and 13 D and that's why  
6 they were at least consistent within their own  
7 voting, which doesn't necessarily always happen.

8 What I also wanted to say is that most  
9 of the reasons for their negative ballots was they  
10 just didn't have the data. They were uncomfortable  
11 saying a 50 percent solution was okay or 40 percent  
12 solution was okay. They just didn't have any data  
13 with which to make a decision. Now that we have got  
14 data, there is a lot of really good data to make a  
15 decision, I'm confident we can come up with the  
16 3 quarters we need that would allow some antifreeze  
17 solutions, that would not totally ban all antifreeze  
18 solution. And if you were to reballot having all  
19 this data now, the idea of banning all antifreeze  
20 solutions, you'd get a ton of negative votes because  
21 people want to maintain antifreeze as a potential  
22 solution. Maurice is right in that a lot of  
23 sprinkler systems can be redesigned so that you

1 don't need antifreeze, but there is always going to  
2 be some need for some kind of antifreeze solution.  
3 There are some situations where antifreeze is just  
4 the right answer to the problem, and so we just  
5 don't want to ban all antifreeze solutions.

6 THE CHAIR: Mr. Gerdes, if you still  
7 have others that want to comment on your question.

8 MR. GERDES: Please, go ahead.

9 MR. PILETTE: Yes antifreeze, why the  
10 NFPA, what we know at this point, the committees  
11 themselves, even NFPA as a whole, wants to allow a  
12 fluid that is combustible in any form or fashion  
13 inside of a piping system or a life safety device  
14 needs to be highly questioned. It's one thing to  
15 end up having a flash fire or fire ball come out of  
16 a warehouse 40 feet up in the air. People look at  
17 it, gee, what was that. It's another thing to have  
18 your kitchen involved with it. And it's not a  
19 matter of controllability. I think what the report  
20 indicated is the aspect of it and the 5, 10 minute  
21 water supply associated with that the tenability and  
22 everything there is there. It's what is happening  
23 initially right at the point of activation is what

1 has occurred in California and Utah. And even the  
2 testing program on 16.26, the spacing of the heads  
3 whether or not it's 20 by 2400-square foot in a  
4 spacing, I don't recall any of the testing that has  
5 been done under the research foundation where we had  
6 the residential sprinklers the antifreeze directly  
7 over the field package or close to it. It's all  
8 been done on the regular spacing rules of which you  
9 can end up having for the distribution based on the  
10 wider spacing and everything else. Nothing has been  
11 done. If you're sitting on your couch or whatever  
12 the case may be or in bed or whatever or right over  
13 your stove and the thing goes off, there is an  
14 expectation that water comes out of that, that  
15 basically protects you but not encouraged to fire at  
16 that point. I don't think any of us want to do that  
17 as you're cooking watching TV and fire ignites and  
18 all of a sudden the initial impact of antifreeze  
19 solution in any form or fashion may end up having a  
20 contributing factor that you light up or that  
21 individual lights up and gets severely burned. Burn  
22 injury resulting from something that is supposed to  
23 help you is not something that the general public is

1 going to understand. The moms and dads and children  
2 are not going to understand the issue how come that  
3 stuff coming out of that residential sprinkler head  
4 that I was told by government to put in is creating  
5 a particular problem. That's what we need to stop  
6 right now and until we find a right solution or  
7 right fixture or requirements to have antifreeze go  
8 forward in residential sprinklers. It's not a  
9 commercial aspect at this point, not the warehouse,  
10 not that tiny little loading dock in the back and  
11 not on the balcony. It's what happens right in your  
12 kitchen. And then the Council wasn't purview and  
13 didn't see any of those videos done on Phase 1 or 2  
14 where you had an entire room enclosure of what  
15 occurs. There isn't a clear spot in that particular  
16 room upon the ignition of the activation of that  
17 sprinkler head.

18 THE CHAIR: Thank you. Mr. Fleming, do  
19 you have a comment?

20 MR. FLEMING: Yes. I just want to  
21 point out every incident of the problem we've seen  
22 can be attributed to antifreeze solutions over  
23 50 percent concentration. So the TIA that would ban

1 antifreeze solution over 50 percent is responsive to  
2 the problems that have been seen out there in the  
3 field and represents dealing with the emergency  
4 nature of the situation.

5 I also want to point out as we saw in  
6 the present by Mr. Wolin, the base document for the  
7 antifreeze information is NFPA 13. NFPA 13 D picked  
8 them up from NFPA 13. You have got the necessary  
9 votes from the NFPA 13 committee to proceed with the  
10 TIA banning solutions over 50 percent. And I think  
11 you can use that for the moral authority to enforce  
12 it on 13 D and 13 R as well. For consistency.

13 THE CHAIR: Thank you. Any questions  
14 from members of Council. Ms. Brodoff.

15 MS. BRODOFF: Maureen Brodoff, NFPA  
16 staff. Just a couple of questions. Ken, you  
17 mentioned non- combustible antifreeze solutions.  
18 What is currently available as far as that goes and  
19 are they commercially acceptable and useable.

20 MR. ISMAN: There is two potential  
21 antifreeze solutions that are noncombustible.

22 MS. BRODOFF: I mean actually  
23 available.

1                   MR. ISMAN: They're available. One is  
2 a salt water brine solution and the other is called  
3 potassium lactate. There are problems with both of  
4 them which is why they're not being used at the  
5 moment. The problem with the brine solution is that  
6 is really corrosive to the brass parts in the  
7 system, and even with plastic piping system we have  
8 brass inserts that go into the fittings. And the  
9 problem with the potassium lactate is it's got a  
10 very low surface tension so it winds its way out  
11 screwed threads, and we have screwed threads in our  
12 joints that put the sprinklers into the piping so  
13 that potassium lactate leaks out, causes a very  
14 leaky sprinkler system.

15                   So those kinds of things can be  
16 overcome with some protection for the brass parts  
17 and maybe developing another way to put sprinklers  
18 in the outlets that wouldn't have screw threads that  
19 might make these viable solutions. People haven't  
20 gone to those lengths because they have had the  
21 propylene glycol and glycerine as options, but they  
22 may decide on a commercial basis to look into those  
23 things, so that's why we're saying we don't want to

1 see the total ban on all antifreeze.

2 We're also aware of a research project  
3 that has been fast tracked by one of our  
4 manufacturers to develop another combustible  
5 solution that they hope to have on the market very  
6 soon.

7 MS. BRODOFF: In the short term from  
8 what you're saying they don't appear to be viable  
9 solutions now.

10 MR. ISMAN: There would be challenges  
11 to overcome.

12 MS. BRODOFF: So it wouldn't be  
13 appropriate to issue a TIA, for example, limiting  
14 antifreeze to non-combustible forms that wouldn't  
15 solve anything in the short term.

16 MR. ISMAN: No, that wouldn't.

17 MS. BRODOFF: That's all I'm trying to  
18 find out. How do you verify one of the issues  
19 raised by Mr. Pilette was in the 13 D system there  
20 is no documentation verification required. Does  
21 that raise any concerns for you about the proper  
22 potential misapplication of the standard and should  
23 any TIA or solution to the problem address that in

1 some fashion, if you can comment on that.

2 MR. ISMAN: If NFPA 13 D required some  
3 limit on antifreeze solution use there could be a  
4 limit on what contractors could do that are required  
5 by law to follow NFPA 13 D. So I don't necessarily  
6 follow his assertion that there is no limit on the  
7 installation of the system.

8 Now the long-term maintenance is  
9 another issue. NFPA 13 D systems are exempt from  
10 maintenance NFPA 25. So NFPA 25 doesn't cover NFPA  
11 13 D systems. So there could potentially be a  
12 long-term maintenance problem with a system  
13 originally installed with 50 percent antifreeze or  
14 say limited to 40 percent antifreeze, and the  
15 initial installation would be correct as long as  
16 people follow 13 D, but it's possible that over time  
17 that system could become diluted. That would be the  
18 worst case situation. There is no way that  
19 additional antifreeze gets in unless the homeowner  
20 on their own without contracting a knowledgeable  
21 sprinkler contractor opens up the system and pours  
22 in their own antifreeze of some kind and does it  
23 wrong. Since sprinkler systems are closed systems

1 under pressure, the ability for that to happen would  
2 actually be relatively small because people can't  
3 open a fill cup and pour antifreeze in. The system  
4 is under pressure. If they open a fill cup they get  
5 splashed in the face with antifreeze solution under  
6 pressure. So it is not something they can just pour  
7 in their own.

8           So there is probably some aspect of  
9 maintenance that needs to be dealt with in some way  
10 on a long-term basis, but I don't see it as an  
11 emergency nature that we have to deal with on TIA.

12           MS. BRODOFF: I wasn't talking  
13 long-term. You're operating under the assumption  
14 that the correct amount will always be put in by the  
15 contractor and so no verification required, and I'm  
16 questioning whether that is an assumption that can  
17 be relied upon given the magnitude of the danger  
18 caused by high use.

19           MR. ISMAN: What our TIAs requires  
20 which are in front of you, that the contractor use a  
21 pre-mixed solution. So the contractor wouldn't be  
22 mixing the solution on the site themselves.

23           MS. BRODOFF: I understand that. But

1 is it possible that a contractor might unwittingly  
2 not apply the standard correctly or might just be  
3 more concerned his client's pipes freezing than  
4 about the possibility of a fire.

5 MR. ISMAN: If you want to be concerned  
6 about safety issues for contractors that don't  
7 follow the standard, we can make a really long list.  
8 If you are going to start worrying about contractors  
9 not following the rule, there is lots of safety  
10 problems that could occur.

11 MS. BRODOFF: So there is not an issue  
12 in your mind.

13 MR. ISMAN: I don't think that's a  
14 reason to ban all antifreeze solutions, no.

15 MS. BRODOFF: How about other  
16 verification requirements or other methods of  
17 dealing with mis-application accidental or  
18 otherwise.

19 MR. ISMAN: One of the things NFPA 13  
20 requires is before you pour the antifreeze in you  
21 take a refractometer and measure the solution  
22 concentration. But again if you are going to say  
23 you're worried about people ignoring the standard, I

1 don't know what you could put in the standard to  
2 solve a problem when you are worried about people  
3 ignoring the standard. So I guess I don't  
4 understand your question. What could we write into  
5 a standard to solve a problem when your problem is  
6 you're concerned with people ignoring the standard.

7 MS. BRODOFF: I'm asking the question  
8 because it seems like an issue that Mr. Pilette  
9 railed and which from a lay person's point of view  
10 certainly comes to mind you could have third party  
11 verification or regular testing. I only raise the  
12 question from what you said, and I'm not a  
13 specialist, but 13 D systems don't require any  
14 maintenance or testing once they're installed.

15 MR. ISMAN: That's correct. Once  
16 they're beyond the acceptance tests they don't  
17 require any maintenance or testing.

18 MS. BRODOFF: If I may, Mr. Chair,  
19 Mr. Pilette, do you have any comment.

20 MR. PILETTE: 13 D doesn't have an  
21 acceptance test criteria as well. It's very loosely  
22 written over the years to promote the cost  
23 effectiveness of sprinklers going into homes. The

1 antifreeze, the industry the contractors look at the  
2 more the better. They worry about the liability  
3 issue relative to associating with freeze protection  
4 and pipes bursting and everything else. That's  
5 where the cost factors with insurance policies and  
6 everything else, water damage, is pipe breakage. So  
7 hay I am going to put more stuff, of the stuff in  
8 there. The control of it is unfortunately you can't  
9 control the mind set of the sprinkler contractor  
10 regardless of what is written there. Codes and  
11 standards and law are not written with the  
12 assumption that people are going to ignore them so  
13 you hope that you end up reading it. This is a  
14 particular item that is a design issue that allows a  
15 substance that needs to be highly checked. And what  
16 we're finding out now, and for the last 67 years we  
17 really haven't looked at for the combustibility and  
18 danger that will occur to one's life by using the  
19 substance. We always looked at it, yes, it controls  
20 the fire and then we have something out there that  
21 occurs, like I said before, in a loading dock or  
22 something of that nature.

23 But this is a whole different

1 environment when we're looking at a particular  
2 subset enclosed room, in your bedroom, living room,  
3 and in your kitchen where we're still adding,  
4 treating like a commercial enterprise. The  
5 committee never looked at it that way before and  
6 needs to revisit this entire issue. And to  
7 eliminate all possibilities that whatever the  
8 committee puts out there that hey, 50/50 maybe 45 or  
9 40 percent may do the trick, but, and all the annex  
10 material that would have to be written and data  
11 associated and additional testing and maintenance  
12 for the homeowner, there is very little left for the  
13 homeowner to deal with. People buy homes with  
14 residential sprinklers, they don't even know they  
15 have residential sprinklers in their homes. If you  
16 were to poll half the people that live in  
17 residential homes with sprinklers they may not even  
18 know they have sprinklers in there. They just  
19 bought it from the real estate agent. They paid  
20 their money, walk in, 3 years down the road what is  
21 that thing sticking out of the ceiling. That's the  
22 reality. We need to not look at the bean counting  
23 aspect of this thing. We need to take a look at

1 real life conditions. These are people's homes.  
2 These are not warehouses. These are not large  
3 mercantile, not shopping malls, not airport  
4 terminals. These are individual persons' homes, and  
5 the industry as a culture we look at that totally  
6 different. A person's home is his castle. Stay out  
7 of it. Do I actually know what I have in there,  
8 there ain't no sprinkler contractor banging on doors  
9 saying Lady, you have to take care of this stuff.  
10 You may end up having antifreeze.

11           And the alert bulletin released by NFPA  
12 that is not going to the homeowner. I don't see  
13 homeowners and fathers and fathers and mothers  
14 looking at the alert bulletin. They're not subject  
15 to that. It's contractors, and they have a dilemma  
16 what to do about this issue. But for the committee  
17 to go forward and to continue the use of antifreeze  
18 is kind of like the wrong approach at this point  
19 until the whole thing is ironed out based on the new  
20 test data we have.

21           MR. FLEMING: If I could answer a  
22 parallel situation, parallel question would be what  
23 keeps contractors right now from putting antifreeze

1 solutions into the systems that don't meet the NFPA  
2 13 requirements. Near all of the antifreeze  
3 solutions allowed by NFPA are allowed because of  
4 compatibility with public water supplies. What is  
5 keeping them from throwing in Prestone or something  
6 they can buy cheaply at an auto part store. We  
7 haven't seen that to be a problem.

8 I think there is an intent to do the  
9 right thing among the users of the standard out  
10 there, and since we haven't seen them throwing all  
11 sorts of toxic antifreeze solutions into their  
12 systems, you can have some assurance they are not  
13 going to do something in violation of the standard,  
14 whereas right now they do. I heard of a guy the  
15 other day who, unaware of this concern for the  
16 maximum concentrations tops off the antifreeze  
17 systems every time he inspections them by putting in  
18 a small amount of pure antifreeze. That is the kind  
19 of thing we have to address through the maximum  
20 concentration.

21 I want to add one other thing. The  
22 thing about if you put the TIA out that says nothing  
23 over 50 percent, it puts arms around the problem in

1 a way and bounds the problem for the industry and  
2 for the authorities having jurisdiction that are out  
3 there. What comes through in the TIAs will be seen  
4 as applicable to existing systems as well as new  
5 systems. And the 50 percent, if we say anything  
6 over 50 percent is a problem based on the testing  
7 that will at least allow everyone to focus effort on  
8 getting rid of the antifreeze exceeding 50 percent  
9 concentrations that are out there in the field.

10 THE CHAIR: Ms. Brodoff.

11 MS. BRODOFF: With respect to existing  
12 systems these TIAs by their terms cover existing  
13 systems, and so whether de facto or not they will  
14 have affect on existing systems leave that aside for  
15 the moment, in terms of actual standard development,  
16 what thought has your association, for example, or  
17 the industry given to how to address the problem in  
18 standards of existing systems either through 25 or I  
19 understand in 13 D at less some annex material about  
20 maintenance, whether the existing systems can be  
21 addressed through some kind of standards activity  
22 since that is a critical issue at this point, I  
23 would think, and won't be addressed by what the

1 Council does today. Are you planning to take some  
2 action within the standard system to address  
3 existing systems, and I would address that to  
4 Mr. Pilette too.

5 MR. FLEMING: Our association technical  
6 committee will be meeting in 2 weeks and take up  
7 these questions, but the NFPA 13 Technical  
8 Correlating Committee at its conference call agreed  
9 this should be referred to the NFPA 25 committee.  
10 It has not at this point been referred to the NFPA  
11 25 committee for their consideration.

12 MS. BRODOFF: I urge you to follow up,  
13 don't let it fall to the wayside if there is some  
14 issues that need to be addressed in terms of  
15 existing systems.

16 MR. FLEMING: Let me clarify, it was  
17 the understanding of the Technical Correlating  
18 Committee that NFPA would in fact refer to the NFPA  
19 25 committee.

20 MS. BRODOFF: My comment stands.  
21 Mr. Pilette.

22 MR. PILETTE: As far as maintenance of  
23 it currently 13 D there is no requirement for a

1    sprinkler contractor to leave a copy of 13 D to  
2    whoever is going to occupy that house.  Nobody knows  
3    who is going to occupy that house.  And the  
4    contractor, he goes through a real estate broker, a  
5    developer who is selling, somebody comes in and none  
6    of that document, to my knowledge, never seen  
7    basically transmitted to the user.  The user doesn't  
8    know, very plain and simple.  The user as for 13 D  
9    as the installing contractor used in that aspect and  
10   that limelight, and he is using 13 D to install the  
11   system and put the antifreeze in, but the user which  
12   is the homeowner never gets to see that document.  
13   There is no requirement for him to see that  
14   document.

15                    So this is a huge issue for  
16   residential, the homeowner.  This is a different  
17   environmental condition here.  We're looking at the  
18   individuals.  We can't treat this issue just like  
19   it's a commercial enterprise where there are  
20   facilities managers, where there are contracts for  
21   sprinkler contractors that come in and do quarterly  
22   testing to take a look at this thing.  This does not  
23   happen on a residential home.  Residential occupants

1 do not go out and bang on doors of residential  
2 sprinkler contractors and hey come in and do this  
3 because I got this copy of NFPA 13 and it really  
4 doesn't tell me anything. And I don't even know  
5 what you're talking about. You can't go down to  
6 Home Depo and buy one or Lowes or any of those  
7 places where the routine average individual  
8 homeowner shops to modify and work on his particular  
9 house. Absolutely nothing to do with sprinkler  
10 systems in any of those entities where they have  
11 just about every other tool and entity and feature  
12 or modification that they can get to modify their  
13 homes. Nothing on sprinklers.

14           The residential occupancy of people in  
15 this country really don't know nothing about this.  
16 And the government is about to basically go forward  
17 across the United States to push residential  
18 sprinklers. And we can't end up having the  
19 government push 13 D in different editions of 13 D  
20 saying go ahead put a substance in there that can be  
21 a contributing factor.

22           MS. BRODOFF: Maybe my question wasn't  
23 clear. There is nothing NFPA can do to get

1 homeowners to read NFPA standards. But that  
2 question aside, on the question of existing systems  
3 which won't be covered by any TIA that the Council  
4 can issue today, is there a place within 13 D or  
5 through some action within standards to at least  
6 provide guidance to contractors and homeowners who  
7 care to read it about what to do with existing  
8 systems. Because other than the alert bulletin that  
9 NFPA as a safety advocate has issued, there doesn't  
10 seem to be any place within our standards where that  
11 can be addressed. And I guess I'm asking is there  
12 such a place and could the 13 D committee look at  
13 that. Is that raising the issue.

14 MR. PILETTE: Yes. 13 D can go forward  
15 to look at that, but it's not something that is  
16 going to be done 50/50 or --

17 MS. BRODOFF: I understand. Is there  
18 something in the annex material now, my  
19 understanding is some general guidance about  
20 maintenance.

21 MR. PILETTE: Not a lot and I think we  
22 had, is it the last cycle, this cycle, that we asked  
23 for our scope for maintenance to be -- it was given

1 to us but it wasn't clear prior to --

2 THE CHAIR: On the record as we're  
3 doing it. Did you have a question you wanted to  
4 direct to staff, Mr. Pilette.

5 MR. PILETTE: No. We had a scope  
6 change that requested for a scope change, to  
7 basically refine the purpose to including testing  
8 and maintenance scope of 13 D to do that. So we  
9 worked on that particular issue. But this here  
10 there is a lot more information that needs to go in  
11 here for the installer and the end user of this  
12 document that we don't have now.

13 THE CHAIR: Mr. Isman did you have a  
14 comment on that topic?

15 MR. ISMAN: Yes. There are three  
16 places in the NFPA code and standards where this can  
17 be addressed: NFPA 25, the annex NFPA 13 D and  
18 there is in the board and care chapter of NFPA 101  
19 there is care and maintenance requirements for 13 D  
20 systems because 101 permits 13 D systems in certain  
21 small board and care facilities. So they wrote  
22 their own care and maintenance requirements in the  
23 life safety code. So there are three places it can

1 be address.

2 THE CHAIR: Thank you. Mr. Bell.

3 MR. BELL: Kerry Bell, member of  
4 Council. Just to comment on that element really to  
5 NFPA 13 D Section 4.1.4 of the current edition of 13  
6 D does require a testing of the antifreeze solution  
7 right now so I assume is that reasonable that that  
8 criteria relative to the maximum concentration can  
9 be introduced into that section.

10 MR. ISMAN: Sure.

11 THE CHAIR: Any questions.

12 MR. LEBER: Member of Council, just  
13 because I have a problem with water sometimes I may  
14 not have understood everything presented, but in the  
15 presentation there were a number of variables that  
16 were raised as making the situation more or less  
17 tenable. It was admitted we hadn't tested all of  
18 those variables. I just wonder what certainty do we  
19 have or how confident do you people feel in the  
20 50 percent limit. I mean when we have been told  
21 that pressure makes a difference, that the type of  
22 sprinkler head makes a difference, that the orifice  
23 makes a difference, and so forth. Do we know we're

1 actually dealing with the problem with the  
2 50 percent solution.

3 MR. FLEMING: When you go into  
4 executive session I hope Mr. Wolin joins you and  
5 answers all of these questions. I think this test  
6 program was based on a range of very severe  
7 conditions. He tested from 10 psi up to 150 psi.  
8 It would be unusual to see pressures above that.  
9 Most of your systems as we said earlier are  
10 considerably below 80 psi or below. The fires were  
11 tremendous fires relative to what you would expect  
12 in a residential. You would normally expect in a  
13 fire that could be controlled suppressed by water.  
14 These fires were not, and they were specifically  
15 engineered to present a worst case or reasonably  
16 worst case situation. And I hope the Council will  
17 consult with Mr. Wolin. As I say in my opening  
18 comments, I said I was impressed by the fact it even  
19 took a very big fire to get propylene glycol to get  
20 to that flash fire condition at 50 percent solution.  
21 A fire that you would not expect to find in a  
22 residence or any normally occupied habitable  
23 occupancy.

1                   MR. PILETTE: The two fires that we do  
2 have in Utah and California, there is no way of  
3 telling what the actual mixture of antifreeze was.  
4 It's gone. People are relying on document and  
5 hearsay. What happened to the other building over  
6 there. They did this they did that. We have no  
7 definitive answer of what actually occurred. But we  
8 do know and what seems to be factual at this point,  
9 antifreeze was involved.

10                   So the thing is two fires, one dead,  
11 three fire injuries, antifreeze was involved, and  
12 different pressures, different types of sprinkler  
13 head, different I believe the K factors might have  
14 been the same. Antifreeze was involved. I don't  
15 think the industry can sustain another one of those  
16 conditions a third time and when it's still at the  
17 same time if that should occur and the committee,  
18 NFPA is still promoting the use of antifreeze when  
19 it knows that antifreeze was part of something that  
20 occurred. And none of the investigation in the  
21 testing program has gone to that particular area.

22                   So the Council needs to take that,  
23 that's why there needs to be a stop to it at the

1 moment so we know with absolute certainly. We  
2 cannot promote a combustible material and dilute it  
3 in some form or fashion to cause another fire injury  
4 another death at this point in time as we go  
5 forward. What we do with all the existing  
6 conditions that needs to be addressed at well.  
7 That's a very real issue, reality issue, but the  
8 aspect of it we know to work on the solution to find  
9 the problem. Now with the existing conditions, we  
10 can't go forward saying keep on doing it. That's in  
11 effect by saying not stop the use of antifreeze  
12 until we know for sure, keep on doing it until we  
13 find out some more. At this point in time.

14 MR. LEBER: Anyone else.

15 MR. FLEMING: I have to object. I  
16 believe that's a misrepresentation of the facts with  
17 regard to the incidents that occur. I think the  
18 sampling of antifreeze solutions and adjacent drops  
19 on the same system is a pretty good indication of  
20 the antifreeze concentration that were in place at  
21 the time of those incidents.

22 MR. LEBER: That was the 70 percent.

23 MR. FLEMING: 60 to 70 percent.

1                   THE CHAIR: Mr. Isman, do you have a  
2 comment?

3                   MR. ISMAN: Yes, just to get back to  
4 your question, a wide range of different types and  
5 sizes and deflector types of sprinkler were looked  
6 at during this particular research program. A wide  
7 range of pressures were tested. A wide range of  
8 fire conditions were tested. A lot of worse case  
9 conditions were thrown at the sprinklers and the  
10 situations. I feel very confident that we know  
11 enough now to start writing some TIAs and some  
12 standards and code language. No research program is  
13 perfect, but I think this research program gives us  
14 the base information we need to move forward. It  
15 would be nice to see some future research on some of  
16 these finer aspects of some of these issues, but  
17 ultimately the residential sprinklers while their  
18 droplet patterns may be slightly different coming  
19 off deflectors, they're all designed to pass the  
20 same test. So they're all going to be similar  
21 enough, I think, we can move forward with the  
22 research we have.

23                   THE CHAIR: Any final questions from

1 Council? While still on the record, Mr. Wolin, did  
2 you have any comments that you want to add to the  
3 record based on the discussions that you heard or  
4 any perspective you want to offer to the Council at  
5 this point.

6 MR. WOLIN: The only thing I'd like to  
7 make sure, clear, is that ignition source used in  
8 the scope A test for instance the 8-foot long 6-foot  
9 wide pan, the reason it was configured like that was  
10 to provide ignition sources spatially separating so  
11 over a long distance. The ultimate size of the fire  
12 wasn't the consideration there. So for instance,  
13 you may not take 8 foot long 6 foot wide, ignition  
14 may be a single 12-inch round cast iron pan with  
15 cooking oil that could cause the same ignition but  
16 only if it is in the right location along there. I  
17 hate to really get caught up in the size of the  
18 ignition source in terms of the total fire size.  
19 Ignition source have very specific purpose, if  
20 anywhere within the area of the length of that  
21 ignition source there is a mix that to be burned to  
22 make that happen.

23 THE CHAIR: Thank you. I bring this

1 hearing to a close. We covered a lot of ground a  
2 lot of leeway with the questions from the Council.  
3 Very quickly are there any final remarks from any of  
4 you an item that we haven't covered. I think from  
5 the Council perspective we gather where you sort of  
6 stand on the TIAs at this point but just any last  
7 final comment. Mr. Isman.

8 MR. ISMAN: I just want to thank the  
9 NFPA and the Research Foundation and Code  
10 Consultants for doing an amazing amount of research  
11 in a very short period of time. It was quite a feat  
12 that they accomplished and we really appreciate the  
13 data we have got to work with now. Thank you.

14 THE CHAIR: Thank you. Mr. Hague.

15 MR. HAGUE: One final comment. We've  
16 used antifreeze for a considerable period of time  
17 and I don't think it's appropriate to -- the back  
18 order at this point. Thank you.

19 THE CHAIR: Mr. Pilette.

20 MR. PILETTE: The antifreeze needs to  
21 be looked at and highly considered to make the  
22 distinction between the homeowner and his domicile  
23 as opposed to walking around in the atrium mall that

1 is significant in today's lifestyle.

2 THE CHAIR: Thank you. Mr. Fleming.

3 MR. FLEMING: I'd just like to echo Mr.

4 Isman's remarks, UL, and Code Consultants putting

5 together a really great program and couldn't have

6 been done without Kathleen Oldman's direction.

7 Remarkable what was accomplished in such a short

8 amount of time.

9 THE CHAIR: With that I am going to

10 bring this hearing to a close. The Council extends

11 appreciation to all of you for being here today.

12 This is an extremely important topic. We appreciate

13 your time and effort that you took to be here. We

14 appreciate the presentation you provided to us, very

15 beneficial to the Council going forward. This was

16 the hearing on the subject of the TIAs with respect

17 to the Council's decision on those TIAs issued by

18 written decision. No member of Council no member of

19 staff will convey any information associated with

20 that decision, that written communication will be

21 the only communication from the Council. With that

22 I will close this hearing and we'll go off the

23 record.

1 (Off the record discussion.

2 Meeting concluded at 12:58

3 p.m.)

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5 C E R T I F I C A T E

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11 I hereby certify that the foregoing 200 pages  
12 contain a full, true and correct transcription of  
13 all my stenographic notes to the best of my ability  
14 taken in the above-captioned matter at said time and  
15 place commencing at 8:00 a.m.

16

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20 \_\_\_\_\_  
Carol DiFazio  
Registered Professional Reporter

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