ANNUAL 2011

NFPA ASSOCIATION TECHNICAL MEETING

BOSTON CONVENTION AND EXHIBITION CENTER

415 SUMMER STREET

BOSTON, MASSACHUSETTS

WEDNESDAY, JUNE 15, 2011

AFTERNOON SESSION

12:30 p.m.

1 I N D E X

PG
2 Report on Gaseous Fire Extinguishing Systems 3
Motion: Pg:
3 2001-1 3
2001-2 30
4 2001-17 52
Report on Structures, Construction and Materials 60
5 703-1 61
Report of TCC Safety to Life 83
6 101-5 85
101-2 88
7 101-3 89
101-5 99
8 101-6 105
101-7 109
9 101-8 123
101-9 132
10 101-10 139
101-11 159
11 101-12 166
101-13 170
12 101-14 179
101-15 187
13 101-19 202
101-23 212
14 101-24 212
Report of the TCC Building Code 216
15 5000-1 217
5000-2 218
16 5000-3 227
5000-4 230
17 5000-5 256
5000-6 255
18 5000-7 257
Report on Electrical Safety in the Workplace 259
19 70E-1 261
70E-2 267
20 70E-3 280
21
22
23

The afternoon session of the NFPA Technical Meeting was held at the Boston Convention Center on Wednesday, June 15, 2011, commencing at 12:30 p.m.

MR. CLARY: Welcome back. You might have noticed as the Chair I was able to suspend time for a while.

The next report under consideration this afternoon is that of the Technical Committee on Gaseous Fire Extinguishing Systems.

Here to present the committee's report is the committee chair Jeffrey Harrington of the Harrington Group, Incorporated, Duluth, Georgia. The committee report can be found in the white 20 CAM fall business cycle ROP ROC.

The Certified Amending Motions are contained in the Motions Committee report and behind me on the screen. You will see the order of the motions numbers presented. Mr. Harrington.

MR. HARRINGTON: Mr. Chair, ladies and gentlemen, the report of the Technical Committee on Gaseous Fire Extinguishing Systems is presented for adoption and can be found in the Report on Proposals and the Report on Comments to the 2010 fall revision

cycle.

The Technical Committee has published a report consisting of a partial revision of NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems.

The report was submitted to letter ballot of the Technical Committee that consists of 29 voting members.

The ballot results can be found on pages 2001-1 to 2001-33 of the Report on Proposals and pages 2001-1 to 2001-12 of the Report on Comments. The presiding officer will now proceed with the Certified Amending Motions.

MR. CLARY: Thank you, Mr. Harrington. Let's now proceed to discussion of the Certified Amending Motion and the first one up will be 2001-1. And microphone number 3.

MR. STILWELL: Hello. I'm Brad Stilwell, of Fike Corporation and I would like to make a motion to return Section 5.4.2.4 to the current edition.

MR. CLARY: And do we have a second?

FROM THE FLOOR: Second.

MR. CLARY: We have a second. Please proceed.

MR. STILWELL: This issue has to deal with the design concentration for Class A combustibles that are usually extinguished with clean agents.

And what this comment would do if the NITMAM were not accepted is it would tie the minimum design concentration for a Class A combustible, wood, paper, and plastic, to a Class B flammable liquid fire which I believe is a mistake.

To give you a little history around that, when NFPA 2001 was originally published in 1994, there was a link between Class A and Class B fires.

And if you looked in the standard there's a table. And in that table there were six gasses in that table, and then on the other side would be companies and the Class B extinguishing concentration they got for that gas.

Well, if you look in that standard there were 24 values in that table. And of the 24 values, there were only two values that were actually the same as each other.

So there was a problem with people agreeing on this Class B concentration, and the

reason that was such a big problem was of the people that supplied clean agent systems, the most dominant one was HFC-227ea. You had three manufacturers at that time promoting systems.

Well, there was one manufacturer that had a design concentration that was different than the other two.

The problem with that is local authorities, fire marshals, people that are reviewing systems, would say, Why is this one different? Why are they different?

So because of that, in the 1990's the committee, with a great deal of effort and work, went to separate the Class A and Class B concentration.

There was actually a test protocol developed to determine what the right concentration would be for the Class A fire.

And I'm happy to say at this time all manufacturers of clean agent systems use the same design concentration.

So I believe that the committee did the right thing back in the late 90's by separating them and having an independent test for those.

Now it's much more clear to a user of the standard what design concentration they can use for the Class A.

The other thing that overturned this comment in supporting the NITMAM is the way the comment is written is it really treats the two main gasses used for clean agents differently.

If you have a liquified agent, then the ratio of concentrations ends up being different than inert gasses which really creates a different level of safety that will be used for one gas versus the other, which is not in my opinion the right thing to do.

Lastly, I believe there really isn't any technical justification for this change, because there isn't any related fire incidence, there isn't really anything hard and technical that you can grab onto that would tell you that comment should be accepted.

And lastly, to accept this motion would be to keep it the way it is today which is what it was for the past ten plus years. Thank you.

MR. CLARY: Thank you. Mr. Harrington.

MR. HARRINGTON: Okay. I think it would be useful to the group for me to give a synopsis of the journey that the committee took that led to the committee action that we're now talking about.

As you can see on the screen, the NITMAM, the CAM, essentially is asking that Proposal 2001-24 be returned and also Comment 2001-16 be returned.

So I'd like to give a quick review of the action we took, the committee took, on Proposal 2001-24.

That proposal, which you can follow along if you'd like, in the proposal ROP document, asked that the safety factor that you use to raise the minimum extinguishing concentration to a minimum design concentration be increased from 1.2 to 1.3 for Class A surface fires.

A number of reasons we would get into which I'm going to basically quickly touch on. One reason was that the Class B hazard safety factor is at 1.3.

The submitter saw no technical basis for Class A having a different safety factor than the Class B.

Another reason for Halon 1301, the old days, and CO2, historically the safety factor for Class A hazards for those two materials was between 1.5 and 1.6.

The submitter saw no technical basis for a new clean agent -- the new clean agents having a safety factor so significantly less.

Some calculations were done by I. Schlosser at BDS that were referred to by this submitter.

It showed a drop in the failure probability prediction could occur from 17.5 to 10 going from 1.2 to a 1.3 safety factor.

There's an international consensus view through the ISO 14520 standard and the U.S. Technical Advisory Group -- it's part of that -- that Class A safety factor should be 1.3.

Also mention was made of the uncertainty that's developed in the minimum extinguishing concentration values for Class A for certain agents, or a certain agent in particular, that recently, relatively speaking, went back and retested and reduced the minimum extinguishing concentration which

had an effect of reducing the inherent safety factor even further.

This was all discussed by the committee and evaluated and ultimately the proposal was accepted by the committee 25 to 3, so it was a pretty strong consensus. The committee is looking for an increase in the safety factor from 1.2 to 1.3.

Looking at now this CAM that we're talking about now also wishes to return the comment 2001-16.

Again, the committee reviewed the issue of safety factor being 1.2 versus 1.3 for Class A surface fires, and the committee developed ultimately a comment that essentially was a compromise and made a change to the proposal by way of compromise.

And it had two parts. One part is that the Class A surface MDC, or minimum design concentration, should be developed by 1.2 times the MEC.

And there was a floor put on it by the committee with a second statement that it should also not be less than the MEC or minimum extinguishing concentration for Heptane. That comment was accepted

23 to 4 by a fairly large margin.

MR. CLARY: Okay. Thank you. Looks like microphone number 5.

MR. GRODSKY: Thank you, Mr. Chair. I'm Larry Grodsky with Siemens Industry. I'm also the president of the Fire Suppression Systems Association and I'm representing the Fire Suppression Systems Association and I am for the motion.

The ROC proposed to insert an additional requirement that the minimum design concentration per Class A service fire hazards shall not be less than the minimum extinguishing concentration for liquid fuel, normal heptane.

The fire suppression Systems Association believes the addition of this new additional requirement is unnecessary and unwarranted.

Number one, the present method of determining Class A design concentrations follows the old standard 2127 and 2166 and the FM Approval Standard 5600 for clean agent systems.

The method involves testing Class A materials to determine the Class A extinguishing concentration.

It is reasonable that the design concentrations for Class A fuels be based on extinguishing Class A materials, not an extinguishment of the class fuel.

And number two in the comments, tens of thousands of clean agent systems have been installed over the last 20 years.

In fact, a recently survey of the FSSA installer members report that we've installed over 23,000 systems since 1993.

The survey reports 191 successful fire extinguishments and zero failures due to failures of extinguishment.

No reports of failures of those systems to extinguish fires has been reported to the NFPA 2001 Technical Committee.

There's no doubt that the current requirements in the NFPA 2001 standards are working. Therefore we're asking the assembly to vote in favor of the motion to retain the current requirements for clean agent design concentrations for Class A surface fire hazards. Thank you.

MR. CLARY: Thank you. Microphone number

1.

MR. RIVERS: Thank you, Mr. Chairman. My name is Paul Rivers. I'm with 3M Company and I'm a principal in the NFPA 2001 Committee.

I'm not speaking on behalf of the committee. I am a manufacturer of a clean agent in the standards.

I rise in support of the NITMAM for the following three reasons, and let me preface it by saying this has nothing to do with Class C energized fire scenarios. This is strictly on Class A. The Class C is subject to the next NITMAM.

First, the substantiation for this comment lacks supporting data to indicate meaningful real world failures to extinguish Class A fires with a 1.2 safety factor applied.

Rather, evidence has been provided to the 2001 committee of numerous documents of successful extinguishments in thousands of clean agent installations to date.

Second, there's a precedence against a change to limit the Class A design concentration value to be no less than another fuel's minimum

extinguishing concentration.

The addition of this requirement recouples the Class A fire design concentration to a Class B heptane cup burner extinguishing concentration, exactly something the committee correctly decoupled back in the 90's.

Lastly, this action creates a nominal 10 percent higher safety margin for halocarbon agents than that of inert gas agents.

There is no reasonable rationale for this, no credible supporting data that has been provided, and is wrong.

I ask the membership to support this NITMAM proposal and maintain 5424 language as it is in the present edition. Thank you, Mr. Chairman.

MR. CLARY: Thank you. Microphone number 2. And I also -- to the individual at microphone number 2 and my congratulations for winning the Lamb Award this year.

MR. DiNENNO: Thank you, Mr. Chairman. Phil DiNenno with Hughes Associates speaking in opposition to the motion. My colleagues who've spoken who are also members of the Technical

1 Committee, I think I'm going to revisit the history a
2 little bit.
3 I'm a member of the Technical Committee
4 and I was the chair of the Technical Committee when
5 these agents were introduced and these various test
6 methods were developed.
7 The reason the committee is concerned
8 about the issue is -- There are several reasons for
9 it but the primary one is that the extinguishing
10 concentrations and, therefore, the design
11 concentrations, have been dropping over time.
12 That probably doesn't have much to do
13 with the increased distinguishing capability of the
14 gasses.
15 So we're looking for, you know, solutions
16 to that problem and that was the genesis of the
17 rationale for setting a floor on the design
18 concentration to a test method for which there is
19 widespread agreement and virtually no spread in the
20 data.
21 The second reason is that when the two
22 first versions of 2001 were passed, we ignore the
23 inherently large safety factors that we had with

1 Halon and CO2 which were in the range of 1.6 to 2
2 times this heptane cup burner concentration.
3 And we did that so as to not
4 unnecessarily penalize the introduction of low ozone
5 or no ozone, zero ozone, depleting gasses. That was
6 the rationale of the committee.
7 So we started with concentrations that
8 had virtually no margin. In fact, the early Class A
9 design concentrations were at approximately a safety
10 factor of -- of 1 compared to the historical data
11 with the CO2 and Halon. Now they've migrated down to
12 somewhere between .7 and .8.
13 Another observation of the committee was
14 that the test method used, the Class A test method,
15 which I had a lot to do with developing, was also
16 accepted -- a version of it was accepted by the
17 International Standards Organization.
18 And today if you look at the difference
19 between the results of the test method as practiced
20 in the United States and the test method as performed
21 by ISO, you see a test result difference of 20 to 30
22 percent for the same -- for nominally the same test
23 method, nominally the same fuels, the same basic fire

scenarios. So this has, rightfully so I think, caused much concern among the committee.

It's clear from the ISO results that we are unable to extinguish very similar fires. Fires that are maybe 10, 15 percent bigger with slightly different mounting hardware, etcetera; we're unable to extinguish them with the current extinguishing concentrations embodied in NFPA 2001.

And I'd submit that if you had any other similar hazard classification where such minor differences resulted in a successful extinguishing versus abject failure to extinguish, other committees would take similar action.

This issue is exaggerated by the problem with these agents that if you have a failure to extinguish in a room full of a halocarbon gas, you have made the situation much worse.

It's not just a matter of, Gee, I didn't extinguish it, I got slightly more damage, it took a little longer to put out.

It's the difference between, I put it out and nothing happened, to, I filled the room with thermal decomposition products that look like

hydrogen fluoride.

MR. CLARY: 30 seconds.

MR. DiNENNO: Relative to the real fire test results, we did see some of those tests or some of those real world data.

Most of them had no concentration data associated with them and the ones that did had concentrations using the old design concentrations which you'd expect because those were the concentrations in effect for the first ten to fifteen years of the standard. So thank you very much, and I urge you to vote against the motion.

MR. CLARY: Thank you. Microphone number 5, please.

MR. HOFFMAN: Thank you. My name is David Hoffman. I'm with Siemens Building Technologies. I'm also the marketing communications chairperson for the Fire Suppression Systems Association and I am speaking today on their behalf.

Most of what I was going to say has already been said in support of the motion. However, I do want to briefly reiterate that the FSSA current members responded to survey requests and have

reported 23,400 systems installed since 1993 and 191 fire events that required extinguishment or activation by systems that are covered under Standard NFPA 2001, and out of those 191 fire events, all 191 fires were extinguished successfully.

For that reason I urge support of this motion because I feel that this proposal is a solution in search of a problem. I urge you to please vote in support of this motion. Thank you.

MR. CLARY: Thank you. And we'll stay with microphone number 5.

MR. ROBIN: Thank you, Mr. Chairman. Mark Robin. I'm a senior technical consultant for DuPont, principal NFPA 2001, speaking in support of the motion.

The ROC proposal based Class A design concentrations on either a standardized UL Class A fire test or a Class B cup burner test, whichever test provides the higher extinguishing concentration.

I want to make three points on this comment. First, there's no technical justification for basing Class A performance on Class B tests.

The fire industry has known for a long

time there are fundamental differences between Class A and Class B fires, for example, fire growth, etcetera. As a result, the UL standards that are employed today are based on a recognition of this fact. The Class A design concentration is based on Class A fire testing.

Second, the proposal's based on belief by some that the current Class A design concentrations are inadequate. The critical point here I think is this is based on a belief.

There's no peer reviewed data from the field or laboratory supporting the contention the MDC's are too low. As a result, there's no consensus among the technical experts that such an increase is required.

If you look at field experience -- we've heard this before -- we've had 20 years of field experience with not a single failure to extinguish a fire.

Laboratory scale results have also failed to produce a smoking gun providing indisputable or compelling evidence of a need for increased design concentrations.

Finally the ROC makes no technical sense in its treatment of the different types of clean agents.

The ROC would raise the design concentration for halocarbon-based agents but for the inert gasses the design concentrations will remain the same.

There's no evidence from the field or from the laboratory to support this idea that the MDC's are somehow too low for halocarbons but somehow adequate for inert gasses.

Based on the above, I would urge the NFPA members to support the motion. Thank you.

MR. CLARY: Thank you. Microphone number 2.

MR. CAMPBELL: I'm Bruce Campbell with Hughes Associates and I speak against the motion. I think one thing we can't lose sight of with the safety factors is the fact that the safety factor's also there to support changing conditions of the enclosure.

You may have a door slightly open or ceiling tile that's up or a floor tile up, something

like that, where you need the extra concentration to account for that.

And I'm in the field quite a bit and see those conditions almost every week. And when we talk about success and failure, I do have a client that recently had a discharge in a fire that was not a success. It was a failure.

It caused a shutdown of some critical equipment for a short period of time, and things like this just don't get reported because my particular client really has no need to report to anybody, but it did happen within the last couple months. Thank you.

MR. CLARY: Thank you. And Mr. Harrington, final comment.

MR. HARRINGTON: Just to restate that the -- final comment --

MR. CLARY: Go ahead and --

MR. HARRINGTON: Maybe, if it's okay, I'll wait.

MR. CLARY: Okay. That's fine. Back to microphone number 2.

MR. WYSOCKI: I'm Tom Wysocki. I'm a

1 member of the NFPA 2001 Technical Committee and have
2 been kicking around this business since about 1973.
3 We've worked --
4 MR. CLARY: For or against?
5 MR. WYSOCKI: I am against the motion,
6 sir. We've worked with Halons, we've worked with
7 carbon dioxide, we've worked with virtually all the
8 clean agents.
9 And having been through the process that
10 our chairman described, I think the committee did a
11 wise thing in setting a floor on the minimum design
12 concentration for Class A fires.
13 The field data that's been referenced,
14 we've been unable to substantiate the actual design
15 concentrations that were used in the successful
16 extinguishments with the exception of several
17 instances where the old higher concentration was
18 used, as Mr. DiNenno noted.
19 We also see the difference in essentially
20 the same test with just a small difference in the
21 fire that Mr. DiNenno noted between ISO and NFPA.
22 Given those things, I think our committee
23 did a prudent thing. It was a bit of a compromise

but I would urge that this assembly support the action of the 2001 Technical Committee. Thank you.

MR. CLARY: Thank you. And number 2 again.

DR. LINTERIS: Hi. I'm Greg Linteris. I work at NIST, National Institute of Standards and Technology. I'm also on the 2001 committee but I'm speaking here on behalf of myself.

I am against the motion for the following reasons. I think the Class A test is a bad test. I think what happens is you spray in the suppressant but you don't mix it before it can interact with the fire.

And so what happens is you can have situations where the concentration locally at the thing that you're trying to put out is higher than it might be in a total flooding system where you're assuming the concentration is a totally mixed concentration. So I think that it's a bad test.

I think you can easily conceive of situations where you have fires -- conceive of -- I have made and seen fires that you cannot put out with these clean agents using the cup burner

concentrations which is what we're trying to go to. This is trying to fix a bad situation with a less bad number.

And finally, there is actually fundamental reasons for using the cup burner heptane numbers. There's some great work at NIST by Wing Tsang, a preeminent world class chemical kineticist, that shows the chemical mechanisms of how some of these reacting HFC's for example, chemical compounds, work.

The chemistry is the same for a wide range of hydrocarbon-like compounds. So to a large extent how they work doesn't make too much difference based on the fuel type.

So there is actually reason to tie it to the cup burner number. And again, that's just an attempt to undo a situation which is not very good because the Class A test isn't particularly good. Thank you.

MR. CLARY: Thank you. And microphone number 3 please.

MR. STILWELL: Brad Stilwell with Fike Corporation. The first thing I'd like to correct is

there are indeed --

MR. CLARY: Are you for or --

MR. STILWELL: I'm sorry. I'm for the motion, yes. I would like to say there are indeed field successful extinguishments at this 1.2 design concentration that uses the current UL FM test protocol.

The other thing I'd like to say is I don't believe the test protocol is a bad test protocol. Some of the things we do, we -- One thing we do, we have an 18-inch by 18-inch wood crib that's four things high and we put a gallon or a half gallon of gasoline on it.

We burn it for about six minutes and we put it in an enclosure and shut the doors and it takes a minute, minute and a half, to put the fires out.

The other thing, the plastic fires are burning for about three and a half minutes before we extinguish. I think -- and I've conducted tests on inert gasses, liquid gas, several gasses, and I would disagree with the statement that it's a bad test. Thank you.

MR. CLARY: Thank you. Now -- Okay. Stay at the microphone.

MR. WYSOCKI: Sorry. I'd just like to -- Mr. Stilwell, if there have indeed been --

MR. CLARY: You have to address through the Chair. Are you for or against the motion?

MR. WYSOCKI: I'm sorry. My name is Thomas Wysocki. Mr. Chair, I am against the motion and I'd like to address the last statement that Mr. Stilwell made that there have indeed been extinguishments at 1.2 times the MEC. That data has not been forwarded --

MR. STILWELL: If you read my --

MR. CLARY: Wait a second. Through the Chair. Right now the Chair recognizes number 2.

MR. WYSOCKI: I'll make the statement that at least I on the Technical Committee have not seen this data at these lower concentrations being used for documented extinguishments.

I think that piece of information, if it exists, would have been very helpful in looking at this. But I think we still would have come to the same conclusion. That's all. Thank you.

MR. CLARY: Thank you. Now number 3.

MR. STILWELL: I'm sorry, sir. One thing I'd like to --

MR. CLARY: Name? Are you for and against the motion?

MR. STILWELL: I'm sorry. Brad Stilwell from Fike. I am indeed for the motion, and when I submitted one of my comments about the safety factors and the current Class A protocol, I provided roughly 17 cases where fires were extinguished.

And the one that jumped in my head the quickest is there was a cancer research center in southern California and that document was indeed -- We made the flyer of it.

It was an FE-25 system designed at 8 percent and it put out a fire in a UPS room. And if you go back to the NFPA archives you will find that information in it.

MR. CLARY: Thank you. And microphone number 2.

DR. LINTERIS: Greg Linteris, NIST. As everybody in here probably knows, not all fires --

MR. CLARY: Are you for or against?

DR. LINTERIS: I'm against. Not all fires are created equal. Just because one concentration can put out lots and lots of fires doesn't mean it will put out all fires. It all depends upon how well stabilized the fire is. Thank you.

MR. CLARY: Thank you. Okay. Mr. Harrington.

MR. HARRINGTON: You can see how much fun my committee is. (Laughter) Okay. All I want to say is that -- reiterate that the committee work resulted in a consensus that was fairly strong.

And I listened to the arguments today on both sides and I believe the committee heard and discussed everything that we heard today and came to the action that they did. So that's it.

MR. CLARY: Thank you. And with this I will proceed to the vote on the Motion Sequence 2001 which is to return a portion of the report in the form of Proposal 2001-24 and related Comment 2001-16. All in favor of the motion signify by raising your hands. Thank you. And all opposed, same sign.

And there is no way I'm calling this one, so we're going to do electronic voting. So I now call members to use your devices.

You must have a red badge with the word Member on the top to be voting. I'll remind you that either 1 in favor of the motion, i.e. to accept, or 2, opposed to the the motion, to reject.

The motion on the floor is to return a portion of a report and in the form of Proposal 2001-24 and related Comment 2001-16.

So at this time please submit your votes. Five seconds. And the balloting is now closed. And the motion is rejected. And it fails, too.

Next up is Motion Sequence 2001-2 and looks like microphone number 5.

MR. GRODSKY: Thank you, Mr. Chairman. Larry Grodsky, Siemens Industry, also president of Fire Suppression Systems Association, representing the Fire Suppression Systems Association.

I move to return a portion of the report in the form of Proposal 2001-26 and related Comment 2001-17.

MR. CLARY: Thank you. Do we have a

second?

FROM THE FLOOR: Second.

MR. CLARY: We have a second also. Mr. Grodsky is the designated representative for the FSSA. Please proceed.

MR. Grodsky: Thank you, Mr. Chairman. The ROC proposed to add a table of design concentrations to be used for Class C hazards.

The ROC includes five conditions which must exist in the hazard in order to use the specified design concentrations.

As I enumerate the criteria for the use of the design concentrations, please try to picture yourselves in a computer room or at that type of structure trying to determine if these conditions exist.

Condition number one. Cable bundles containing power cables must be less than four inches in diameter.

Condition number two. Cable trays must be filled to less than 60 percent of their cross-sectional area.

Number three. Cable trays must be spaced

more than ten inches apart. Number four. Maximum power consumption or production in an individual piece of equipment must be less than or equal to five kilowatts.

And number five, electric power suppled to the equipment must be 480 volts or less. The enforcement of such conditions in real life field applications is untenable.

These conditions are not supported by any test data, technical justification, or field experience.

In fact, the latest research study on clean agent concentrations required for Class C hazards sponsored by the NFPA Fire Protection Research Foundation and funded in part by the FSSA indicates that clean agent extinguishing system concentrations are predicted upon energy flux, not upon the conditions given in the ROC.

The Fire Suppression Systems Association fully supports development of a standardized design concentration for Class C fire hazards based on good science.

The FSSA is working with members of the

1 NFPA 2001 Technical Committee to develop a tentative
2 interim agreement which will add standardized design
3 concentrations based on clear, usable, enforceable
4 criteria for NFPA 2001.
5 Specifically, the FSSA would like to see
6 design concentrations suitable for the most common
7 spaces protected by clean agents; namely, IT
8 equipment rooms and telecommunications facilities,
9 added to the standard.
10 Once again, tens of thousands of clean
11 agent systems have been installed over the last 20
12 years. As we said, we reported 191 successful fire
13 extinguishments, and 20 of those were in energized
14 electrical spaces, and zero failures to extinguish
15 have been available.
16 Clearly in the current provisions of the
17 standard there's been -- the standard's been very
18 effective.
19 To close, we ask that the assembly to
20 vote in favor of motion to retain the current
21 requirements for Class C minimum design
22 concentrations and remove the language contained in
23 the ROC as it is unenforceable and technically

unsupported. Thank you, Mr. Chairman.

MR. CLARY: Thank you. And Mr. Harrington, would you like to offer the committee's position?

MR. HARRINGTON: Yes, I would, and I need to speak as fast as that gentleman but I'm not sure I'm capable of it. I'll try.

Because I have -- There's a lot of history that the committee has been part of and it goes back several cycles.

We were here in I believe it was 2007 with a similar motion related to Class C, and the motion was upheld and the current standard shows that, basically saying that Class C concentrations shall be at least equal to Class A concentrations.

So the committee has been very active in the process of trying to better understand the Class C fire risk, and I want to go through some of the history pretty quick, touch on it at a high level just so you have an appreciation for what the committee went through and what fed into the committee action.

So in the last cycle -- Let me skip that

part because I don't think I have time. Let me pick it up after -- into the current cycle.

It was recognized in the last cycle that we needed more technical basis to address the issue of Class C.

So we approached the Fire Protection Research Foundation and, through their leadership, were successful in establishing a project, and also through funding and volunteer time of the entire industry and all segments of the industry, a very cooperative effort through the Fire Protection Research Foundation on Class C fires, culminating in a report.

The contractor who did the study and wrote the report was Dr. Greg Linteris who is here today. And that report was published in January 09.

One month later a workshop was held at the SUPDET conference in Orlando in February of 09 just on Class C issues.

Three working groups were established; one on electronic data processing hazard environments, one on telecommunication, and one on power generation.

At the end of the workshop, all of the results of the working task groups were brought together and some conclusions were drawn.

And both Doctor Linteris's report and minutes, if you will, from the SUPDET meeting are available on line.

What came out of the report that Doctor Linteris published are three major conclusions: With added energy, flame requires more agent to extinguish.

A little energy makes a big difference in the amount of agent required. And energy flux -- as was previously mentioned, energy flux to the burning surface is the key but not -- has not been studied very much up to this point.

What came out of the work group session SUPDET: The scope of Class C hazards should be focused. Narrow it down and focus on EDP, electronic data processing facility hazards and telecom, and don't try to include power generation.

It was recognized that the upper boundary of heat flux energy that could be addressed is probably in the 50 kilowatt per square meter range.

And it also was recognized that to really tackle this problem, extensive round-robin testing of Class C scenarios is probably needed but it was also recognized that probably the industry would not find it cost effective to fund it.

MR. CLARY: Please try to summarize. Please try to wrap up.

MR. HARRINGTON: So the point I'm trying to make with that is that all of that came forward into this cycle and was all considered by the committee in its deliberations and resulted in the ROC that you have before you. And I'll just leave it at that.

MR. CLARY: Thank you, and microphone number 3 please.

MS. ADRIAN: Thank you, Mr. Chairman. My name is Katherine Adrian. I'm an engineered systems product manager responsible for CO2, halocarbon, and inert gas fire suppression systems.

I'm here today representing Tyco International, a company which provides a wide range of fire protection products and services.

We are here in support of the certified

amending motion to make the existing language stated in the 2008 edition of NFPA 2001 paragraph 5.4.2.5.

The proposal to amend the design concentration for Class C hazards lacks justification.

A change of this magnitude requires scientific test data which at this time has not been presented.

In fact, the only data that has been presented to date shows successful extinguishment of Class C hazards with no reported failures.

In addition, the proposal includes criteria that are not well defined, allowing for different interpretations of the standard.

It is impractical to require testing on every installation where the proposed criteria cannot be met without an agreed-upon test protocol.

In closing, Tyco is supporting the Certified Amending Motion based on the absence of scientific data and agreed-upon test protocol which we believe will compromise the integrity of the standard.

MR. CLARY: Thank you. And microphone

number 2.

MR. DiNENNO: This is Phil DiNenno with Hughes Associates speaking in opposition to the motion, sort of following up a bit on the chairman's remarks about how the committee got where it got.

The committee's position three years ago was to go to a concentration that was in approximately a safety factor of 1.6 over the minimum extinguishing concentration.

And if you look at the Research Foundation data, the extinguishing concentration for fuels that are externally heated or with energy added sort of levels off at what number? 1.6, 1.7, two times that minimum concentration.

If you think back about what concentration we used on these applications for -- with CO2 and with Halon, the ratio is about 1.6 to 1.7 times.

We are not proposing anything so draconian in this particular version of the standard. We are at an analogous concentration increase of about 1.05 to 1.1.

So the committee worked very hard to try

to find a compromise position which would fit most of the needs of the user community.

Relative to the comment that those requirements or those criteria are too complicated to enforce, I would only add that those criteria have been in the ISO documents for I think about 15 years now.

So clearly the fire equipment distributors and installers who are installing nominally the same hardware and nominally the same gasses in Europe and throughout the rest of the world have not hit a wall with enforcing or interpreting these requirements.

We also know that if this proposal is accepted, we'll go to a situation where we're using concentrations of gasses that will not put out -- based on published information, some information which is currently in 2001, will not put out relatively simple energized electrical fires involving single small cables. So this is a very nominal set of changes.

We heard in 2007 the same calls by the industry for -- looking for solutions looking for

improvements, perhaps even recognizing the potential for an issue.

Effectively they have added or contributed nothing to that debate and now we're asked to roll back the clock because the criteria aren't -- they don't particularly agree with the criteria that the committee put together.

So, in closing, we know that if we accept this motion we'll have electrical energized fire scenarios that we can't put out.

We know from a theoretical and a small-scale test basis that the concentrations we're using now aren't acceptable.

We have that well-documented in a National Fire -- or a Fire Protection Research Foundation record report on the subject.

So I think the committee was well within its technical basis and technical grounds to make this very nominal and modest change. So I urge you to vote against this motion and support the committee in this action. Thank you.

MR. CLARY: Thank you. Microphone number 1 please.

MR. RIVERS: Thank you, Mr. Chairman. Again, this is -- my name is Paul Rivers. I'm an application development fire protection engineer at 3M Company and I'm a principal in the NFPA 2001 Committee -- I'm not speaking on behalf of the committee -- and the manufacturer of a clean agent in the standard.

I rise to support of the NITMAM due to the following two claims made by the committee: In the committee action changing Section 5.4.2.5 and associated paragraphs, the annexed material claims that the new Class C design values using a 1.35 safety factor are, quote, also based on the results of extinguishment tests involving energized electrical equipment. That is a false statement.

The committee's statement uses the rationale for the acceptance of this proposal claims the comment, quote, is consistent with laboratory tests on energized equipment. That is a false statement.

No specific fire data underpins the new table -- new data in the table of design

concentrations. I know because many of the research papers generating fire data used as rationale for these two false claims are based on papers that were coauthored by me.

Further, a recent paper written by NIST, referenced here earlier and funded through the Fire Protection Research Foundation, includes specific data referred to in committee claiming extinguishment data based on radiant heat flux rates as a rationale for higher concentrations. It's excellent data.

But these data have no relation to the new table of design concentrations. I know because 3M generated and published that data along with NIST back in the 1990's.

Using radiant heat flux rate as rationale for higher concentrations is valid, but only if applied correctly.

These data of heat flux rates that were used to justify the increased concentrations are in the range of 10 to 60 kilowatts per meter squared, while the real heat flux rates in data centers and telecommunications facilities are an order of magnitude less, in the 1 to 4 kilowatt per meter

squared range.

We need agent performance data at those lower heat flux rates on which to correctly base Class C design, and to that end 3M is committed to doing and plans to do the following:

Currently we are conducting multiple agent performance testings in our laboratories at the appropriate lower heat flux rates to publish within the next year.

We are confirming with experts in the data center and telecommunications industries, such as those on NFPA 75 and 76, the validity of such heat flux rates in end use.

We plan to work with NIST as proposed to provide independent validation of agent performance at the proper lower heat flux rates similar to the way we did back in the 90's.

And we will submit a proposal to NFPA 2001 Technical Committee in the next cycle for Class C design concentrations based on real data.

I ask the membership to join me in support of this NITMAM proposal and to send this issue back to the committee to remove the baseless

design criteria from the standard as submitted and replace it with design values based on relevant independently reviewed data. Thank you, Mr. Chairman.

MR. CLARY: Okay. Thank you. Microphone number 3 please.

MR. STILWELL: Yes. This is Brad Stilwell with Fike Corporation and I support the motion with a little bit of an asterisk and I'll explain myself here.

Class C fires -- and the other presenters are correct -- there is a lot of data and the NFPA Research Foundation did a study that shows when you augment fires electrically, more agent is required.

And what my plans would be is if this motion is successful -- the reason why I'm saying is successful is I would follow up with an amending motion to include the table that is called out in the standard right now, and I would make a motion -- if you want to look at 2001-17 Log 10, which basically what that does is it sets the concentrations for Class C fires at what's currently proposed in the standard.

But what it does, it helps the end user, the end user, the ANE, as far as making it more clear about what design concentration you should use.

When systems are installed in data centers, generally the room is empty, they don't know how much cable's going to be in the cable trays, they don't know the diameter of the cables.

And I also believe that a lot of these criteria don't necessarily -- there really is no technical background that says because the cable is four inches we need to use more.

So I believe we should just have a table that says, These are the concentrations that we need to use, and use them. Thank you so much.

MR. CLARY: Thank you. Microphone number 5, please.

MR. WYSOCKI: Thomas Wysocki, Guardian Services, Incorporated, a member of the NFPA 2001 Technical Committee, speaking in favor of the motion with the same caveat as Mr. Stilwell just put forth.

The NFPA Technical Committee in good faith tried to put together a set of criteria which would make these design concentrations readily usable

in the most common Class C type hazards. In retrospect I think we missed the mark a bit.

For example, the restriction on equipment power to 5 kilowatts is really not technically correct. We should have been looking at energy flux kilowatts per square meter. That's just one example of how we missed the mark a bit on this.

Nonetheless, what is in the ROC is much better than what is in the 2008 version where we basically say Class C equals the minimum of Class A.

Now, only because Mr. Stilwell has indicated his intent to make a follow-up motion to move his ROC proposal, I am asking this group to vote for the NITMAM in order to enable what I think would be a very good, very good, move for this standard to make a definitive statement on the concentrations for energized electrical equipment within a certain class of equipment and to allow this to be readily used by the people that install these clean agent systems in the most common hazards; data centers and telecommunication facilities.

So it's maybe a little bit convoluted saying, Support this NITMAM so that we can go on to a

follow-up motion, but that is what I am asking this group to do. Thank you.

MR. CLARY: Thank you. And microphone number 2.

DR. LINTERIS: Greg Linteris, NIST, member of the 2001 Committee and speaking on behalf of myself, I sort of don't know where --

MR. CLARY: And you are --

DR. LINTERIS: I don't know.

MR. CLARY: Against?

DR. LINTERIS: Against. I guess I'm against here because that's the sign I'm at. But here's what's going on.

So I did this study for the NFPA Research Foundation, and we didn't do any new research. I just looked at what was out there in the literature and -- but since -- My two areas of research at NIST are fire suppression and materials flammability so this project fit very well.

There certainly is technical justification for requiring more agent. Imagine a night light -- Do you remember the old style night lights that we used to have when we were younger?

The little round things that would heat up a little bit, they're 6 watts or something like that.

A night light like that, if it's leaning against a material, can double the amount of clean agent that you need to put the fire out. It doesn't take much heat flux to increase by a factor of two the amount of agent you need.

So when you think about it in equipment -- in a data center, we're not talking about the nominally operating equipment that has some heat generation. We're talking about a failed piece of equipment. That's why we have a backup system.

And it's pretty easy to envision a situation where you have heat fluxes on the order of a night light when something is going wrong.

Now, as far as technical justification, I looked at all the studies that people had done where they tried to simulate failing equipment and then figure out how much agent you needed to put out those fires.

And when people did that, I found heat flux is much, much higher than this six watts per square centimeter.

So there's definitely -- Based on all the studies that people did -- and many of these people are included among the speakers -- based on the tests that they did to try to simulate failing equipment, you expect much higher levels of heat flux. So we're well into this regime where you need twice as much agent.

So I think that what we're trying to do here is remedy a situation where the old standard is not requiring enough agent or trying to increase the amount that we need because, for situations where you're adding energy, it makes a tremendously big difference.

How best to do it; reject this or accept it and then go with Brad's thing, I'm not sure, but I'm against at this point. Thank you.

MR. CLARY: And at that, Mr. Harrington.

MR. HARRINGTON: Okay. Again, I think that the group here has heard the for and against arguments that the committee heard and the committee took action to find a compromise but still require additional agent for Class C fires. And I'll leave it to you.

MR. CLARY: Thank you. And seeing no one else at the mikes we're going to be proceeding in the vote on Motion 2001-2 which is to return a portion of the report in the form of Proposal 2001-26 and related Comment 2001-17.

So all in favor of the motion please signify by raising your hands. Thank you. All opposed? I suspect -- No. We're going to go to the electronic vote.

So by using your voting devices -- You must have a red badge with the word Member on top to be voting. I remind you either vote 1 in favor of the motion to accept or, 2, opposed to the motion, to reject.

And again, the motion on the floor is to return a portion of a report in the form of Proposal 2001-26 and related Comment 2001-17.

At this time please record your votes. Five seconds. And the balloting is now closed. I thought it was close. And the motion passes.

And since this is the last item on the docket for this one, at this time is there any follow-up motions?

MR. STILWELL: Yes, sir.

MR. CLARY: Microphone number 3 please.

MR. STILWELL: This is Brad Stilwell with Fike Corporation and I would like to make a motion to accept the original comment from the ROC, 2001-17, Log 10. If you'd like I can read that comment or --

MR. CLARY: No. Hold on for a second, but thank you. I have it now. Can you please -- First of all, according to our rules I'll need two seconds.

FROM THE FLOOR: Second.

FROM THE FLOOR: Second.

MR. CLARY: Okay. We have the two seconds. Would you please now explain the relevance of your follow-up motion and how it relates to the actions that we've already taken on the floor.

MR. STILWELL: Very good. The NITMAM that was just voted on was actually derived from my initial comment.

My initial comment was, The minimum design concentration for Class C hazards shall be extinguishing concentrations times a safety factor of 1.3.

The justification for that was a lot of the fire research that has been given, not all of it, but a lot of it's that's been given about the fires being extinguished in the field is based on the concentration times a safety factor of 1.3.

The one caveat that I have in my initial comment was the minimum design concentrations for spaces containing energized electrical hazard supply greater than 480 volts which remains powered during and after agent discharge shall be determined by testing as necessary and a hazard analysis.

So my initial proposal was, yes, we should indeed follow that table that we just discussed but we shouldn't have all of those other issues around it; the cable bundles and cable trays.

So it was more of a simple thing for the users of the standard to say, Okay, I have a Class C hazard, I should use this design concentration.

MR. CLARY: So do I understand the follow-up motion to be that you are moving then to accept Comment 2001-17 and its related -- in its original form?

MR. STILWELL: Yes, sir.

MR. CLARY: As the presiding officer I'll accept that follow-up motion. So at this time, Mr. Harrington?

MR. HARRINGTON: What the committee did was took that comment and essentially took the basis of 1.35 safety factor and created a table that showed the resulting concentrations that could be used, and then added some caveats, some restrictions and conditions.

Going back to the comment will eliminate those -- all but one, I think, of those restrictions, at least the restriction that if you have a hazard and voltage exceeding 480 volts, you have to do a special test in order to determine the design concentration. Otherwise you use 1.35 times the MEC.

And I just wanted to clarify, you know, what's different. And essentially the committee consensus is that an increase in the design concentration through an increased safety factor is needed for Class C and this would accomplish that.

MR. CLARY: Thank you. And for those out there, this is the follow-up. Again, we're talking in regards to the original language of Comment

2001-17, Log 10, which is found on page 2001-6 through -7, the Report of Comments fall of 2010. Microphone number 5.

MR. WYSOCKI: Thomas Wysocki, Guardian Services, members of the NFPA 2001 Technical Committee, and also the Task Group chair that worked on this particular Class C issue in committee.

I speak in favor of Mr. Stilwell's motion. I'd like the group to consider the result of passing Mr. Stilwell's motion versus rejecting his motion.

Let's first look at rejecting. If we should reject his motion, the NFPA 2001 standard will effectively return to the language which says Class C design concentrations shall be minimum equal to Class A design concentrations.

Doctor Linteris has already spoken to the fact that energy-augmented fires do require more agent than fires that are not subjected to external energy flux. That fact in itself makes it incorrect for us to go back to the current 2008 verbage.

What Mr. Stilwell has proposed is essentially to have those values in the table that

1 you saw in the ROC, but to take away the truly
2 difficult -- if we want to be charitable towards it,
3 they're very difficult to enforce. They're probably
4 more like unenforceable criteria.
5 They don't have really strong technical
6 substantiation and, as I said earlier, the 5 kilowatt
7 limit on electrical equipment is not a valid limit.
8 As Doctor Linteris pointed out, you could
9 have a 15 watt bulb that could subject a fire to a
10 heat flux that would require additional
11 concentrations.
12 And likewise, we could have a 100
13 kilowatt air handling unit within a room that would
14 have zero effect on a fire in a piece of electrical
15 data processing equipment.
16 So that's not a good criteria that we
17 have in there. I apologize for that but it's not.
18 What Mr. Stilwell has proposed will give us the
19 concentrations that will account for a reasonable
20 amount of energy flux that might be expected in
21 places like data processing centers,
22 telecommunications facilities, going -- the present
23 forward.

And one of the other items that we need to consider is that the energy densities and the heat that's in current data processing centers is quite a bit more than what it has been over the last 20 years, and it's still increasing.

So with those things in mind, this would be an excellent, excellent step for this group to take and help out the NFPA 2001 Technical Committee put forth a document which will be very useful and technically as good as we can get it at the present time given our level of knowledge.

So I strongly urge that you vote in favor of Mr. Stilwell's motion. Thank you, Mr. Chairman.

MR. CLARY: Thank you. And everyone kind of be ready at the microphones they want to go to. Microphone number 5, please.

DR. LINTERIS: Greg Linteris, NIST, 2001 committee member speaking on behalf of myself. I agree with what Tom said.

I think this is definitely a big improvement and a step in the right direction and I think that Brad has really proposed a good solution here and I'm in favor of it.

MR. CLARY: Thank you. And microphone number 4.

MR. RIVERS: My name is Paul Rivers with 3M Company and I'm stepping up here in opposition to this proposal which makes me -- it's a little something -- considering that for the last 15 years I've been looking at trying to get this right, I'm not opposed to increasing concentrations but the main thing that I am opposed with is putting in data or putting in values into the standard that are not based on real data.

Now, I can understand why you'd want to have that. I know why the installers want to have it. They want to have that guidance in the standard which they haven't had.

I think we can do that same thing. If you want to do it via TIA we can do it in a few months after the publication of this document and not have data that is going to go into the standard only to be changed again with new data -- values going into the standards that are going to be changed with new data that we will provide.

I don't have a problem doing that but I

would urge the membership here not to vote for this and allow the process to go ahead and get us some real data on which to base values in the standard. Thank you, Mr. Chairman.

MR. CLARY: Thank you. Microphone number 5.

MR. DiNENNO: Phil DiNenno, Hughes Associates, speaking in favor of the motion. I'll echo what the previous two speakers in support of the motion indicated.

And I also wanted to address Paul Rivers' point by saying that the data that we're putting in is clearly not perfect.

It probably represents the low end of what we might expect for other more severe power scenarios, but the data that's being included, at least for the agents that I've looked at, does represent realistic extinguishment data for some electrically heating scenarios.

So while it might not be perfect and it might not be representative of all electrical heating scenarios for all agents, it's much better than what we have now.

So I would urge you to vote for this follow-up motion. Thank you.

MR. CLARY: Thank you. Mr. Harrington, any final comments?

MR. HARRINGTON: I have none.

MR. CLARY: Okay. At that we're moving to the motion which is on the floor which again is to accept the original comment submission, 2001-17, Log 10.

And at that, all in favor of the motion signify by hands up. Thank you. All opposed, same sign. And the motion passes. At that we conclude with this document. Thank you, Mr. Harrington.

The next report under consideration this afternoon is that of the Technical Committee on Structures, Construction and Materials. This is the committee's report.

The Technical Committee chair is Peter Willse of Global Asset Protection Services, Hartford, Connecticut.

The committee report can be found in the blue 2011 Annual Revision Cycle ROP and ROC with Certified Amending Motions that are contained in the

Motions Committee report and behind me on the screen.

We will proceed in the order of the motion numbers presented. Mr. Willse.

MR. WILLSE: Thank you, Mr. Chair. Mr. Chair, ladies and gentlemen, the report of the Technical Committee on Structures, Construction and Materials is presented for adoption and can be found in the Report on Proposals and the Report on Comments for the 2011 Annual Meeting Revision Cycle.

The Technical Committee has published a report consisting of a partial revision of NFPA 703, standard for their fire retardant-treated wood and fire retardant coatings for building materials.

The report was submitted to letter ballot of the Technical Committee that consists of 16 voting members.

The ballot results can be found on pages 703-1 to 703-3 of the Report on Proposals and on pages 703-1 to 703-2 on the Report on Comments. The presiding officer will now proceed with the Certified Amending Motions.

MR. CLARY: Thank you, Mr. Willse. We'll proceed to Motion Sequence 703-1 and microphone

number 5.

DR. HIRSCHLER: Thank you, Mr. Chairman Marcelo Hirschler, GBH International speaking on behalf of NAFRA and I move to accept Comment 703-3.

MR. CLARY: Do we have a second?

FROM THE FLOOR: Second.

MR. CLARY: We do have a second. Please proceed.

DR. HIRSCHLER: Thank you, Mr. Chairman. The changes that were proposed to be made to this definition are proprietary changes.

What is being proposed is that the words "or other means during manufacture" of making fire retardant-treated wood be taken out.

This document and all of NFPA's codes and standards are performance documents where certain performance is required.

We don't normally -- We don't ever tell people how to make what you want to make. You make a particular product. Then you go and run the test or whatever performance is required and see if you pass or not pass.

This is unique in which it is being --

the user of the standard is being told how this product has to be made, not how it performs.

There are manufacturers who are making products that are not being made by the pressure process and yet comply with the requirements, the requirements being ASTM E84, extended for 30 minutes with a listed flame spread index of 25 or less, no evidence of significant combustion, no flame progressing more than 10.5 feet beyond the center line of burners at any time during the test. I'm just reading from here.

The point is that it is being done by manufacturers without going through the pressure -- through the pressure process.

And so suddenly those products will no longer be valid because the manufacturing process they chose is different from the manufacturing process chosen by the proponent of this definition. That's just not acceptable.

And I want to make something very, very clear because it was suggested that I'm dealing with manufacturers who make coated product.

They may make coated products, but they

also make fire retardant-treated wood by manufacturing process that are not the pressure process.

Please support my motion and don't allow something that is a propriety issue to come into the standard. Thank you.

Just want to point out one more thing. You're going to hear this discussion here, in 101 and in 5000, because the same change of definition has been put in all three.

Unfortunately we do not have the definitions being extracted so -- they're all independently the same so we're going to hear the same thing three times. Sorry about that. But please support this motion. Thank you.

MR. CLARY: Thank you. Mr. Willse, do you have a committee perspective?

MR. WILLSE: Yes. I'll respond. Doctor Hirschler is correct in the fact that we're going to be hearing this again. We're going to be hearing it under the NFPA 101-1 and 101-2 as well as the 5000-5 and 5000-6 comments that will come up.

The committee had received a public

proposal that was submitted in. A gentleman from -- who was a manufacturer of the wood products wrote the proposal, said that as far as he knew there was only pressure-treated that was being used, there were no other proprietary systems. Therefore we could turn around and eliminate that part.

MR. CLARY: Thank you. Microphone number 1.

MR. BEITEL: Thank you. Jesse Beitel, Hughes Associates, speaking for myself on this issue. I am a member of the committee, I'm speaking for the committee. What we wound up changing --

MR. CLARY: Are you speaking for or against?

MR. BEITEL: I apologize. I'm speaking for the motion on the floor. The committee basically modified -- and you can see -- If you look at Proposal 703-5 on page 703-2, you will see the rewording that was done by the committee for the definition of fire retardant-treated wood.

And basically while we moved a few -- added some words, we basically stripped out the words "or other means during manufacture." And at that

point it sounded like a good idea.

Later on -- and in fact, even in my letter ballot to that proposal, I realized that we did that -- there are other issues and there are other products which could potentially be used which are not made the way that the committee rewrote the proposal but could still pass the test and still potentially be used as a fire retardant-treated wood product.

So, for example, right now fire retardant-treated wood is basically the wood and then it is put into vats, pressure-treated. The chemicals are forced by the pressure into the wood.

It comes out. We have fire retardant-treated wood which will meet the requirements of the 30-minute E-84 test.

If I have a product -- and I know of some products that are like this -- where the manufacturer may take layers of, for example, paper and basically treat those layers with some type of resin material which may have a fire-retardant component in it.

Then you take those layers and you put them together. Then you actually then compress those

layers and create a product. Now that product, which could also meet the 30-minute E-84 test, would now not meet the definition of FRTW wood because it's not necessarily impregnated into the product.

The components are treated and then the product is formed. That's a big difference, and so therefore those products would not be allowed.

So we have a problem with this. I think that we need to go back to the standard definition. We have some concerns.

And especially as some of these newer products come onto the marketplace in the next several years, we don't want to try to keep them out because we wound up making a definition or a change in the definition which is very proprietary for existing products and may affect future products.

So I would ask that the assembly support the motion on the floor. Thank you very much.

MR. CLARY: Thank you. Microphone number 4 please.

MR. OWEN: Thank you, Mr. Chairman my name is Kris Owen. I represent Arch Wood Protection. I support the motion on the floor.

Our company has been in the fire retardant wood industry for over 60 years. As a company whose history and ongoing business is based on sound science, research and fire testing, leading to successful wood treatment for safe and code-conforming wood products, we ask that you support this motion to ensure the phrase "or other means during manufacture" be maintained in the standard.

For over 15 years, expending thousands of dollars, working with a number of companies, we continue to work toward introducing fire retardant chemistries added during manufacture -- in the USB industry, for example -- to give fire-retardant properties to that product.

We continue this effort today to give engineered wood composites such as OSB the fire safety the code requires.

Defeat of this proposal today would set our efforts and the work of other companies back considerably, restrict the opportunity to develop the science, and halt the opportunity of a significant move forward in fire safety and engineered wood composite products used in lightweight construction.

We urge you to support the motion and thank you.

MR. CLARY: Thank you. Microphone number 6, please.

MR. VERSTEEG: Good afternoon, Mr. Chairman. Joe Versteeg representing myself. I'm a voting member of NFPA 703 Committee as well as chair of NFPA 5000 Building, Construction. I speak against the motion.

If the motion were accepted, we would revert back to the text in the code as previously written and you would lose the verbage requiring the product to be labeled or listed.

MR. CLARY: Thank you. Microphone number 2.

MR. BOUCHER: Thank you, Chair. David Boucher, Hoover Treated Wood Products and I'm speaking against the proposal.

I wanted to point out that fire retardant-treated wood is treated in a pressure impregnation process. That process is not proprietary. I think that's being confused.

Hundreds of treaters in the United States

use the same process and use multiple chemical company manufacturers' treatments in their process. It's not a proprietary process and I urge you all to reject this proposal. Thank you.

MR. CLARY: Thank you. Microphone number 1.

MS. NEWMAN: Good afternoon. My name is Kathleen Newman. I'm with FireTect flame retardant manufacturing and application in California. I'm in favor of the NITMAM. I'm also a member of the Technical Committee as well.

The Standards Council's responsible for ensuring that the rules have been followed and that the due process and fairness has been upheld.

I do not believe that due process and fairness has been achieved in this case. The code should not state specific processes but it should include performance-based standards.

As long as there are other methods of achieving the same exact goal, no industry or process should be excluded. The deletion of "or other means" will limit any other process from being used to achieve the requirement for NFPA 703.

It is important to include the existing word of "or other means" so it does not limit the options for builders and authorities having jurisdiction when complying with NFPA 703.

Many companies have invested time and money into research and development to achieve the ASTM extended E-84, 30-minute test.

These tests were done by the same accredited labs and are listed by the same accredited agencies that are used by the pressure-treated or impregnated wood industry.

The removal of "or other means" is a direct attempt to limit options for fire safety to comply with the NFPA 703 standard for fire retardant-treated wood and fire retardant coatings for the building materials.

It is important to leave "or other means" in the terminology because there are other technologies that include absorbance impregnated treatments that still meet the standards.

So for these reasons I urge the NFPA voters today to vote to reinstate the words as it is currently written and include "or other means" and

support the NITMAM. Thank you.

MR. CLARY: Thank you. Microphone number 2.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products. In the testimony where they're supporting --

MR. CLARY: Are you for or against?

MR. HOLLAND: I am against the motion. In the previous testimony you heard could, should, may. Working 15 years -- and I've been in this industry for 30 and it hasn't happened.

When we submitted the change we did submit proposals and comments that had different approaches besides eliminating the words "or other means during manufacture."

The committee chose overwhelmingly to eliminate the words "or other means during manufacture" as opposed to the other methods that we were approaching in order to eliminate the abuse.

And that's really what we're talking about here is abuse. You heard the previous speaker talk about or other means, or other means, or other

means.

Not once did you hear "or other means during manufacture" and that's where the abuse is coming in.

There are materials out there that are pretending to be fire retardant-treated wood that are produced by "or other means" which the section is not intended to cover.

The section is only intended to cover "or other means during manufacture." That's where the abuse is coming in.

Like I said, we presented different options. This is the option that the committee overwhelmingly chose to select.

When you're looking at the agenda, I really don't understand why they're doing what they're doing here, saying, you know, If you do what I want you to do you're going to go back to this language that's being shown in the agenda.

That's already been accepted by the committee. So you haven't done anything as far as changing what was done by the committee except eliminating another section that was overwhelmingly

approved not only by the TC but also the Technical Correlating Committee also recommended approval on this as well, and that's one of the things you're going to hear later on.

The proprietary is a red herring. Pressure treating wood's been around for over a hundred years.

We are trying to eliminate the abuse. Not once did I hear any of the previous speakers who were supporting the motion saying, I've got a product out there that is done by "or other means during manufacture." Not once did you hear that.

What you had heard was may, could, should. When that day happens, I will gladly support doing something in order to recognize that product.

But right now that section is being abused. We're getting stuff out there that's got paint applied on one side. We've got all this untreated wood on all the other sides and they're trying to say, I'm fire retardant-treated wood.

I know of no product in the United States that has a listing for the 30-minute extended test that's required by that section, but yet they're out

there pushing this product saying, Oh, we're fire retardant-treated wood. We would urge you to not support the NITMAM.

MR. CLARY: Thank you. Microphone number 5.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA and in support. I just want to point out -- You heard Joe Holland talk about no one has this, if they ever come.

Well, at least one of the speakers said they have a product like that. One of the speakers said, We're imminently ready to have a product like this.

But the point is is the code the place to say, If you develop something, we're not going to allow you to use it because you didn't manufacture it the way we manufacture it?

Joe Holland talks about the cheating, talks about the coating. I told you from the beginning anything that meets this definition cannot be fire retardant-coated wood. It cannot be a coated product.

Coated products won't meet this. Coated

products are not acceptable in the same way that fire retardant-treated wood is acceptable.

I am not here supporting coated products on this issue. I do think coated products have a place in the market and there's some areas where they should be used.

But here, all this is doing, all this change in the definition is doing, is saying, We cannot accept progress, we cannot accept any other way of making something. Only my way or the highway. My way is the only way I can accept.

This is not the way we write code. This is not the way we write standards here. We allow people to come onto the market with whatever way they make the stuff as long as it meets the requirements.

And the requirements are that you meet -- you have to meet the test with a product that's impregnated, so the product has to go all the way through -- sorry -- not all the way through. It has to go through. Not just painted.

A painted product, a coated product, is not fire retardant-treated wood. But fire retardant-treated wood does not have to be made by a

pressure-treated process.

Another point that was made before is that if this definition that is proposed by the NITMAM is accepted, it doesn't talk about listed or labeled.

Why does it necessarily have to be listed and labeled in the definition? That's just a little bit more money for the listing organization.

I'm all in favor of listing and, in fact, the definition does talk about listed flame spread, but the entire product?

I mean, I agree, and Section 4.5 of 703 already tells you that fire retardant-treated wood used in 703 shall be listed and labeled, but it doesn't have to be in the definition. That's another point. Thank you.

MR. CLARY: Thank you. Microphone number 1 please.

MR. MILLER: Thank you. My name is Tim Miller with Flame Control Coatings and I support the motion. And at the point of being redundant, it shouldn't be about a process. It should be about

having other means to satisfy the test, and if you pass the test requirements, I don't know how you can be considered a cheater.

So it's about making the tests speak for themselves and if you have something that passes the required test, your product should be allowed even if it doesn't meet one word or one process. Thank you.

MR. CLARY: Thank you. Microphone number 2.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products, again speaking against the motion. Again, we've just heard "or other means." They're conveniently forgetting "during manufacture," and that's where the abuse is coming in.

Now, the previous speaker also said he's not talking about coating, but I'm telling you, that's what this is about. It is about coatings.

We wouldn't be up here if it wasn't for the abuse. And they're saying, Well, we don't tell you how to do stuff. That is a red herring. That is not true.

If I had the time, I could go through the

code and I could show you many, many, many, many instances where we tell you how to do something and what you need to do in order to do it. So that's absolutely incorrect.

We urge you to support the committee. They overwhelmingly went in this direction rather than some of the other options that we presented to them. Thank you.

MR. CLARY: Thank you. Microphone number 6.

MR. VERSTEEG: Joe Versteeg representing myself, member of the NFPA 703 Technical Committee. To the issue of listed and labeled --

MR. CLARY: And are you speaking for or against?

MR. VERSTEEG: I'm sorry. I'm against the motion. Speaking to the issue of listed and labeled again, the reference was brought up that the current text has the phrase "has a listed flame spread index of 25 or less," comma, "and shows no evidence." There's no requirement for listing or

labeling of the second part of that test.

So listing and labeling in the beginning covers everything within the criteria. Thank you.

MR. CLARY: Thank you. Microphone number 1, please.

MS. NEWMAN: Hi. Kathleen Newman, FireTect. I am for the NITMAM. And I just want to say that anything that is done to the wood after it's cut down from being a tree, no matter what it is, is part of a manufacturing process. Thank you.

MR. CLARY: And number 5. I don't care which one, but one of you.

DR. HIRSCHLER: Marcelo Hirschler, GBH International for NAFRA and in support of the motion. I want to point out a couple things.

First of all, the definition proposed does include the words, "or other means during manufacture." I'll repeat: "During manufacture" remains in the definition. "During manufacture" remains in the definition. "During manufacture" remains in the definition. I support that the terms "during manufacture" remain in the definition. Okay.

With regard to the issue of listing, 703 requires fire retardant-treated wood to be listed and labeled. I support that. That is very important. So please support the NITMAM. Thank you.

MR. CLARY: Number 5. Go ahead.

MR. KAMALASANAN: My name is Kutti from Saudi Arabia, working for Saudi Aramco. From 19 years I have come later. If any code want to change selected as per the requirement, I have --

MR. CLARY: Are you for or against the motion?

MR. KAMALASANAN: I am in support of the motion.

MR. CLARY: Thank you.

MR. KAMALASANAN: I have develop 2009 subject -- I will now already brought up the subject to NFPA to consider for -- So I like to submit this for an example for everybody to have a look.

MR. CLARY: Thank you. No. 3 please.

FROM THE FLOOR: Call the question.

MR. CLARY: We have call the question. Do we have a second?

FROM THE FLOOR: Second.

MR. CLARY: We have numerous seconds. That's non-debatable. So at this time we'll -- The Chair is busy. Okay.

Once again, we have a motion to call the question which is non-debatable. All in favor of the motion please signify by rasing your hands. Thank you. All opposed, same sign. The motion carries.

At this time we go immediately to the Motion Sequence 703-1 which is to accept Comment 703-3.

All in favor of the motion please signify by raising your hand. Thank you. All opposed? It's late in the day but you're so spread apart, so for the final time for me up here, I will now call for a vote using electronic voting devices.

You must have a red badge with the word Member on the top. 1 is in favor of the motion or 2 to oppose the motion and reject.

Again, the motion on the floor is to accept Comment 703-3. And at this time please record your vote. Five seconds. And the balloting is now closed. And the motion passes. Any further

discussion on this document? Seeing none, at this time we'll move on to NFPA 101. Thank you, Mr. Willse.

MR. WILLSE: Thank you.

MR. CLARY: And before we begin the next document it is my extreme pleasure to introduce Dr. James Milke, member of the Standards Council, who will be the presiding officer during the final three documents.

DR. MILKE: Thank you, Shane. We'll move right into the next set of documents. As you've heard I'm tasked with leading us through the next three which will be the final three documents.

My goal is to work expeditiously so that I can make my plane at 9 tomorrow morning.

(Laughter.)

The next report under consideration this afternoon is that of the Technical Correlating Committee on Safety to Life.

Here to present the committee report is Technical Correlating Committee Chair, William Koffel of Koffel Associates, incorporated Elkridge, Maryland.

The committee report can be found in the blue 2011 Annual Revision Cycle ROP and ROC. Their Certified Amending Motions are contained in the Motions Committee report and behind me on the screen.

We will proceed as usual in the order of the motion number presented. Mr. Koffel.

MR. KOFFEL: Thank you, Mr. Chair. Ladies and gentlemen, the Safety to Life Technical Correlating Committee is presenting one report for adoption and can be found in the Report on Proposals and the Report on Comments for the 2001 Annual Revision Cycle.

The Technical Committee and the Technical Correlating Committee on Safety to Life have published a report consisting of a partial revision of NFPA 101 Life Safety Code.

The report was submitted to letter ballot of the Technical Correlating Committee and the Technical Committee.

All ballot results can be found on pages 101-8 to 101-224 of the Report on Proposals and pages 101-8 to 101-161 of the Report on Comments.

The presiding officer will now proceed

with the Certified Amending Motions.

DR. MILKE: Thank you, Mr. Koffel. In the interest of trying to do something a little more expeditiously, I'd like to propose the following process as we move forward.

As you've heard, for a couple of these Certified Amending Motions that come up next, the first one being 101-1, that it's largely the same as what we've just discussed.

So if there are no objections what I'd like to propose as Doctor Hirschler provides a short motion, to then only emphasize those items which are different than we've just had.

So if there are no objections I'd like to proceed that way and perhaps expedite the process here a little bit. Good. Microphone number 5, please.

DR. HIRSCHLER: Thank you, Mr. Chairman. Marcelo Hirschler, GBH International, speaking for NAFRA and I hereby move to accept Comment 101-24.

DR. MILKE: There is a motion on the floor to accept Comment 101-24. I did hear a second already. I guess, Doctor Hirschler, a short comment

perhaps.

DR. HIRSCHLER: Yes. Very short. This is almost identical before -- The only slight difference, which is why 101-2 is there afterwards, is that the word index is not in here.

So if this motion passes, then I will make the subsequent motion which just adds the word index. Other than that, it's the exact same thing that we've discussed for the least 10 or 15 minutes. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to offer the committee's position?

MR. KOFFEL: Thank you, Mr. Chair. As you can see, in the ROC on Comment 101-24, the action of the TCC was to produce a definition consistent between 101 and 5000.

We had no way of really addressing the 703 item at that time. However, based upon the previous action we would encourage you to support this comment as well as the next motion so that the definitions in 101 would be the same as 703.

DR. MILKE: Microphone number 2.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products.

DR. HIRSCHLER: Excuse me, point of order. The screen is wrong. Excuse me. Could you amend that, please?

DR. MILKE: And would microphone number 2 state whether you're for or against.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products, speaking against the motion. It's unfortunate that the membership did not understand the significance of the previous change, because this was acted on by three separate committees and they all agreed in some fashion that the "ordinary means during manufacture" was a concern and needed to be removed from it.

So again, we would ask for you to support our position and not support the NITMAM, to vote against the NITMAM. Thank you.

DR. MILKE: Microphone number 5, are you wanting -- No. Any further discussion on Motion 101-1 to accept Comment 101-24? Seeing none, we will move to a vote.

Before we vote, again, the motion on the

1 floor is to accept Comment 101-24. All in favor of
2 the motion please raise your hand. All opposed? The
3 motion passes.
4 Let's move on to Motion 101-2, again,
5 with the expeditious mode in mind. Microphone number
6 5, please.
7 DR. HIRSCHLER: Marcelo Hirschler, GBH
8 International, speaking for the North American Flame
9 Retardants Alliance, and I move to accept Comment
10 101-23.
11 DR. MILKE: There is a motion on the
12 floor to accept Comment 101-23. I heard a second.
13 Please proceed with the discussion of the motion.
14 DR. HIRSCHLER: This is identical to the
15 previous one. The only thing it does is correct an
16 editorial change. Add the word index. No other
17 change. Thank you.
18 DR. MILKE: Thank you. Mr. Koffel, the
19 committee's position?
20 MR. KOFFEL: Again, the intent of the
21 Technical Correlating Committee is consistent
22 definition. Accepting this comment and accepting
23 this motion would in fact result in definitions

consistent between 5000, if a subsequent CAM is approved, 101 and 703.

DR. MILKE: Thank you, Mr. Koffel. We can now open up debate on this motion. Is there anyone at a mike? Seeing no one we'll move then on to the vote.

The motion on the floor here is Motion 101-2 to accept Comment 101-23. All in favor of the motion, please indicate by raising your hand. All opposed? The motion passes. Move on to Motion 101-3. Microphone 5.

MR. CRIMI: Thank you, Mr. Chairman. My name is Tony Crimi, A.C. Consulting, representing the International Firestop Council and I'd like to move acceptance of Comment 101-89.

FROM THE FLOOR: Second.

DR. MILKE: Thank you. There's a motion on the floor to accept Comment 101-89. I heard a second. Mr. Crimi, would you like to discuss the --

MR. CRIMI: Thank you, Mr. Moderator. The purpose of this proposal is to clarify and prevent a misapplication or potential misapplication of the Life Safety Code and the standards in relation

to the determination of fire resistance ratings for building elements.

Fire resistance ratings for building elements in the code by definition are determined in accordance with the test standards NFPA 251 or ASTM E119 or UL 263.

Those test standards do not have provision for testing assemblies for true fire resistance ratings that incorporate both active and passive means of fire protection.

This issue was originally raised by some authorities having jurisdiction who expressed concern about the fact that they were receiving test reports from manufacturers claiming by definition a fire resistance rating for assemblies that incorporated either a water protection system or other form of suppression system in combination with building elements like glazing or columns or, in some cases, walls or doors.

What this provision does is clarify that a fire resistance rating by definition cannot incorporate both active and passive elements to achieve the fire resistance ratings, that if you're

1 going to do that you really need to use the
2 alternative provisions in 104 or the performance
3 provisions in 105.
4 It's important to understand that those
5 test standards have been around in some cases for
6 almost a hundred years, and they just don't make
7 provision for that kind of assembly.
8 The difficulty that you have is that if
9 someone comes in with a test report and claims that
10 it's a fire resistance rating in accordance with the
11 standard, the burden of proof becomes on the AHJ to
12 disprove the fact that that assembly is in fact
13 tested in accordance with that standard, whereas the
14 burden of proof should really be the other way around
15 where the proponent has to indicate why their system
16 may provide equivalent or similar performance.
17 The other thing that it's important to
18 try not to muddle is the fact that in some cases we
19 have different fire resistance ratings for
20 sprinklered buildings than we do for unsprinklered
21 buildings or occupancies or locations.
22 This kind of report or this kind of
23 provision muddies the water by combining these two

things into single sort of submissions.

In cases where sprinklers are provided in buildings, there has already been credit for that and the expectation then is that whatever passive fire resistance rating requirements still exist in the code, they are to supplement whatever was -- whatever was remaining after we decided to sprinkler the building. So those provisions have already been taken into account.

The public comment on this item was originally accepted by the Technical Committee at its meeting but failed to achieve the necessary two-thirds vote during the letter ballot by a single vote. The vote was 13 to 8.

So we would urge you to support Comment 101-89 and support this motion in order to be able to achieve a clarification of a potential misapplication of the code. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to offer the committee's position?

MR. KOFFEL: Mr. Chair, I sit on the Technical Committee on Fire Protection Features representing the Glazing Industry Code Committee.

1 Therefore, to avoid any potential
2 conflict of interest at this time, I am going to step
3 down and I have asked Eric Rosenbaum, chair of the
4 Fire Protection Features Technical Committee, to
5 address the issues on behalf of the Technical
6 Committee and to explain the TCC note.
7 DR. MILKE: Thank you. Mr. Rosenbaum.
8 MR. ROSENBAUM: I'm Eric Rosenbaum,
9 chairman of the Fire Protection Features Committee.
10 I intend to present the committee's opinion.
11 As originally indicated in committee
12 meeting, the committee originally accepted in
13 principle the proposed change.
14 Several concerns were identified and the
15 majority agreement was achieved at the meeting.
16 However, upon balloting a two-thirds affirmative vote
17 was not achieved. Therefore the final action was
18 changed to reject.
19 Rationale for the rejection is provided
20 on page 101-36 and 37 of the ROC. This rationale
21 included compliance with test methods or analytical
22 methods are required already.
23 The change creates possible confusion and

can result in sprinklers not being allowed even with equivalency or performance.

Commentary was not felt to be necessary and a similar commentary could be applicable to many other sections in the code.

Section 104 equivalency adequately addresses issue and is always available but not highlighted in every case where it is potentially applicable.

Code already allows use of Chapter 5 for this and many other issues but code does not highlight every case.

Technical basis was not sufficient for change. Change may inhibit the use of equivalencies and similar changes have been submitted in multiple cycles and not passed.

DR. MILKE: Thank you, Mr. Rosenbaum. Microphone 3.

MR. ZAREMBA: Tom Zaremba, Roetzell and Andress, speaking in support of the motion to accept the comment.

As was mentioned several times now, the committee vote was extraordinarily close. It was two

thirds less one vote or 13 to 8. Had it been 14-7, the outcome would have been entirely different.

The IBC has recently adopted a very similar provision to this that will become a part of the 2015 International Building Code.

And the reason for its adoption was very pragmatic. As everyone here knows, standards, test standards, can be altered by virtue of code provisions.

Well, what has happened in this case and that this comment is intended to address, is that there has become a de facto exception to the code in certain circumstances by virtue of the publication of evaluation services reports that basically provide a blanket equivalency between the operation in certain applications of automatic suppression devices with materials that are tested to ASTM E119 and secure fire resistance rating.

This particular provision is intended to override essentially that de facto exception that is being utilized in the field with authorities having jurisdiction where the evaluation services reports are being used as, in effect, regardless of the

circumstances or regardless of the specifics of the application, as a de facto exception of the code.

This provision, if adopted, is going to restore to the authority having jurisdiction the necessary code provision to enable the authority having jurisdiction to review each individual circumstance individually to determine whether or not there is in fact equivalency between a fire resistance rated product tested to E119 and the use of an automatic suppression device.

For example, you could have curtains installed after the fact, after the building goes up, and perhaps those types of applications where the curtain would block the sprinkler from activating and cooling or wetting a specific product during a fire outbreak could be avoided by restoring to the authority having jurisdiction the requisite authority to review the circumstances of each application on a case-by-case basis.

And for these reasons I urge you to vote in favor of accepting Comment 101-89. Thank you.

DR. MILKE: Thank you. Microphone number 5.

MR. LATHROP: Jim Lathrop, Koffler Associates, and I don't think I have a client interest in this but since Bill stepped down, I guess the company does so we do somewhere. I don't.

First of all, I do want to point out something I think Eric pointed out that I really want to emphasize.

The committee in session approved this, and in fact in ballots the committee approved it as far as a majority vote but not the two thirds.

I encourage you strongly to look at those negative votes because if you look at some of them, they have nothing to do with the technical issue going on here.

In fact, one of the negative votes was totally about the fact that the proposal is equating three -- the ASTM, the NFPA, and the UL test methods, and they're saying unless they're proven, they're equal to each other.

Well, we all know that the last few editions of both the Life Safety Code and 5000 have equated those without actually saying they're equal.

Now, if you take that one vote away,

guess what. This passes two thirds. And in fact that vote influenced at least one other vote because one vote was changed based on that justification, and so it would be well over two thirds.

I encourage you to look at the other negatives because in addition to Eric when he went through them, several of the other negatives weren't addressing the technical issue here.

I ask you one major question. Think about this. Why do we have fire resistance rated barriers in sprinklered buildings. Why?

If we rely on the sprinklers a hundred percent, a hundred percent, we don't need them. Obviously they're there for the little -- I don't want to get into the issues of 1 percent, 2 percent, 5 percent, but that little percent of the potential for sprinkler failure.

If the sprinklers fail, guess what's going to fail? The sprinklers that are protecting that glass.

Now, the last thing I do want to emphasize, because this has come up several times at least in other areas so people might be thinking of

it, this has no effect whatsoever on the atrium provisions that allow sprinklers and glass to be substituted for the separation wall.

Because that has never been equated to a fire resistance rated wall. In fact, never required specialized sprinklers to do it.

DR. MILKE: Mr. Rosenbaum, any final comments? Seeing none from Mr. Rosenbaum or anyone else at a mike, we'll move on to a vote.

The motion on the floor is to accept Comment 101-89. All in favor please raise your hand. All opposed? The motion passes.

Moving on to Motion 101-4. I'm sorry. Microphone number 3, please.

MR. ZAREMBA: Tom Zaremba. I am the submitter of the comment and the motion and I would like to withdraw the Certified Amending Motion please.

DR. MILKE: Okay. Thank you very much. Moving on then to Motion 101-5. Microphone number 3.

MR. CABLE: Eugene Cable, Life Safety Consultants, Averill Park, New York, representing myself and making a motion to accept Proposal 101-89.

DR. MILKE: Thank you. There's a motion on the floor to accept Proposal 101-189. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Hearing a second, please proceed with the discussion on the motion.

MR. CABLE: This proposal is an attempt to head off what I believe is a growing tendency to use this Section 8.6.8.2, the two-story convenience opening, when the design team cannot meet the mini-atrium requirement and does not want to incur the expense of an atrium engineered smoke management system.

Often now, even in health care, I am seeing an open lobby type floor plan with large vertical openings.

Without a corridor, this means we no longer have the two-story vertical opening tucked behind a corridor wall.

That vertical opening that had to be separated from the protected way to two exits is no longer separated.

Everyone's egress path with the open

1 floor space is now exposed to this vertical opening
2 and any fire/smoke condition developed from the floor
3 below.
4 The convenience opening was originally
5 intended to allow for a stair, often a spiral stair,
6 spoken two vertically-aligned offices. The offices
7 are bounded by a corridor wall and doors.
8 I see no problem with vertical opening
9 exposing two rooms. I do sense trouble when the same
10 vertical opening exposes large areas on both floors
11 because there's no identifiable corridor.
12 I submit that when no corridor exists, we
13 lose the ability to appropriately apply convenience
14 opening protection.
15 This situation violates a fundamental
16 requirement. Section 4.5.6. Every vertical opening
17 between floors of a building shall be suitably
18 enclosed or protected as necessary to afford
19 reasonable safety to occupants while using the means
20 of egress and to prevent the spread of fire, smoke,
21 or fumes through vertical openings from floor to
22 floor before occupants have entered exits.
23 Many of you are familiar with the FSES,

Fire Safety Evaluation System, for evaluating alternative approaches to life safety.

Of all the 13 safety parameters, the unprotected vertical opening takes the greatest possible hit for life safety. A fundamentally important concept is to properly protect vertical openings.

Getting back to the proposal before us, my intent is to add language which will require the two-story vertical opening, called the convenience opening, to be separated or protected in some way as it was, with a room around it.

If there is no corridor to separate the floor area from the opening, then some type of enclosure should be provided.

I urge you to vote for this motion in order to protect the convenience opening as originally intended.

DR. MILKE: Okay. Welcome back, Mr. Koffel. Would you like to make a statement on behalf of the committee?

MR. KOFFEL: Yes, Mr. Chair. One of the responsibilities of the Correlating Committee is to

correlate the actions of the various Technical Committees that report to us.

When a proposal or comment comes before us with a committee action to reject, there rarely is a correlation action.

Therefore, on this motion, as well as subsequent motions today, one of the things that I will offer is a personal opinion as to whether I believed they create a correlation problem or not.

In this instance I do not see any correlation problem and therefore would defer to Eric Rosenbaum, chair of the Technical Committee on Fire Protection Features, to present the committee position on this item.

DR. MILKE: Thank you. Mr. Rosenbaum.

MR. ROSENBAUM: I'm Eric Rosenbaum, chair of the Fire Protection Features Committee. My intent is to present the committee's opinion.

The committee reviewed the proposal and thought that it would potentially be more appropriate for this requirement to be located in specific occupancy chapters if it's appropriate, and felt that the current provisions of the code are adequate in

addressing the concerns of the submitter.

DR. MILKE: Okay. Thank you. With that we can open up debate on this proposal or motion to accept Proposal 101-189. Microphone number 2.

MR. HUEY: First I'm speaking against. I'm Marvin Huey, FTC Architects, Dallas, Texas, speaking on behalf of the health care section.

At our meeting yesterday the board and its members voted not to support this motion.

DR. MILKE: Okay. Thank you. Any further discussion on Motion 101-5? Seeing none we move to a vote.

This motion on the floor is to accept Proposal 101-189. All in favor, please raise your hands? All opposed? Motion fails. The next motion was submitted by an employee of Koffel Associates. Mr. Koffel?

MR. KOFFEL: Yes. The next motion was submitted by Jim Lathrop. Therefore, to avoid any potential conflict of interest, at this time I'm going to step down and ask Eric Rosenbaum, chair of the Technical Committee on Fire Protection Features, to address the issues on behalf of the committee.

DR. MILKE: So you want to move to Motion 101-6. Microphone number 5.

MR. LATHROP: Jim Lathrop, Koffel Associates, and no client interest on this. I'd like to move to return a portion of the report in the form of Proposal 101-193. There's a typo there. 193, okay? And 101-222 and related comments 101-144c and 101 -- I'm sorry. I'm reading the wrong one.

Return a portion of the report in the form of Proposal of 101-193, not 192a. There's the mistake there. It's 193. And related Comment 101-122.

DR. MILKE: Okay. Hold just a minute.

MR. LATHROP: I was making Joe Holland's motion, sorry.

DR. MILKE: Okay. We've been able to confirm that, as he suggested, there was an error up here on the board.

So it is 193a, 101-193a that is the motion and that is to return a portion of the report in the form of Proposal 101-193a and related Comment 101-122. So we'll get that fixed. Is there a second to this?

FROM THE FLOOR: Second.

DR. MILKE: Thank you very much. We do have a second. Mr. Lathrop, please proceed with your motion.

MR. LATHROP: I've had a lot of questions about this over this week because it looks really bad, but we have no choice but to approve this and the reason for this is as follows.

What's happened is the alcohol hand gel provisions that have been -- and still will be, by the way, for the health care people.

It stays in the health care chapter, stays in the ambulatory health care, it stays in educational, stays in day care, because those actually have their own provisions.

What happened was the Chapter 8 committee has put this in Chapter 8 to govern the whole document, but then it said "where permitted by."

And what the problem is this provision never went to the occupancy chapters and so none of the occupancy chapters took it and accepted this.

If this stays in the code, every occupancy that did not say it's okay, it would be

prohibited in, which would mean we would not be allowed to have the alcohol hand gels in this building. We have them all around here because it's an assembly occupancy, and assemblies didn't pick this up.

Business occupancies -- Now, this will help health care because medical office buildings would not be allowed to have alcohol hand gel because it says in Chapter 8 now unless accepted by the occupancy chapter, and business didn't pick it up.

Mercantile didn't pick it up. I think you've all seen it nowadays. When you go in the store there's a little alcohol thing there.

This was an oversight. It should have either gone to the occupancy chapters -- Well, no matter what, it should have gone to the occupancy chapters.

It could be easily fixed if we could just change it to say "unless prohibited by," but at the same time, the occupancy chapters haven't had the choice to see whether they were going to prohibit it or not. I can't imagine anyone would.

But as it stands now, if we let this go

1 through, this will be prohibited in every occupancy
2 except for those -- I think it's is 3 4 that
3 specifically has provisions for that. Thank you.
4 DR. MILKE: Thank you. Mr. Rosenbaum,
5 do you want to make a statement on behalf of the
6 committee?
7 MR. ROSENBAUM: Sure. On behalf of the
8 committee, the committee approved this motion based
9 on the intent that the information would be presented
10 to the occupancy chapters for review.
11 Upon review, occupancy chapters would
12 have access to language to reference. It was not the
13 intent to prohibit use of alcohol-based hand-rubs in
14 all occupancies.
15 DR. MILKE: Thank you, gentlemen. We can
16 open up debate on this Motion 101-6. Microphone 3.
17 MR. PETERKIN: Jim Peterkin, Heery
18 International, representing the health care section.
19 We agree with Jim Lathrop here. It's a good idea.
20 This section was a good idea.
21 But unfortunately it just didn't get
22 carried out the right way and the health care section
23 voted to support this motion. Thank you.

DR. MILKE: Thank you. Any further discussion on Motion 101-6? Seeing none we will move to a vote. The screen is now corrected.

Before we vote, let me restate the motion and, again, for clarification, as Mr. Lathrop has pointed out, the motion on the floor is to return a portion of a report in the form of Proposal 101-193a and related Comment 101-122.

All in favor of the motion, please indicate by raising your hand. All opposed, same sign. Motion passes. Thank you very much.

Move on to Motion 101-7. Microphone 5 please.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products. Move to accept a motion to return a portion of the report in the form of Proposals 101-221 and 101-222, and the related comments of 101-144c and 101-145.

DR. MILKE: Thank you. There's a motion on the floor to return a portion of a report in the form of Proposals 101-221 and 101-222, and related Comments 101-144c and 101-145. Is there a second? Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. We do have a second. Please proceed with the discussion on the motion. Microphone 5.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products. We're for the motion. Part of the problem is this committee in this proposal has really exceeded the scope of the committee.

I'm going to read the scope of the committee as provided in the NFPA documents. It says, The Committee on Furnishings and Contents. This committee shall have primary responsibility for documents on limiting the impact of furnishings and building contents' effect on protection of human life and property from fire and other circumstances capable of producing similar consequences and on the emergency movement of people.

They're talking about assemblies in this proposed change. Because they're talking about assemblies, it's outside the scope of the committee. This is neither a furnishing nor a content.

As this comment is specific to

assemblies, it should have been sent to the Building Construction Technical Committee for review and action.

Chapter 10 covers interior finishes and furnishings and contents. The committee's comment covers assemblies and it discusses surface burning and then goes on to apply it to assemblies.

Why did they make the distinction? There's no explanation. We're also concerned about the base material. There's nothing in there that talks about the base materials. It says panels. Panels can be thing.

Part of the problem is could this be applied to other materials that are already being accepted into code?

One thing that came to my mind was acoustical ceiling tile. It's made in a factory. It has a fire retardant applied or mixed in with the material.

Will acoustical ceiling tile and other assemblies now need to be retested for the 30-minute duration that is given in this change?

In addition, this is for interior finish.

1 That's the E-84 test. The E-84 test is a 10-minute
2 test.
3 Why does this particular product have to
4 be tested for 30 minutes? Don't know. There's no
5 explanation for that.
6 Also concerned with enforcement problems
7 and life safety issues. It says obviously the way
8 the material is -- this section is worded, that the
9 material has maintenance problems.
10 How does a building owner, operator, or
11 tenant know they have a material that must be
12 maintained? What are the maintenance issues?
13 Where's the requirement for the
14 manufacturer to provide the building owner with the
15 procedures.
16 If the building owner and operator does
17 not know, where's the requirement that mandates the
18 manufacturer supplies the maintenance procedures?
19 This change isn't needed. And like I
20 said, the committee has exceeded their
21 responsibility. It should have been referred to the
22 committee that would have responsibility for
23 assemblies. We urge you to support the motion.

Thank you.

DR. MILKE: Thank you. Mr. Koffel, welcome back again. I guess it's an odd numbered motion so you're back with us. Would you like to offer the committee's position?

MR. KOFFEL: Mr. Chair, the Correlating Committee has reviewed these items as they were recommended by the committee, saw no correlation issues, and therefore I would defer to Jim Lathrop, a member of the Technical Committee on Furnishings and Contents, to present the committee view.

DR. MILKE: Thank you. Mr. Lathrop.

MR. LATHROP: Jim Lathrop, Koffel Associates, and a member of the Interior Finishes Committee.

Joe Holland said that it's outside of our scope, but it says in there, In new construction surfaces of walls, partitions, columns and ceilings.

Interior surfaces are definitely in here and therefore within the scope of the Interior Finishes Committee.

He mentioned the use of the term assemblies. The original comment that this is based

on was actually on the next page and that used the word panels, and we felt using assemblies would be more generic and therefore not as restricted as far as maybe some of you might say restraint of trade or something on that idea. Therefore we used assemblies to try to get it to be a little more open.

I do want to point out that of the membership of the committee, it was 7 affirmative and 2 abstentions.

DR. MILKE: Thank you. We can open up debate on the motion. Microphone 2.

DR. HIRSCHLER: Marcelo Hirschler, GBH International speaking for NAFRA and I am the original commenter on that. The committee accepted my comment in principle, made some changes.

I want to point out there's a significant difference between what we're discussing now and what we were discussing before. This does not address fire retardant-treated wood.

This does not address fire retardant-treated wood. This is a coated panel but this is not something where someone goes on site and paints or coats walls or panels in some way.

1 This is a product that is made at a
2 factory, manufactured in some way with the coating on
3 it, and the entire product with the coating on it
4 needs to meet not just the 10-minute E-84 but the
5 extended E-84 with all the additional requirements.
6 And the entire product must be listed and
7 labeled by a nationally-recognized testing
8 laboratory.
9 I'm not going to address whether this did
10 or did not exceed the committee's scope. That's -- I
11 think Jim Lathrop covered that and I don't know that.
12 I just want to address the technical issues.
13 And the two key points I want you to
14 remember is, number one, this is not fire
15 retardant-treated wood.
16 It's not pretending to be fire
17 retardant-treated wood. It doesn't say it's fire
18 retardant-treated wood. This is a coated panel.
19 And the reason that it requires more than
20 the normal E-84 is because normally there is no
21 permission in new construction -- and appropriately
22 so -- there's no permission in new construction to
23 just coat a panel or a wall or a ceiling or whatever

and say you've done the job, and I think that is perfectly appropriate.

But on the other hand, what this does, it is a product that is listed and labeled and manufactured as a coated panel and passes not just the E-84 Class A but the full E-84, 30-minute with the additional provisions. It should be accepted. Thank you. Please oppose this motion. Thank you.

DR. MILKE: Thank you. Microphone number 3, please.

MR. DOBSON: Yes. My name is Mike Dobson, Fire and Life safety consultant and I'm speaking for support of the motion on the floor.

I also have support of the National Code Service Association which is a group under the Western Fire Chiefs.

And some of the concerns that I have is the confusion that this will create for the authority having jurisdiction.

Being a former fire marshal, we've expanded this to add the new construction there. And we have a myriad of terms that are not in the standard and they need some clean-up I think before

this would be ready.

You know, we're now going to have factory-applied fire retardant-coated assemblies. As you heard in the discussion earlier, we're using the term product.

Then we're also in -- lower in the standard we have fire retardant coatings. And then enter the discussion whether it's FRTW or not, you have a lot of different terminology for a lot of different products that would come under this section that are not identified.

And I think this will create some real problems for the authority having jurisdiction and needs more clarification.

DR. MILKE: Microphone number 5.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products. This shows you what we were trying to accomplish in the previous actions that the membership considered under 101-703.

The previous speaker who was speaking against the motion says this is not fire retardant-treated wood.

But when you go to 703 what they've got

in here is the definition for fire retardant-treated wood. So how can you have it both ways?

How can you say, This is not fire retardant-treated wood, and before I wasn't speaking about coatings, now I am talking about coatings and I'm also going to say that the coatings have to meet the provision for fire retardant-treated wood.

How can you have it both ways? That's part of the problem. That's where the abuse is coming in. That's why we were trying to do what we were trying to do.

Second part of it is I'm going to read you right out of the section of the code. This is 101-222, the proposal, and the comment number 101-144c.

The way the section reads now, if you're going to apply the coating in the field, you pass the E-84 10-minute test, and you can put the coating on in an existing building in the field.

What this is trying to do is say, Oh, okay, now I'm going to put it on in a factory so I'm going to change the rules here because instead of it being applied in a factory I'm going to put it on --

I mean in the field, I'm going to put it on in a factory. So this changes something.

It's still a coating. I don't know what it's changing, but yet I still have to meet the requirements of fire retardant-treated wood.

So what it says is -- This is the new section. In new construction, surfaces of walls, partitions, columns and ceilings shall be permitted to be finished with factory-applied fire retardant-coated assemblies. And that's where we get the problem.

It doesn't speak to just the surface. It's talking about assemblies. Not within the realm or within the scope of the furnishings and contents -- Furnishings and Contents Committee.

And then it goes on and it tells you how you have to test it and it's got to have a flame spread of 25 or less, E-84.

You've got to extend it for 20 minutes additional and it's got to have a flame font of not more than ten and a half feet.

That is the definition for fire retardant-treated wood. How can you have it both

ways? This is an inappropriate change. And as far as I could tell, there's nothing in 101 that would prevent somebody from applying a coating onto a material in a factory, test it for ten minutes like you would a ceiling tile, acoustical ceiling tile or anything like that, like you test it for ten minutes, and not allow it to be used in new construction.

So the section's not needed. It's bringing in something that does not belong in this section of the code. We urge you to support the motion.

DR. MILKE: Thank you. Microphone number 2.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, speaking for NAFRA against the motion. Number one, if someone brings in a product that ran the 10-minute test, it's in contravention with this.

If someone coats something on the field, it's in contravention with this. This is very clear. You're not allowed to do that.

And I agree, you should never be allowed to do that. You should never be allowed to just paint something new construction. No.

This says very clearly what you need to bring in is a panel that has already got the product already made in the factory and listed and labeled to be like that.

Number two, the issue of is this fire retardant-treated wood, it is not. This meets the same fire test requirement of fire retardant-treated wood just like in the International Wildland Urban Interface Code and in the WUI California Code, plastic -- wood plastic composites are allowed to meet that test -- are required to meet that test to be used in certain applications and plastic lumber in the WUI code and the International WIT are allowed to meet that code.

And as of Monday the ASTM E-5 Committee on Standards has approved a standard -- I think it's E-2678 but I've probably got the number wrong -- that is exactly that.

It's a standard test method where you take the E-84, run it for 30 minutes, and do all the other things as well.

That has nothing to do with fire retardant-treated wood. Fire retardant-treated wood

needs to meet that, but every other material in the sun could try to beat it as well, and any panel that is to be allowed under this section needs to meet the same test. Thank you.

DR. MILKE: Thank you. Microphone number 5.

MR. KAMALASANAN: I speak in support of flame and fire --

DR. MILKE: Please identify who you are and your affiliation.

MR. KAMALASANAN: As per the standard --

DR. MILKE: Please say who you are.

MR. KAMALASANAN: -- fire and flame --

DR. MILKE: Please, hold on. Excuse me. Sir, at microphone number 5, stop. Please identify who you are and your affiliation.

MR. KAMALASANAN: I am in support.

DR. MILKE: Who are you? Your name.

MR. KAMALASANAN: My name is Kutti. I am from Saudi Arabia working for Saudi Aramco.

DR. MILKE: Thank you very much.

MR. KAMALASANAN: Difference between fire and flame, all material, it's flame retardant, not

fire retardant.

Please bear with me. If the manufacturer can give the test report for a few minutes, as for the material requirement, we can accept that one. I got the standard with me. There's a difference between flame and fire.

DR. MILKE: Thank you very much. Microphone number 6.

MR. SONTAG: Rob Sontag, state of Colorado, I call the question.

DR. MILKE: Not a debatable motion. I heard a second. We go right to a vote of that motion. All in favor of calling the question raise your hand. All opposed. That passes.

So we go right to a vote of the motion; the original motion, that is. The motion on the floor is to return a portion of a report in the form of Proposals 101-221 and 101-222, related Comments 101-144c and 101-145.

All in favor of the motion, please indicate by raising your hand. All opposed? Motion fails. Move on to Motion 101-8. I see microphone number 3.

MR. CABLE: Eugene Cable, Life Safety consultant, Averill Park, New York, representing myself. I move to accept Proposal 101-276 as modified by the Technical Committee.

DR. MILKE: Thank you. There's a motion from the floor to accept as modified by TC Proposal 101-276. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. We go to Mr. Cable. Please proceed.

MR. CABLE: I follow the advice of Chapter 8 Committee. The proposal states, Delete Section 18.3.1.2. This would prohibit the use of a convenience opening, Section 8.6.8.2, within health care occupancy space.

The three-story communicating space is already prohibited. The Health Care Committee initially accepted this proposal with a 20-to-1 vote.

The modification was to keep the section as reserved rather than delete the section. So initially this proposal resounded well with the committee.

I want to note this is only for new

construction. Chapter 18 will not affect existing vertical openings.

A story. First-time visit to a 450,000-square foot, six-story hospital to conduct a Joint Commission Statement of Conditions Life Safety Assessment.

I walked in the main entrance doors and to a nice open lobby area. I see a rather large reception booth with three desks inside, sort of like a small office area, plenty of upholstered chairs and benches, and the usual nice gift shop to one side.

Straight ahead are three elevators and, uh-oh, what is this? A double-wide open stair with handrail in the center -- that was good -- leading up to the second floor.

Open to the second floor also and, again, a fairly large elevator lobby up there with another small gift shop.

Now, at the ground level three corridors lead to this front lobby, all three with a double door opening into the lobby but with egress required through the lobby to the front door exit.

On the second floor three corridors also

1 connect to this lobby, but on the second floor there
2 are no double doors separating the corridors from
3 that lobby which is open to this open stair.
4 This is within health care occupancy.
5 There are no two-hour barriers available to separate
6 health care from this space.
7 This is not an atrium. This is not a
8 three-floor communicating space, because that's not
9 allowed in health care.
10 This is not a vertical opening piercing
11 only one floor, because there is no two-hour barrier
12 instead of doors even possible at the top or bottom
13 of this wide stair, so it must be considered a
14 convenience opening.
15 But clearly it is opened to corridors on
16 the second floor and, in my mind anyway, it's also
17 open to corridors on the first floor as well since
18 those corridors have to exit through it.
19 My point is this. This noncompliant open
20 stair in health care space has been there for eleven
21 years. It was built in 1999 and 2000.
22 Massachusetts Department of Health had no
23 problem with it. Prior experts conducting at least

1 three SOC's up to this point did not see a problem.
2 At least three Joint Commission surveys did not
3 identify it. And the architect of record considered
4 it okay as a convenience opening.
5 This is one example of four that I've
6 seen in the recent -- last recent three years. There
7 is serious confusion out here on what constitutes a
8 compliant convenient opening.
9 I submit that the vertical openings
10 within health care compartments should be strictly
11 limited.
12 Consider that allowing any vertical
13 opening essentially could double the smoke
14 compartment size, allowing two floors to be one smoke
15 compartment which violates the fundamental principle
16 that floors provide a basic degree of
17 compartmentation.
18 If there is anywhere to maintain tight
19 controls on compartmentation --
20 DR. MILKE: 30 seconds.
21 MR. CABLE: -- thank you -- it is within
22 hospitals and nursing homes. If a design team would
23 like a vertical opening, wonderful. I like openness,

natural light, and so on, but have it in business occupancy and separate it from health care.

Voting for this motion will disallow all vertical openings in health care except the bona fide atrium and eradicate the possibility and also demonstrated occurrence of seriously noncompliant --

DR. MILKE: Sorry. Time is up.

MR. CABLE: -- convenience openings.

DR. MILKE: Thank you for finishing. Mr. Koffel, the committee's position, please.

MR. KOFFEL: Thank you, Mr. Chair. For the members present, I would call your attention to three public comments since you might wonder why the motion is to accept an action that was taken by the committee during the proposal period.

And those are Comments 101-203, 101-204 and 101-205, in particular Comment 101-203 in which the committee reversed its position, and that is the reason the maker of motion has made that motion.

Whereas the permitted use of convenience openings is an item that's subject to the permission of the occupancy chapter, I will ask David Klein, chair of the Life Safety Technical Committee on

1 Health Care Occupancies to address the issues on
2 behalf of the committee.
3 MR. KLEIN: Thank you, Mr. Chair. David
4 Klein with the Department of Veterans Affairs, and
5 I'm the chair of the Technical Committee on Health
6 Care Occupancies for the Life Safety Code.
7 During the proposal stage the committee
8 agreed in principle with the change sought by the
9 proponent and removed the provision for convenience
10 openings in new health care occupancies.
11 One committee member voted against this
12 position. The vote on the proposal was 20 to 1.
13 During the comment stage the committee reversed its
14 position and reinstated the provisions for
15 convenience openings back to the text as currently in
16 the 2009 code.
17 The committee stated that the provisions
18 for convenience openings are adequate for use in
19 health care occupancies and should not be deleted,
20 and the vote on that was unanimous, 28 to nothing.
21 Now, my observation in listening to the
22 proponent just now is I think he's making two points.
23 Some convenience openings he feels are being designed

in a manner that is inconsistent with the intent of the code. If that's the case, this is not a problem with the code but a problem with designers using the code inappropriately.

If designed correctly, convenience openings are not a hazard and this design option should remain available for use in health care occupancies.

The other point that I believe the proponent was making is that the requirements for convenience openings should be clarified so as to not permit convenience openings to include the means of egress for occupants who are not within the area exposed by the convenience opening. If that is the case, the motion on the floor will not accomplish this. Thank you.

DR. MILKE: Thank you, Mr. Klein. With that we open up debate on the motion. As a reminder, please provide your name, affiliation, and whether you're speaking in support or against the motion. Microphone 2 please.

MR. HUEY: Again, speaking against, Marvin Huey, FTC Architects, Dallas, Texas speaking

on behalf of the health care section. Membership and board voted yesterday to oppose the motion on the floor.

DR. MILKE: Okay. Thank you very much. Any other discussion on Motion 101-8? Seeing none, we will move on to the vote then.

Again, the motion here is to accept as modified by TC Proposal 101-276. All in favor, please raise your hand. All opposed. Well, let us go with the electronic on this one please, as spread out as you are.

So again, the rules of engagement are that you must have a red badge with the word Member on the top to be voting using the electronic voting devices.

Let me remind you to vote either 1 in favor of the motion, that is, to accept, or 2, opposed to the motion and reject.

The motion on the floor is, again, to accept as modified TC Proposal 101-276. Please go ahead and make your vote. Five seconds.

All right, and done. The results posted here straight away. Motion fails. Perhaps I should

have been able to see that visually here. I'll put my glasses on next time. So thank you. Let's move on to Motion 101-9. Microphone 3.

MR. LARRIMER: Thank you, Mr. Chair. My name is Pete Larrimer. I work for the Department of Veterans Affairs.

I'm a member of the Health Care Committee as well as a member of the Technical Correlating Committee for the National Fire Alarm Code. I'd like to make a motion to reject Comment 101-206.

DR. MILKE: There's a motion on the floor to reject Comment 101-206. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you very much. We do have a second. Please proceed with the discussion on the motion, Mr. Larrimer.

MR. LARRIMER: Thank you, Mr. Chairman. The reason I'm standing here in front of you today is really just one reason.

I would like to try to reduce nuisance alarms that are going to result as a result of the change that was made to the health care section.

With the culture change we are making a

lot of modifications in the health care section, and kitchen stoves are now going to be permitted in health care occupancies.

Not only that, they're going to be permitted in health care occupancies and open to the corridor. In order for that to happen, the philosophy in health care was that any area open to the corridor either be supervised by staff 24/7 or be detected by smoke detection.

Never before would we allow any hazardous area to be opened to the corridor, but in this case we're now allowing kitchen stoves to be in a space that's open to the corridor.

The original proposal asked for single-station smoking alarms to be installed so that if there were any products of combustion that were created that caused a problem, the single-station smoke alarms would be activated and the staff would respond back to the kitchen so that they could take necessary action to deal with whatever was happening there.

During the ROC stage, that was changed by a comment, Comment 101-206, to instead of single-

station smoke alarms, to system smoke detectors.

Installing system smoke detectors in this space with these kitchen stoves now will not only ring the building throughout, activate the alarms throughout the building, but it will also bring the fire department.

I think we know one thing for sure and that's cooking operations will generate smoke products and they will activate smoke detectors.

We don't want to create nuisance alarms but we have set up a situation in health care that I believe will do just that.

Supporting this motion will not reduce the level of safety. It will just replace the system detectors in the area closest to these kitchen stoves with single-station smoke alarms. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to offer the committee's position?

MR. KOFFEL: Thank you, Mr. Chair. This motion as well as the next motion was submitted by Peter Larrimer, U.S. Department of Veterans Affairs, and the chair of the Life Safety Technical Committee on Health Care Occupancies, David Klein, is also

1 employed with the U.S. Department of Veterans
2 Affairs.
3 Therefore, to avoid any potential
4 conflict of interest and whereas I am a member of the
5 Health Care Occupancies Committee, I will be
6 presenting both the perspective of the Technical
7 Correlating Committee and the Technical Committee.
8 With regard to the motion on the floor --
9 and I believe I understand the intent of the motion,
10 but I want to make sure the record is clear -- the
11 maker of the motion is asking for a comment to be
12 rejected, and that comment was to accept a proposal
13 that was rejected.
14 However, I believe the intent of the
15 maker is to only address the smoke alarm smoke
16 detector issue.
17 Relative to cooking facilities open to
18 the corridor, the requirement's there for they are
19 addressed in subsequent Comments 207 and 208 and,
20 again, I would give you or recommend you reference
21 Comment 101-208.
22 In item 11 of the committee action, not
23 of the original comment, of the committee action, the

committee initially voted to require smoke alarms at these locations. Two smoke alarms.

Through Comment 206 the committee then further revised that action to require smoke detectors at those locations rather than smoke alarms.

Comment 206 was passed by the committee by a vote of 27 to 1. You can see the negative comments from David Klein. Thank you.

DR. MILKE: Thank you, Mr. Koffel. We can open up debate on the motion. This motion is to reject Comment 101-206. Microphone number 5.

MR. LATHROP: Jim Lathrop, Koffel Associates, not speaking for or against but I think there's an errata that we need to do to the goldenrod sheet.

The goldenrod sheet says this is applying to 18.2.3.5 and 19.2.3.5. I believe the 2 and the 3 are swapped. I think it should be 18.3.2.5 and 19.3.2.5.

DR. MILKE: Thank you. Let's take a minute to confirm that and we appreciate you once again helping -- That is a correct change.

MR. LATHROP: I just wanted to make sure there was no confusion.

DR. MILKE: Should be 18.3.2.5 and 19.3.2.5. Thank you. Microphone number 3.

MR. GREGORY: Thank you. Skip Gregory, Health Authority Consulting, speaking on behalf of the health care section in favor of this motion.

The health care section met yesterday and voted to support this motion because we feel there will be a high likelihood of nuisance -- false and nuisance alarms caused not by smoke from a fire but by the normal cooking particulates that come from cooking activity.

These are very small kitchens that have been inserted into the code to allow for a more homelike atmosphere in nursing homes and they have multiple safeguards on them already.

By alerting the staff and attendants instead of rolling the trucks, much as is permitted by the smoke detectors, a high degree of safety we believe is maintained in the nursing home. Thank you.

DR. MILKE: Thank you. Microphone number

1.

MR. JAEGER: Tom Jaeger of Jaeger Associates and I represent the American Health Care Association and Leading Edge which represents about 85 percent of the nursing homes in the United States.

I was part of the coalition that originally submitted the -- or submitted the original proposals for cultural change facilities which included the open kitchen to the corridors.

I believe that our proposal did not contain smoke detectors in the kitchen because we wanted to avoid nuisance alarms.

The committee -- First of all, I speak in favor of the motion. I forgot to say that.

DR. MILKE: Thank you.

MR. JAEGER: We originally did not have smoke detectors in the kitchen but the Technical Committee on Health Care was clear that this proposal would not go forward unless we had smoke detectors in the kitchen.

And so the nursing home industry agree that I'd rather have a smoke detector that does not

roll the fire engines than have a smoke detector that does roll the fire engine. So we support the single-station smoke detector in the kitchen.

DR. MILKE: Thank you. Any further discussion on this motion to reject Comment 101-206? Seeing none, we can move to a vote.

Again, the motion on the floor is to reject Comment 101-206. All in favor of the motion, please indicate by raising your hand. All opposed. Motion passes. We move to Motion 101-10. Microphone 3 once again.

MR. LARRIMER: Thank you, Mr. Chairman. Again, my name's Peter Larrimer with the Department of Veterans Affairs. I make a motion to accept Comment 101-223.

DR. MILKE: Thank you. There's a motion on the floor to accept Comment 101-223, is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. We do have a second. So please proceed with a discussion of the motion.

MR. LARRIMER: Thank you. I'm asking to

accept Comment 223 which is on page 103 of the ROC which will accept Proposal 101-292 on page 101-146 of the ROP.

If this motion is accepted, the requirement to install smoke barriers on non-health care floors that are below health care floors will be deleted when there is two-hour separation at the floor level.

Presently smoke barriers are required to be installed on floors that are not health care occupancies if they are directly below health care occupancy floors.

The committee states that the entire floor above might be filled with smoke, creating the potential to affect the entire health care occupancy floor.

Actually, there are no requirements to align smoke barriers from floor to floor, so therefore if your barriers are perpendicular to each other from one floor to the next, this potential still exists.

Secondly, the space below will be required to be sprinkler-protected since it falls

1 under Chapter 18 which requires the building to be
2 sprinkler-protected.
3 Third, there is a requirement that the
4 floor be a two-hour rated barrier. Even with some
5 pole, sprinklers along a two-hour rated barrier
6 provide adequate protection.
7 In conclusion, with sprinklers installed
8 on the floor below the health care floor along with
9 the two-hour rated floor separation, plus the fact
10 that the smoke barriers are not required to be
11 aligned from floor to floor, the requirement to
12 provide smoke barriers on the floor below a health
13 care floor provides very little if any benefit. I
14 ask you to support the motion to accept Comment
15 101-223. Thank you.
16 DR. MILKE: Thank you. Mr. Koffel, would
17 you like to offer the committee's position?
18 MR. KOFFEL: Yes. As previously noted,
19 with the maker of this motion being from the
20 Department of Veterans Affairs and the chair of the
21 committee being from the Department of Veterans
22 Affairs, I will attempt to represent both the
23 Correlating Committee and the Technical Committee on

this item.

I would merely -- Well, initially I would start off by referring those to Proposal 101-292 -- and if I'm incorrect, Peter, please correct me, but the proponent, the original proponent of that proposal, did not tell us what to do with item 4.

It is my opinion that the maker of this motion intends that the existing item 4 would remain as existing item 5 and I just want to clarify that for the record.

With respect to this provision, many editions ago the code was interpreted to say that smoke barriers had to extend throughout the building, even in a mixed or multiple occupancy scenario.

When the text that's proposed to be revised was inserted into the code, at least some members of the committee perceived that to be a relaxation and felt there was a need to continue the smoke barrier one level below the health care occupancy.

As Peter indicated, that was to address the issue of smoke spread on that floor below and to hopefully prevent smoke migration into the health

care occupancy on both sides of the smoke barrier.

As Peter has indicated, there's no requirement that smoke barriers be vertically aligned.

With that as background, the committee voted, as you can see in the Report on Comment, to reject the comment. And again, I will rest on the committee's substantiation or comment with regard to their action.

DR. MILKE: Thank you very much. Microphone 2.

MR. LATHROP: Jim Lathrop, Koffel Associates, speaking for my self and speaking in opposition.

I wasn't going to speak in opposition to this, and unfortunately the justifications given by the proponent kind of force me to speak against it.

First of all, there never was a requirement, never was an intent, never was any anticipation, that the vertical barriers would be aligned.

The point here is I will have a two-hour floor slab that probably will have some penetrations

and no guarantee that they're always properly sealed.

But the big issue was this will allow a total wide open landscape office area, totally wide open, to be sitting right underneath a health care occupancy.

The whole point here is the smoke barriers is one of our last lines of defense in case there is a sprinkler failure.

Again, I don't want to get into the percentages of sprinkler failures. We all know it's very low. I'm a huge sprinkler advocate. That's not the issue.

The issue is if we do have a sprinkler failure and we have a fire in that wide open landscape office building sitting right underneath this health care occupancy, we've all seen the results of open landscape fires in non-sprinklered areas.

So we want to at least subdivide that area so we don't get a fire exceeding 22,500 square feet in area.

I think there's a lot of other issues that were legitimate reasons for potentially

eliminating this, but based on lack of alignment and sprinkler protection I think were the wrong reasons.

DR. MILKE: Thank you. Microphone 3.

MR. BUNJI: Thank you, Mr. Chairman. My name is Makuta Bunji. I am a life safety consultant speaking in support of this proposal and on my own behalf.

In the annex to NFPA 101 regarding the smoke barriers, it says in times of egress arrangements should be made to transfer patient from one section of the floor to another section of the floor that is separated by a fire barrier or a smoke barrier in such a manner that patients confined to their bed can be transferred in their bed.

So the provision is clearly talking about defend in place health care occupancy. Now, under the separated provision you're providing a two-hour fire floor ceiling assembly and the penetration -- the code are required to be firestop.

And as an example, when we had the business occupancy under health care, the provisions of business occupancy are totally different.

For example, the travel distance to exits

under the business occupancy are 300 feet. Under the smoke barrier provision, travel distance to the door of the smoke barrier is now 200.

Now, bringing the provision of the health care and mandating into a business occupancy where the character of the use is totally different -- and as an example, we're right now evaluating the project, seven-story building, lower level.

The lower level is business, non-health care related. But because of this provision, you're ending up having subdivision of the smoke barriers from 12 to 14,000 square foot only to meet the requirement of the travel distance.

The occupants of the lower level are able-bodied. They can exit the building any time they want. But, again, the provision is saying 200 feet and referring back to the health care provision.

Now, the separation requirements. Under Chapter 6 we have separate occupancies. Any time separated occupancy provisions are declared, the character of the occupancies mandating the provision to be enforced for that occupancy.

We are intermingling the provision from

health care into another occupancy. And also under NFPA Chapter 18 it says doors in the smoke barriers that are not simply health care are not required to be double egress.

However, we have a 48-inch corridor and if the smoke compartment has an area of more than 5,000 you're forced to provide a door which egress in both direction.

Because under Chapter 7, any area of an occupant more than 50 has to have egress in both directions. So we end up having a 48-inch corridor. Once we reach the smoke barrier, we have to widen it and put double door in order to meet the requirement. So I would urge support of the motion. Thank you.

DR. MILKE: Thank you. Microphone number 3.

MR. PETERKIN: Jim Peterkin, Heery International, representing the health care section and speaking in support of the motion.

The health care section met yesterday morning and the board and membership voted, for reasons Peter outlined, to support this motion. Thank you.

DR. MILKE: Thank you. Microphone number 2.

MR. HUEY: Speaking against, I'm Marvin Huey, FTC Architects, Dallas, Texas, representing myself. The Technical Committee report on the Report on Proposal was clear. If we read it, it's clear on why the proposal needs to be rejected.

If we have smoke compartments -- we have -- Presently we have smoke compartments today on the health care -- on the floor below a health care occupancy.

If a fire develops on that floor that is not health care, it will very likely be contained, smoke can be contained to that floor and possibly migrate to one, two, three -- cannot get the number -- smoke compartments on the health care floor.

If we remove this requirement we have the potential of the entire floor, the entire health care floor -- and most of the facilities I deal with have 10, 20, 30 smoke compartments per floor.

And by that, we are now contaminating or smoke that's migrating potentially to the entire

floor.

Most of the penetrations on a floor are concealed within walls; i.e. plumbing, electrical, and they are not easily checked.

Fire dampers or duct work penetrations are easily checked and that was part of the comment that I heard, that it's easily checked, easily looked after, but the plumbing and electrical penetrations are not, and smoke could migrate through those floors.

I've heard a number of arguments against why we shouldn't do this. One, the architects are missing it. I say you need to get another architect.

The other is you may not own that floor. Well, if you don't own that floor, then the provisions of you leasing that space, should have been in the agreement that you maintain those smoke compartment walls in the first place. Please vote against this. I think it's a hazard to health care.

DR. MILKE: Thank you. Microphone number 3.

MR. JELINSKE: Mark Jelinske, Cator Ruma Associates, consulting engineers, and I speak for the

1 motion.

2 I'd like to point out some of the

3 practical application impacts of this. As currently

4 written, these smoke barrier -- This is similar to

5 the change from the previous version.

6 The words are now, Smoke barriers shall

7 not apply to any of the following, and it lists the

8 five exceptions. So in other words, if any one of

9 those five exceptions apply, a smoke barrier is not

10 required.

11 One of those is areas that do not contain

12 health care occupancies and are separated from the

13 health care occupancy by a fire barrier complying

14 with 7.2.4.3. 7.2.4.3 is essentially a horizontal

15 exit.

16 So for example, a lower floor of a

17 hospital that is, say, 10 percent health care and 90

18 percent business, would have a or could have a

19 horizontal barrier at the occupancy separation and,

20 therefore, per exception number 2, have no smoke

21 compartments.

22 The vast majority of the health care

23 occupancy would be over that uncompartmentalized

occupancy. However, if that 10 percent health care went away, now suddenly we've got to compartmentalize that non-health care occupancy.

Obviously, a way to game the system would be to put a single exam room on that non-health care floor. Similarly, you know, the mechanical -- an exception was allowed for mechanical floor below a health care occupancy to not have smoke compartments.

I should say an entire smoke -- mechanical only floor. But if the engineering offices are on that floor, now we need smoke compartments again.

So for no other reason, just to be consistent with everything else, I recommend that this proposal be accepted. Thank you.

DR. MILKE: Number 1.

MR. ACRE: Paul Acre, Arkansas Department of Health. I speak for the proposal. I've dealt with this issue many number of times on plans.

And the way I look at it is the smoke compartment is essentially an area of refuge. The facility, the floor, is all about compartmentation and being able to move away from wherever a problem

1 might develop.

2 If you're on that floor and certainly if

3 you're afforded horizontal movement to get away from

4 a problem, that would be ideal.

5 The worst-case scenario is just the

6 vertical evacuation which would be go to the stairway

7 and if you're able to dump out into the floor below

8 to escape the problem and then you have a degree of

9 separation.

10 I understand and appreciate the comment

11 and concerns about what if there's floor penetrations

12 and problems.

13 Well, if you're evacuating vertically you

14 simply go down another floor. And if that floor is

15 problematic, then your other option would be of

16 course to escape outside, horizontally exiting to the

17 exterior of the building. Of course that's, again,

18 another worst-case scenario.

19 So your first area of refuge is your

20 corridor, your suite, the smoke compartment, and then

21 maybe if there's another smoke compartment on that

22 floor, then you evacuate to yet another smoke

23 compartment.

1 But vertical evacuation, of course, would
2 be the last option I would hope would be considered.
3 But if in any event you did, you hopefully have
4 multiple floors upon which to evacuate to. Thank
5 you.
6 DR. MILKE: Thank you. Microphone number
7 3.
8
9 MR. ELVOVE: Mr. Chair, I'm Josh Elvove
10 with the U.S. General Services Administration and I'm
11 in favor of the motion.
12 And, yes, I am representing the U.S.
13 General Services Administration, the GSA in this
14 case, and you would say, I wonder why.
15 Well, it is possible that we can lease
16 our space to a federal entity in a floor below health
17 care. And if we do this, this could affect the
18 potential characteristics of the lease space and
19 potential of our client.
20 He would be forced to have a smoke
21 compartments in a space that we would have no idea --
22 I guess we would he know that health care is above
23 us, but really it doesn't matter to us. We're

leasing this particular space.

If it happens to be below health care we're now forced into these provisions and I don't think our designers would even know that the provisions exist because we're contracting business work. We're not dealing with health care. So I think that would be a potential issue for the U.S. General Services Administration.

But I make another point -- and this goes -- one of the comments -- The only comment I guess against this was that if you delete the barrier, the smoke barrier, you have the potential of fire from any portion of the floor below getting up into the health care occupancy space. I guess so.

But the horizontal exit concept is very similar. If you have a horizontal exit, you are allowed to terminate that horizontal exit at a two-hour floor slab provided your means of egress discharged directly to the outside.

That creates your egress once you're into the stair. However, the same scenario exists where I can have a fire on the floor below since -- and that fire could potentially affect all the barriers if it

goes above.

My horizontal exit in this sense has been compromised on all the floors above that's supposed to have the horizontal exit.

We have an inconsistency in the code here and one might say health care deserves more. I'm hearing the health care industry say, We're okay with it.

So I think for those reasons alone, if not what else you've heard, you should accept this comment. Thank you.

DR. MILKE: Thank you. Microphone number 2.

MR. HUEY: Speaking against, Marvin Huey, FTC Architects, Dallas, Texas. The arguments about the smoke compartment I have not heard yet as valid. It's all about we're not sure who's going to be below it.

That is the lease agreement. That is something that you should be able to maintain. If it's your property, you lease it. This is something you write in your contract.

Additionally, this code is a compromise to what was originally out there indicating the entire building needed to be smoke compartmentalized.

This compromise has been in effect for quite a few years and we have been operating under this design provision for quite some time. This is not a change.

It is suggested that we change to a much lesser requirement without any backing at all other than we don't know what's below it.

DR. MILKE: Mr. Koffel, I'd give you a minute if you want -- There have been a bunch of comments. Do you have a response?

MR. KOFFEL: No further comment.

DR. MILKE: Microphone number 3.

MR. LARRIMER: Thank you, Mr. Chair. Pete Larrimer, Department of Veterans Affairs, against. I just want to make two point.

The first point I want to make is that the Technical Committee on Health Care this time did accept another exception to allow a mechanical equipment space, only a space that handles mechanical equipment, to be wide open on the floor below health

care without any barriers.

So there's already provision that was accepted this code change cycle that allows that with no barriers. That has opened up the door.

And my second point is that I would argue any other space would probably be subdivided in some way, shape, or form.

It may not be a one-hour rated or a 30-minute rated barrier duct to duct, but chances are there's going to be quite a bit of compartmentalization from the barriers associated with whatever occupancy's down there.

And if there are sprinklers which would be required under Chapter 18, then the provisions to control the smoke within that compartment would be there. So I ask you to accept this comment. Thank you.

DR. MILKE: Microphone number 4.

MR. LATHROP: Jim Lathrop, Koffel Associates. Again, I wasn't going to speak but sometimes Peter wins and then brings up subjects that I have to rebut.

DR. MILKE: For or against?

MR. LATHROP: Against, but like I said, I told Peter I wasn't going to discuss this unless certain items are brought up, and they keep coming up.

How you can equate a mechanical floor as far as fuel load to an open landscape office building, I am totally at loss.

To try to justify this based on the fact that the committee recognized subdividing mechanical floors is a real problem.

A mechanical floor doesn't have much to burn out, so please don't do this because of that. I think there's been a lot of other good reasons brought up.

But I think, you know, when you say we're going to do this because we're going to allow a mechanical floor to be subdivided, sorry.

DR. MILKE: Microphone number 6.

MR. CUTTER: Steve Cutter. I'd like to ask to call the question.

FROM THE FLOOR: Second.

DR. MILKE: It's a non-debatable motion. There's been a second so we go right to the vote to

call the question.

All in favor of calling the question, raise your hands. All opposed. That passed. So we go right to a vote of the motion.

The motion on the floor is to accept Comment 101-223. All in favor of the motion please indicate by raising your hand. All opposed?

Electronic let's go to. Sorry. So call for a vote using the electronic devices. You must have a red badge with the word Member on the top to be voting.

Let me remind you to vote either 1 in favor of the motion, accept, or 2, opposed and the motion reject. And please vote now.

Five seconds. And closed. Thank you. Okay. The motion fails. We move on to Motion 101-11. We go to microphone number 5, please.

DR. HIRSCHLER: Thank you, Mr. Chairman. Marcelo Hirschler, GBH International, for NAFRA. And I hereby move to accept Comment 101-232 and Comment 101-250.

DR. MILKE: Thank you. There's a group amending motion on the floor to accept Comment

101-232 and accept Comment 101-250. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: I heard a second. Please proceed with the discussion on the motion.

DR. HIRSCHLER: Thank you, Mr. Chairman. What this is I thought was very simple, I hope. Since 1978 the furniture industry in this country has required that their furniture be resistant to smoldering emission.

Health care occupancies are all required to be sprinklered but sprinklers don't really do anything to smoldering ignition.

Sprinklers do affect heat release, so until actual fact the requirement for heat release of furniture have -- are moot in the code.

So what this proposal says is new furniture -- and remember that this has been in effect since 1978 so there isn't very much furniture around that is from older than 1978 -- new furniture should meet the smoldering requirements for Chapter 10.

And there is a clear -- an exception here

to make sure that if patients bring their own furniture they're, of course, allowed to retain that furniture.

And it doesn't matter whether they're -- what type of smoke detectors. Whatever the type of smoke detectors, it still is acceptable to vote for the exclusion.

And the reason for the two comments is one is in new construction and one is in existing construction.

The committee objected to this because they said facilities are well manned, but I think we're really giving the wrong message to the public if we're telling, in the Life Safety Code, that in spite of the fact that the industry has been requiring for over 30 years that all the furniture be smolder resistant, it doesn't have to be smolder resistant in hospitals.

It's really a very bad message. I hope you'll support the motion. Thank you.

DR. MILKE: Thank you. Again, keep in mind for the people here that this is a combined group amending motion, Comment 101-232 that's on the

1 screen and also 101-250. Mr. Koffel, committee
2 statement?
3 MR. KOFFEL: Yes, thank you. Chapter 10
4 provides requirements for upholstered furniture but
5 then states where required by the occupancy chapter.
6 That's where we believe the expertise lies.
7 Therefore I would like to ask David
8 Klein, chair of the Life Safety Technical Committee
9 on Health Care Occupancies to address the issues on
10 behalf of the committee.
11 DR. MILKE: Mr. Klein.
12 MR. KLEIN: Thank you, Mr. Chair. My
13 name is David Klein, Department of Veterans Affairs,
14 chairs of the Health Care Technical Committee.
15 The committee considered the changes
16 sought by the proponents and concluded that the
17 presence of sprinklers makes additional regulations
18 unnecessary.
19 The committee pointed out that in health
20 care occupancies, staff members are available to
21 detect and react to fire, and the proponent did not
22 provide statistical evidence to indicate that
23 smoldering fires present a problem in health care

occupancies.

In the text of the current Life Safety Code, upholstered furniture belonging to the patient in non-sprinklered sleeping rooms of existing nursing homes is exempted from the smoldering ignition and rate of heat release requirements provided that the smoke detector is installed in the patient's sleeping room and the battery powered single-station smoke alarm is permitted to be used.

The motion on the floor would eliminate the permission for use of the battery powered single-station smoke alarm by moving this provision from the body of the code to a recommendation in the annex.

In addition, as mentioned by the proponent, the proposal would also remove the rate of heat release requirements by moving this provision also from the body of the code to a recommended in the annex.

Furthermore, the motion on the floor would also expand the scope of the exemption for patient-owned upholstered furniture in sleeping rooms of nursing homes to patient-owned upholstered furniture in sleeping rooms of health care

occupancies.

So the scope would be expanded from nursing homes to health care occupancies. The committee rejected this by a unanimous vote of 28 to nothing. Thank you.

DR. MILKE: Thank you Mr. Koffel for Mr. Klein. We could open up debate on the motion at this point. Microphone number 5.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for the American Fire Safety Council. The text says that furniture from patients can be brought in and it doesn't require to be used in spite of the fact that virtually no patients are going to bring in furniture that's not smolder resistant because it's got to be over 30 years old but it's allowed.

And the heat release requirements, which I love -- and I wish they were in place -- are moot. That's why I took them out, because in fact all the occupancies are sprinklered. So what's the point?

They're sprinklered so they're not allowed to have heat release -- We went through that

the last cycle. They are sprinklered so the heat release requirements from Chapter 10 are moot. Thank you.

DR. MILKE: Just to make sure, Doctor Hirschler, you're for the motion?

DR. HIRSCHLER: I am in favor of the motion. I'm sorry that I forgot to mention that.

DR. MILKE: Fine. Thank you. Microphone number 6.

MR. GREGORY: Skip Gregory, Health Facility Consulting speaking on behalf of the health care section and speaking against the motion in favor of the Technical Committee's action.

Health care section board and membership voted yesterday to reject this motion because the presence of sprinklers required by this section provides an acceptable level of protection without the need of additional regulation.

Health care is an occupancy where staff is available 24/7. There's no statistical evidence showing that smoldering fires have created any harm in health care occupancies.

And certainly residents who live in

nursing homes have been bringing their own furnishings into these facilities that are fully sprinklered without this need of additional protection with no adverse effects. Thank you.

DR. MILKE: Thank you. Any further discussion on Motion 101-11 to accept Comment 101-232 and Comment 101-250?

Seeing none, we will move to a vote. Again, the motion on the floor is to accept Comment 101-232 and Comment 101-250.

All in favor of the motion, please indicate by raising your hand. All opposed? That fails. Going to 101-12. And looks like we're going back to microphone number 5.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, speaking for NAFRA, and I hereby move 101-233 and 101 -- sorry -- 101 Comment 233 and 101 Comment 251.

DR. MILKE: Thank you. There's a group amending motion from the floor to accept Comment 101-233 and 101-251. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: I heard a second. Please

proceed with the discussion on the motion.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA. This is the same as before, with one exception.

This deals with mattresses, and mattresses in the United States have been required by the federal government since 1972 to be smolder resistant.

So in order to find new mattresses that are not smolder resistant, they must be illegally imported into the United States so that they can be placed in a hospital.

They have to be illegally imported because if they're legally imported they're not allowed to be sold here, and if they're private they can bring them in.

So we're asking people to please illegally import mattresses into hospitals so they can be non-smolder resistant. This is ludicrous. Please support this motion. Thank you.

DR. MILKE: Thank you. Mr. Koffel.

MR. KOFFEL: Again I will defer to David Klein, chair of the Life Safety Technical Committee

on Health Care Occupancies.

DR. MILKE: Mr. Klein.

MR. KLEIN: Thank you, Mr. Chair. David Klein, Department of Veterans Affairs, chair of the Health Care Technical Committee.

As mentioned by the proponents, this is basically -- these are basically the same issues that we discussed previously except related to mattresses rather than upholstered furniture.

Again, the Health Care Technical Committee considered the changes sought by the proponents and concluded that the presence of sprinklers makes additional regulations unnecessary.

The committee again pointed out that in health care occupancies, staff members are available to detect and react to fire, and the proponent did not provide statistical evidence to indicate that smoldering fires present a problem in health care occupancies.

In the text of the current Life Safety Code, mattresses belonging to the patient in non-sprinklered sleeping rooms of existing nursing homes are exempted from the smolder emission and rate

of heat release requirements provided that a smoke detector is installed in the patient's sleeping room and the battery operated single-station smoke alarm is permitted.

This motion, the motion that's on the floor, would eliminate the permission for use of the battery powered single-station smoke alarm by moving this provision from the body of the code to a recommendation in the annex.

Again, the proposal would also remove the rate of heat release requirements by moving this provision from the body of the code to a recommendation in the annex.

And again, as with the previous discussion, the motion on the floor would expand the scope of the exemption mentioned from sleeping rooms of nursing homes to sleeping rooms of health care occupancies.

Again, the committee rejected this by unanimous vote of 28 to nothing. Thank you.

DR. MILKE: Any further discussion on 101-12? I'm sorry. Microphone number 6.

MR. GREGORY: Skip Gregory, Health

1 Facility Consulting speaking on behalf of the health
2 care section and speaking against the motion in favor
3 of the Technical Committee's action.
4 The health care section voted yesterday
5 to not support this comment and to support the
6 committee action. Thank you.
7 DR. MILKE: Thank you. Any further
8 discussion now? Microphone number 5.
9 FROM THE FLOOR: Call the question.
10 DR. MILKE: Calling the question is
11 non-debatable so we'll go right to the vote of that.
12 All in favor of calling the question raise your hand.
13 All opposed?
14 We go right to a vote of the motion then
15 and that motion is to accept Comment 101-233 and
16 101-251. All in favor of the motion, please raise
17 your hands. All opposed? That fails. We go to
18 101-13. Microphone number 5.
19 DR. HIRSCHLER: Mr. Chairman, Marcelo
20 Hirschler, GBH International, for NAFRA. And I
21 hereby move 101 -- Comment 101-236 and accept Comment
22 101-253.
23 DR. MILKE: Thank you. There is a group

amending motion on the floor to accept Comment 101-236 and 101-253. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: I hear a second. We have that. Please proceed with the discussion on the motion.

DR. HIRSCHLER: Thank you, again. Marcelo Hirschler, GBH International, for NAFRA. This is a completely different issue. Forget smoldering. Completely different issue.

What the code says is that decorations have to be flame retardant. Throughout the NFPA system, with the exception of a few places in 101 -- and they will be coming up in these motions today -- the word flame retardant as a requirement has been removed because it's meaningless. It is completely unenforceable. There's nothing that says that.

Usually what -- that's been replaced by the phrase, Complying with the flame spread requirement of NFPA 701.

When that was proposed here the health care section decided, No, we don't want that. We want more options, and the AHJ knows how to decide

whether something's flame retardant.

And I have a great deal of respect for the AHJ but -- so I'm trying to figure out how they know if something is flame retardant.

They can know by talking to the decoration? By having a conversation with it? By smelling it? By looking at it? By listening to what it says? By looking at it? I don't know.

But I thought in spite of and beyond all of that, I'd give them some additional tools beyond them having this conversation with the decoration since there is no standard or nothing in writing that says what that flame retardant means.

So what this does is give them a variety of options for what means increased fire performance. One of the options is determined by the authority having jurisdiction in whatever way they want to determine that there is acceptable fire performance, however they wish to do that.

But beyond that, if they don't want to do that, they can use one of the accepted methods and then the annex explains where these things come from.

Again, the real point here is that saying

that something is flame retardant doesn't mean anything. It cannot be enforced. There is no standard, no test method, nothing that says you passed it and you're flame retardant. It doesn't exist. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to offer the committee position?

MR. KOFFEL: Yes. From the Technical Correlating Committee's perspective, since the action on these various comments was consistent there was not a correlation issue.

But I would indicate that at least with regard to the reference to flame retardant, if we have a different action on these different motions that are forthcoming, there may be a correlation issue.

And since this is the first one, I think it's appropriate before I ask David Klein to speak on behalf of the Health Care Committee, to share the comments of some of the other committees so that we can consider those all at this time.

If you look at Comment 110-264 which deals with detention and correctional occupancies,

that committee took exception to the use of the word fire performance in lieu of flame retardant, indicating that fire performance is a much broader term and a term that is also not defined.

And we are relying on the authority having jurisdiction to make a determination based upon an undefined term, fire performance.

The committee also took exception to items 1 and 4. I've already identified item 1, item 4. Verbage such as limited quantities that a hazard to fire development are spread is minimal.

So I'd ask that you consider those in evaluating your action on this motion as well. With that said, David Klein, if you would represent the views of the Technical Committee on Health Care Occupancies.

DR. MILKE: Mr. Klein.

MR. KLEIN: Thank you, Mr. Chair. David Klein, Department of Veterans Affairs, chair of the Health Care Technical Committee.

The committee considered the change sought by the proponents. The committee stated that the proposed change would actually make it more

difficult for the authority having jurisdiction to enforce the provision.

The change would expand the current requirement, which is that decorations be flame retardant, into a requirement that the decorations must be -- I'm quoting here -- considered by the authority having jurisdiction to exhibit acceptable fire performance, unquote.

Fire performance includes many more considerations than a judgment related to flame retardant.

Fire performance considerations involve all the characteristics of a material related to fire. This is a significant increase on what will be required of the AHJ.

The committee also pointed out that action on another comment, 101-235, revised sub item 1 to address treatments with an approved fire-retardant coating that is listed and labeled for application to the material to which it is applied.

The committee rejected this unanimously 28 to nothing. Thank you.

DR. MILKE: Okay. Thank you. With that

we will open up debate on the motion. Please provide your name and affiliation and whether you are speaking in support or against the motion. Microphone 5.

MR. KAMALASANAN: I'm in support of the motion.

DR. MILKE: Your name and affiliation.

MR. KAMALASANAN: My name is Kutti from Saudi Arabia, representing Saudi Aramco from Saudi Arabia.

DR. MILKE: Thank you.

MR. KAMALASANAN: Flame-retardant material means it can withstand up to certain temperature. Thereafter, without melting, it will be -- It is already clear -- I got the notes with me. So the flame-retardant material will be selected based on our requirement.

There is no fireproof material. This coat is flameproof. I am working on the plans. We got already flameproof.

But fireproof material, it is not there. Flameproof material, it can withstand up to certain temperature. Thereafter without melting it will

be -- I believe I got the proof.

This is already clearly mentioned in the material. I'm an electrical engineer but basically it is with me. You can have a look.

DR. MILKE: Okay. Thank you. Microphone number 6.

MR. GREGORY: Skip Gregory, Health Facility Consulting speaking on behalf of the health care section and speaking against the motion in favor of the Technical Committee's action. Thank you.

DR. MILKE: Thank you. Any further discussion on the motion? Microphone 5.

DR. HIRSCHLER: Thank you. As was pointed out by the Technical Committee chair --

DR. MILKE: I'm sorry, could you --

DR. HIRSCHLER: Marcelo Hirschler, GBH International, speaking for the motion. I apologize. I'm sorry.

The committee accepted 101-235a which says they are flame retardant, which is not defined, or treated with approved flame retardant. How much? That it is listed and labeled for the application. How much? That's the problem. We don't know.

The problem is all this says is it's going to be approved by the AHJ in some way. And flame retardant is a vague term because it is the name of an additive.

That's the organization I represent. The North American Flame Retardant Alliance. These members make flame retardants.

So is the decoration now one of the products that the members -- association I represent makes? The decoration suddenly becomes one of those products? How is it determined?

I mean, the products that they make are usually in either liquid or powder form or pellet form. They're not a decoration usually so you can't be flame retardant. You can't be.

So my alternate wording says they are -- they have a fire performance, however that is defined that is acceptable to the AHJ.

However the AHJ decides to define it, it doesn't matter. But that way, he or she can then decide what acceptable is. Thank you.

DR. MILKE: Thank you. Gentlemen at microphone 5.

FROM THE FLOOR: Call the question.

FROM THE FLOOR: Second.

DR. MILKE: Motion to call the question. There's a second. That's non-debatable. All in favor of calling the question, raise your hand. All opposed? Passes.

We move to the motion on the floor. Now, that is to accept Comments 101-236 and 101-253. All in favor of the motion, please indicate by raising your hand. All opposed? Motion fails. Moving on to Motion 101-14.

DR. HIRSCHLER: My name is Marcelo Hirschler, GBH International, and I'm the designated representative for James Everitt.

I hereby move to return a portion of a report and form of Proposal 101-305a and related Comment 101-237.

DR. MILKE: Okay. Thank you. There's a motion on the floor to return a portion of a report in the form of a Proposal 101-305a and related Comment 101-237. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: We do have a second. Please proceed with the discussion on the motion.

DR. HIRSCHLER: Thank you. With this we're dealing now with something completely different and that is we're dealing with trash receptacles.

The committee added a section that allows the trash receptacles to be listed to an FM standard. Jim Everitt shared with me indication that when you test with that standard, the fire performance of those trash receptacles is very poor.

And trash receptacles that comply with that standard, it can very easily -- as soon as the lid is closed, the contents stop burning in the test and the materials that are very low fire performance can pass the test.

He shared with me a video, which of course I can't show you, but he shared with me a video showing how there's significant difference between these receptacles that meet the FM test and the receptacles that meet the alternate requirements that are contained in NFPA 1.

So by deleting all of this, returning it to committee, what we're doing is allowing the

1 default requirement for health care occupancy for
2 very large trash receptacles to apply. Thank you.
3 DR. MILKE: Thank you. I should add for
4 the record that Doctor Hirschler is the designated
5 representative for James Everitt who submitted this
6 motion. Mr. Koffel, if you'd like to make a
7 committee statement.
8 MR. KOFFEL: Mr. Chairperson, the related
9 Comment 101-237 was submitted by Jim Lathrop of
10 Koffel Associates on behalf of a client.
11 Therefore, to avoid any potential
12 conflict of interest, at this time I'm going to step
13 down and David Klein, chair of the Life Safety
14 Technical Committee on Health Care Occupancies, will
15 address the issues on behalf of the Technical
16 Committee.
17 DR. MILKE: Mr. Klein.
18
19 MR. KLEIN: Thank you, Mr. Chair. David
20 Klein, Department of Veterans Affairs, chair of the
21 Health Care Technical Committee.
22 This motion is related to Comment 101-237
23 which is based on Proposal 101-305a. The effect of

the comment and proposal as accepted by the Technical Committee is to expand options available under the Soiled Linen and Trash Receptacles section, which is Section 7.5.7 in Chapters 18 and 19, to permit containers larger than the current maximum capacity of 32 gallons provided that certain provisions are met, including the requirement that the containers are used solely for recycling, cleaning, or for patient records awaiting destruction, that the containers do not exceed a capacity of 96 gallons, and that the containers for combustibles are labeled and listed as meeting the requirements of FM Approval Standard 6921.

Testing, listing, and labeling is not limited to FM approvals. Other labs can do this. The committee felt that the provisions as approved by the committee were reasonable and provided additional options concerning receptacles. This action by the committee was approved unanimously 28 to nothing. Thank you.

DR. MILKE: Thank you, Mr. Klein. With that we can open up debate on the motion and go to microphone number 6.

MR. PETERKIN: Jim Peterkin, Heery International, representing the health care section. I'd just wanted to first say that the health care section met and discussed this item and voted -- membership and the board voted to support this motion or, I mean, oppose this motion.

And then speaking also just -- if anybody's been in the hospitals, they'll notice a lot of these are used for medical records for disposal. You'll see them all over the hospital.

And they're supposed to be right now in a hazardous area but it's kind of a violation that's happening everywhere.

And this will give us a way of meeting that requirement without having to place them in a hazardous area, and then we would be in compliance.

One other thing I'd also like to point out, I'm a member of the NFPA 1 Committee, although I'm not speaking for that committee, but this item was also voted by the NFPA 1 Committee and was approved but, again, I would speak in opposition to this motion.

DR. MILKE: Thank you. Microphone number 4.

MR. LATHROP: Jim Lathrop, Koffel Associates. In this case we do have a client called Loss Prevention and Investigations. They came to us and said, We have a problem --

DR. MILKE: Speaking for or against?

MR. LATHROP: Speaking against, sorry -- we have a problem in the real world, and that is especially with HIPAA.

Everybody sees these large HIPAA containers all over the facility and they're a violation. And so this company came to us and said, Let's let them be bigger.

I said, No. You're going to have to give something back to get them bigger and you're going to have to do something.

And we found this FM test and we think it's pretty good. It prevents the heat from exposing collaterally. It has a test above it to prevent and make sure that flames coming out will not come out and ignite things above it.

If Marcelo's -- Whoever Marcelo's

representing I don't know or whoever Jim Everitt's representing I don't know, but if they have another test method and they want to add that, add that test method. But as it is right now, this is going to be a lot better than what we have out there.

DR. MILKE: Thank you. Microphone 5.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for Jim Everitt. There is a significant difference between the --

DR. MILKE: Speaking for or --

DR. HIRSCHLER: Excuse me. Speaking for the motion. I apologize one more time. There is a clear difference between the alternate approach that is being shown by NFPA 1 for large containers which have to meet the ASTM E1354, the cone test, with the heat release requirement.

And if you can see side by side as I have seen, side by side the picture of what happens when you apply a flame, a small flame, to something that simply passed the FM test or something that's made of materials that comply with the cone calorimeter, it's a massive difference, no question about it.

So it's not a question that we're

suddenly -- that there's nothing there. Large trash containers, according to NFPA 1, need to comply with the cone calorimeter test and have needed to for a couple of cycles.

With regard to comment made by the Technical Committee chair that NFPA 1 accepted this -- NFPA 1 extracted this from 101, which is why Jim Everitt put this NITMAM in because what this would do would -- if this were to go through, would be to make a big exception on the requirements for trash containers in NFPA 1. Thank you.

DR. MILKE: Thank you. Microphone 4.

MR. LATHROP: Jim Lathrop, Koffel Associates, again speaking against the motion. The test Marcelo's talking about is a test for the container.

You've got this big huge container with tons of combustibles in it. The container burning or not burning is almost irrelevant. What this test does is try to maintain the fire within the container.

DR. MILKE: Any further discussion on this motion? With that we can go to the vote.

Again, the motion on the floor is to return a portion of a report in the form of a Proposal 101-305a and related Comment 101-237.

All in favor of the motion, please indicate by raising your hand. All opposed? The motion fails.

We're going to take a short break here meaning five minutes. Now as opposed to the midday break which was a metric ten minutes, this will be a real five and we'll try to stay very close to that. Five minutes please. That takes us to about twelve after.

(Whereupon at 4:07 p.m. the meeting recessed and reconvened at 4:13 p.m.)

DR. MILKE: All right. So we want to move on to Motion 101-15 please. Microphone 5.

MR. DANIEL: Thank you, Mr. Chairman. My name is Mike Daniel, Daniel Consulting LTD. I'm speaking for myself on this particular issue. I would like to move acceptance of my Comment 101-239.

DR. MILKE: Thank you. There's a motion on the floor to accept Comment 101-239. Is there a

1 second?

2 FROM THE FLOOR: Second.

3 DR. MILKE: Thank you. We do have a

4 second. Mr. Daniel, please proceed with the

5 discussion on the motion.

6 MR. DANIEL: This motion, which would

7 result in the acceptance of Proposal 101-307 on page

8 101-153 of the ROP, involves allowable locking

9 provisions in Health Care Occupancies and essentially

10 attempts to alleviate the potential application of

11 retroactive requirements on existing facilities.

12 Prior to adoption of the 2009 edition of

13 the code there were essentially three allowable means

14 to lock a door in the means of egress in a health

15 care occupancy; delayed egress, access control sensor

16 device, and based on the clinical needs of the

17 patient which essentially required some means for

18 rapid removal of occupants such as remote control of

19 locks, keying of all locks and keys carried by staff

20 at all times, or other such reliable means available

21 to the staff at all times.

22 As such, pediatric, newborn, and

23 maternity areas were being allowed, by many

1 authorities having jurisdiction, to be secured under
2 the clinical needs provision.
3 There were, however, some authorities
4 that were questioning whether or not these patient
5 populations actually met the clinical need intent.
6 In an effort to alleviate this concern
7 and confusion, there was an attempt in the 2009
8 edition of the code to rewrite the definition of
9 clinical need to clearly incorporate these areas.
10 The committee decided, however, to break
11 the locking provisions into two separate sections.
12 Number one, where the clinical needs -- again,
13 clinical need -- of patients required specialized
14 security measures or where patients posed a security
15 threat and, number two, where a patient's special
16 needs require specialized protective measures for
17 their safety. So clinical needs and safety.
18 While the requirement for locking for the
19 clinical needs provision remained the same in the
20 2009 edition as in previous editions for both new and
21 existing construction, additional requirements such
22 as sprinkler protection, smoke detector or remote
23 control locks and others, were added to the locking

1 requirements under the safety provisions.

2 The basic problem is that these

3 additional requirements were added to both the new

4 and existing chapter.

5 While this does not create a significant

6 problem for new health care occupancies given that

7 they're already required to be sprinklered

8 throughout, many existing facilities that were

9 previously being allowed to secure pediatric, infant,

10 and maternity areas of the clinical needs

11 requirements faced non-compliance without the

12 application of retroactive requirements that they

13 wanted to continue to protect these patient

14 populations.

15 While there's obviously a monetary impact

16 to such new requirements, more importantly from an

17 operational perspective, what do these facilities do

18 in the interim to protect these patients while the

19 retroactive requirements are being implemented?

20 First of all, there's definitely still an

21 argument that these populations fit the criteria for

22 clinical need.

23 As an example, in a typical health care

1 setting you will find infant and pediatric areas
2 intermingled. When children are able to walk, they
3 tend to wander without worry, similar to the same
4 risk as Alzheimer's patients which are clearly
5 delineated under the clinical need provision.
6 Acceptance of this motion will, however,
7 avoid having to worry about such interpretations on
8 the issue while also alleviating the application of
9 potential retroactive requirements.
10 This motion addresses existing facility
11 only as addressed in Chapter 19. It allows existing
12 facilities, existing facilities only, the option
13 under the safety provision to continue to secure
14 these areas under the same previous provisions as
15 they were allowed under the clinical need, the same
16 requirements that both new and existing facilities
17 are currently held to under the clinical need locking
18 provisions.
19 It results in no decrease in the level of
20 safety from previous provisions, provides a proven
21 safe and effective option, and avoids any significant
22 ramifications or risk resulting from the application
23 of retroactive requirements to existing facilities.

1 As such, I strongly urge you to support
2 this motion. Thank you, with five seconds to spare.
3 DR. MILKE: Well done. Thank you.
4 Mr. Koffel, would you like to make a statement for
5 the committee?
6 MR. KOFFEL: Yes, Mr. Chair. I'd like to
7 offer two comments before asking David Klein to speak
8 to this issue.
9 First off I would note that there are
10 some related comments and in particular Comment
11 101-238.
12 You heard some testimony with regard to
13 whether pediatric units or maternity units qualify
14 under the concept of clinical needs and I think the
15 committee has clarified that in their statement on
16 that public comment.
17 As I stated earlier, one of my tasks is
18 to review the potential correlation problems that
19 might occur as we take action on these various
20 proposals and comments.
21 And in this instance, while I can't speak
22 for the Correlating Committee, I have identified a
23 potential correlation issue within the code if this

1 motion is accepted.

2 There's one other occupancy that allows

3 this feature in which we will lock people behind

4 doors and rely on staff to respond for those people

5 to egress, and that is detention and correctional

6 occupancies.

7 What is proposed herein is not consistent

8 with the detention and correctional occupancy

9 provisions, however.

10 In order to do this in the detention and

11 correctional occupancies, there are three additional

12 criteria that must be met that are not posed or

13 proposed in this language.

14 One is a response time requirement for

15 staff. The second is the keys are identifiable by

16 sight and touch. And third, that there's a monthly

17 inspection of the door hardware.

18 So in that there is a potential

19 correlation issue. I can't speak as to how the TCC

20 would act on that.

21 With that I'd like to ask David Klein,

22 charge of the Life Safety Technical Committee on

23 Health Care Occupancies to address the specific

1 issues.

2 DR. MILKE: Mr. Klein.

3

4 MR. KLEIN: Thank you, Mr. Chairman.

5 David Klein, Department of Veterans Affairs, chair of

6 the Health Care Technical Committee.

7 The Health Care Occupancies chapters of

8 the Life Safety Code have long permitted the locking

9 of doors and mind of egress where the clinical needs

10 of patients require specialized security measures or

11 where patients pose a security threat.

12 In the 2009 edition of the code,

13 additional provisions were added that permit door-

14 locking where patients' special needs require

15 specialized protective measures for their safety.

16 The committee points out that special

17 needs are different than clinical needs and the

18 committee established different provisions for

19 locking based on special needs than for locking based

20 on clinical needs.

21 In the case of clinical needs, door-

22 locking is permitted if staff can readily unlock the

23 doors at all times in accordance with 19.2.2.2.6.

1 The requirements for locking in the case
2 of patients' special needs are more extensive as
3 pointed out by the proponent.
4 The effect of the motion on the floor
5 would be to permit the same provisions for patients'
6 special needs as for patients' clinical needs, which
7 is that door locking would be permitted if staff can
8 readily unlock doors at all times in accordance with
9 19.2.2.2.6.
10 The committee did not agree with this
11 proposed change and stood with the minimum standards
12 that the committee had previously established for
13 door-locking. On this issue the committee vote was
14 20 to 1. Thank you.
15 DR. MILKE: Thank you, Mr. Koffel and
16 Mr. Klein. We will now open up the debate on the
17 motion to accept Comment 101-239. Microphone 4.
18 MR. LATHROP: Jim Lathrop, Koffel
19 Associates, speaking for myself and speaking against
20 the motion. Little quick history here.
21 First of all, the code for decades said
22 that this would be allowed for psychiatric patients,
23 and I think it was about the late 80's or so, with

1 the dramatic increase in Alzheimer's patients, which
2 are not psychiatric patients, and the issues
3 involved -- and I can actually go to -- didn't call
4 them ROP's and ROC's then but the old TCR's and
5 TCD's -- you can actually go back there and see where
6 it was changed to clinical need based on Alzheimer's
7 and psychiatric.
8 That being said, we all know there's
9 problems with what we have with the infirmaries and
10 the pediatric units.
11 And so over the years people started
12 using the clinical needs as, to be blunt, an excuse
13 to use these provisions.
14 The committee, recognizing this and
15 wanting to fix this, came up with a Task Group to
16 work on the provisions that came out of the 2009
17 edition of the code.
18 I want to emphasize that those
19 provisions, that Task Group, consisted of
20 representatives of ASHI, Joint Commission, DMS, and
21 the American Health Care Association.
22 With all that group together there was a
23 lot of compromise. There were some things some

1 people wanted more stringent, some people wanted some
2 things less stringent. That's a consensus-based
3 document.
4 And what you came up with is what you see
5 in the 2009 edition of the code. It was a
6 cooperative effort between all organizations.
7 One of the things I do want to point out,
8 if this goes through the only thing that will be
9 required is the staff carry the keys.
10 You can lock just about any patient you
11 want in the hospital with a key and padlock
12 basically, and obviously you won't be using padlocks
13 hopefully. Just a dead-bolt lock. But it's a key-
14 operated dead-bolt lock.
15 Now, based on that, one of the things you
16 want to remember, yeah, there are some new
17 requirements here but they're not new because
18 technically you shouldn't have been doing this in the
19 past.
20 But one of the things you've got to
21 remember here is the fact that there really is
22 nothing that onerous going on here.
23 First of all, yes, it does require

1 sprinkler protection but we've already heard, first
2 of all, all the nursing homes are going to have to be
3 sprinklered.
4 And existing health care hospitals, we've
5 already been told that around 89 percent are already
6 fully sprinklered.
7 And there is an annex note talking about
8 buildings that are non-sprinklered or partially
9 sprinklered and some of the stuff that can be done.
10 The other thing is smoke detection.
11 Well, I'm actually one of those that wanted the smoke
12 detection and the remote release, but it ended up
13 being smoke detection or remote release, so I don't
14 think that's overly onerous anyhow.
15 If that was really the concern, being
16 overly onerous for existing facilities, it would have
17 been much better to just put in existing previously
18 approved installations.
19 Because if somebody previously approved
20 it, maybe they'll continue to allow it under
21 existing. I don't think this is really going to have
22 the impact that's being told here.
23 Now, one of the things it does say is

that as long as staff carry the keys at all times. And I don't like to bring up incidental anecdotal incidents, but just about two months ago I was going through a facility, a psychiatric facility that is allowed to be key-locked with keys.

And the first thing we've did, we went up to a key staff member on the floor and said, Okay, let's do a little drill. Let's unlock the doors.

And they said, Oh, hold on a second. I've got to go. I'll be right back. And the chief engineer that I was with said, Where are you going?

He says, Oh, I forgot my keys in the car today. I've got to go get a set of keys. So this stuff does happen in the real world.

I think we're doing a big disservice expanding this. I would not oppose it at all if the proponent wanted to go with a complaint to the Standards Council and say, Let's put previously approved existing in there.

That probably wouldn't be a huge problem because it would say previously approved existing.

DR. MILKE: Thank you. Microphone number 3.

1 MS. McLAUGHLIN: Yes. Susan McLaughlin,
2 MSL Health Care Consulting speaking on behalf of the
3 health care section and speaking in favor of the
4 motion on the floor.
5 The health care section, at its meeting
6 yesterday morning, voted to support this motion.
7 Thank you very much.
8 DR. MILKE: Thank you. Microphone 5.
9 MR. ACRE: Paul Acre, AHJ, Arkansas.
10 I'm speaking in support of the motion. Historically,
11 use of the code -- as an AHJ you don't always have
12 the perspective of the history and you have to take
13 the clinical needs of the patient base within the
14 context of the way it's presented in the code itself.
15 I have traditionally -- I have worked
16 with facilities on the application of the use of the
17 code regarding clinical needs and the use of locking
18 arrangements that required or allowed staff to be
19 responsible for egress.
20 I've never encountered an instance in
21 which it constituted locking an infant and mother in
22 their room.
23 It normally encompassed or it has always

in my experience encompassed the control of a suite or wing space. And anyway, again, I'm in support of this and I think it would be a disservice to go backwards on this.

DR. MILKE: Thank you. Any further discussions on Motion 101-15 to accept Comment 101-239? Microphone 4.

MR. LATHROP: Jim Lathrop, Koffel Associates, one more time. I hope you all have a copy of the 2009 edition of the code because you really need to see what this is going to do.

It going to take 19.2.2.5.2. which could be applied to emergency departments, it could be basically applied to any department in the building, and it's going to say, Instead of doing this stuff that's listed there, you can just look the doors period with key locks.

DR. MILKE: Thank you. Any further discussion? Seeing none, we will move to a floor vote. Again, the motion on the floor is to accept Comment 101-239. All in favor raise your hands. All opposed. The motion fails.

We've been informed that the maker of

Motion 101-16 is not pursuing that motion, so we move on. Similarly we've been informed that the maker of Motion 101-17 and, while we're at it, 18, will not be pursuing either of those motions.

So that takes us to 101-19. At the risk of surprising the person for that motion, who may not be near a mike yet -- Motion 101-19 please. Microphone 5.

MR. PETERSON: My name is David Glenn Peterson. I'm currently employed at the University of New Hampshire, associate university architect.

I'm here today as designated representative of Michael Anthony of the University of Michigan and Ted Wagner, the University of Nebraska, the original submitters of this proposal sponsored by the Educational Facilities Management Administrators, known as EFMA. I move to accept Comment 101-277.

DR. MILKE: Okay. Thank you. There's a motion on the floor to accept Comment 101-277. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. Please proceed

with the discussion on the motion.

MR. PETERSON: I've been asked to say a few words in support of EFMA's proposal to establish new chapters under NFPA 101 to regulate new and existing student resident facilities as a separate occupancy type.

Much of the rationale for this offering was laid out in the original proposal, but I would like to highlight several of the key factors we feel demand separate recognition of these facilities.

First of all, they are totally unlike the type of facility they're currently lumped in with, hotels.

Hotels and motels are self-contained businesses typically providing short-term overnight accommodations to responsible adults, primarily only for sleeping, and do not have an intimate familiarity with the building.

While these facilities have some typical guest amenities such as restaurants and pools, the buildings generally tend to be formulaic in their layout and architectures with multiple stories served by double loaded corridors leading to egress

1 stairwells at their ends.

2 Residents halls, on the other hand, are

3 run by educational institutions in support of their

4 academic missions and intended for a longer-term

5 occupancy.

6 This permits a greater familiarity with

7 the facility but is an occupancy that is primarily

8 inhabited by minors who by definition cannot be

9 relied upon to be responsible for their actions.

10 For this reason, these facilities are

11 staffed with full-time round-the-clock employees

12 trained to deal with a range of emergencies that can

13 be typically encountered.

14 Because they are dealing with minors,

15 educational institutions are seen as having in loco

16 parentis fiduciary responsibilities to act in the

17 best interest of the students, whereas at hotels the

18 staff's primary emphasis is hospitality.

19 Furthermore, today's residence halls are

20 anything but formulaic, including -- some built on my

21 own campus are a mix of apartments, suites, double

22 doubles, and single-occupant rooms.

23 These kinds of facilities make for

interesting architectural arrangements of space and are complex in interior floor plans that don't always have intuitively obvious exit routes.

Cooking facilities both in individual rooms and communal kitchens, as well as food service facilities, are becoming more common if not the norm.

A trend towards living and learning has created buildings that have increasing amounts of assembly space within them.

Classrooms, recreation halls, movie, concert, and dance venues are becoming increasingly common in these newer facilities.

I think it's worth spending a few moments to elaborate on the propensities of the occupants of the student residence halls and ask you to consider your own experience as a student.

It's not hard to generate a list of activities that commonly occur in resident halls that constitute a danger in facilities.

Even in buildings where cooking or dangerous appliances are prohibited, they are commonly found.

As the code manager for a campus in

New York state, it was my responsibility to respond to every alarm in the building for reoccupancy in conjunction with the local fire department.

On more than one occasion I responded to subsequent alarms caused by a fire resulting from misuse of a prohibited appliance.

The prohibited appliance would be confiscated. A second alarm would occur on the same night generated by the same students who had simply found another appliance nearby and started another fire.

There is also propensity for embers and open flames in such things as candles, incense, and smoking, all in the presence of copious combustibles.

Heat-generating appliances, ignition sources, and large quantities of introduced combustibles of this type would rarely be found in a hotel brought in by a hotel guest but are commonplace in residence halls.

Beyond things students bring and use in the room, there are behaviors, not only behaviors that increase the likelihood of fires starting, but behaviors that increase the likelihood of them

1 becoming a victim.

2 It is well-known that students are more

3 likely to experiment with drugs and alcohol, to be

4 intoxicated to the point of incapacitation.

5 They're more likely to engage in other

6 risky behaviors that increase the chances of fires

7 and other emergencies.

8 This environment also breeds complacency

9 in emergency response, making training staff an

10 important part of the overall safety plan.

11 I remember in my own experience in

12 college dorms that I was subject to frequent false

13 alarms, so much so that some of my hall mates and I

14 set up beds beneath our own beds so that we could

15 continue to sleep when the alarms went off in the

16 middle of the night.

17 Thank God I was sleeping elsewhere the

18 night an arson fire was set less than 50 feet from my

19 door.

20 Opponents may argue that dormitory fires

21 are rare and fatalities even rarer, but just because

22 headlines aren't filled daily with one campus tragedy

23 after another is not a reason to not be proactive and

make the change to the code that could improve the safety of both occupancy types.

Across the country there are many older and historic Type III and Type V construction residence halls that have no sprinklers, no enclosed egress stairs, inadequate fire staffing, which are combustible filled and thermals waiting to happen. Even with newer construction --

DR. MILKE: 30 seconds.

MR. PETERSON: -- the trend in campus residence halls over the last several years has been outsourced to private developers who sometimes operate student housing for a lease period, generally on campus property occupied by the students, referred by the school, until the facility is handed over at the conclusion of the lease.

The incentive for the private developer is to build as economically as possible, often Type V for construction and the minimum requirements necessary. I urge support of the motion. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to offer the committee's position?

MR. KOFFEL: Yes. Again, I will offer

comments with regard to potential conflicts that could occur if this motion is accepted.

First off, I'd like to commend the proponent. To draft new chapters in this document is not necessarily easy and overall it appears to be a very good effort on the part of the proponent.

However, with regard to the occupancy classification, I did not detect any change to Chapter 6 that would define this as an occupancy classification.

With regard to 34.1.2, multiple occupancies, I did not find any proposals to Chapter 6 that would address how to deal with the separation in a separated occupancy approach.

In Table 34.3.2.2.2 and some other locations, kitchen has been added as a hazardous area. That's not typical throughout the code.

And the protection method is defined as chemical suppression, and I'm not sure that's well defined.

In 34.6 there's a reference to egress windows. I'm almost positive -- I know what the proponent is seeking, but again, that's not

necessarily well defined in the code.

With those correlation comments, I would also ask Warren Bonisch, chair of the Life Safety Technical Committee on Residential Occupancies, to present the committee's view.

DR. MILKE: Mr. Bonisch.

MR. BONISCH: Thank you, Mr. Chair. This is Warren Bonisch with Aon Fire Protection and chair of Residential.

All of the committee members except one reject the proposal. The basis of -- the committee included universities.

We specifically had a follow-up call with the committee about a month ago asking if there was any specific concerns with changes of the current document, and they all indicated that the current chapters as written were fine.

There was numerous technical issues that the committee represented in the substantiation with the current proposal, and I'd like to stand with the document as published.

DR. MILKE: Thank you. With that we can open up debate on the motion. We go to microphone 4.

MR. LATHROP: Jim Lathrop, Koffel Associates. I'm speaking for myself. I'm a member of the residential committee but not speaking for the committee. One thing I'd like to add --

DR. MILKE: Are you for or against?

MR. LATHROP: Against. One thing I'd like to add to Warren's comments is the committee made a pretty good analysis of the proposed chapters and he could only find about six things that were different and took at least one of those -- I think it was -- dealt with exit drills -- and did incorporate it into the hotel and motel chapter.

As Mr. Koffel said, I commend the submitter for the work, but we really needed to see something that was different and, not only just different, but addressed the hazards or the problems that the proponent was talking about.

DR. MILKE: Any further discussion? Seeing none, we'll move on to a vote on the motion. Motion on the floor is to accept Comment 101-277. All in favor, please raise your hands. All opposed? That fails.

Moving on, we've been advised that the submitter of 101-20 will not be pursuing that motion. Similarly, the submitter of 101-21 will not be submitting that motion.

Next motion NFPA 101-22 is on our agenda. However, no one signed in within the proper time frame to make the amending motion.

Therefore, in accordance with NFPA rules the motion may not be considered by the assembly as a Certified Amending Motion and is removed from the agenda. We now move on to the next motion. That is Motion 101-23.

DR. HIRSCHLER: Mr. Chairman, Marcelo Hirschler, GBH International, for NAFRA. I would like to move at the same time 101-303 and 101-307.

They're the same exact issue so if you don't mind, let's combine the two. I move to accept Comment 101-303 and 101-307. Same issue, same committee.

DR. MILKE: Hold on please. Give us a minute to caucus on this a bit to confirm it's an appropriate motion.

DR. HIRSCHLER: We're going to waste more

time otherwise --

DR. MILKE: Okay. We've caucused up here and decided we can treat those as a group amending motion. These are two different occupancies you're addressing but, nevertheless, we do need a second on this.

FROM THE FLOOR: Second.

DR. MILKE: Thank you. Doctor Hirschler, please.

DR. HIRSCHLER: Thank you. This is similar to what we've done before with one exception, where we're dealing in the first one with the -- with one occupancy and other one with storage occupancy -- industrial occupancy and storage occupancies.

Sorry. In Chapter 40 with industrial occupancies, and Chapter 42 with storage occupancies, which are not sprinklered.

So one of the key arguments that was raised before -- the other issues were not taken because we're dealing with sprinklered occupancies. These are not sprinklered occupancies.

And all this asks in both cases is that the smoldering requirement for upholstered furniture,

mattresses -- Those for mattresses have been required in the United States for 40 years. Those for upholstered furniture have been applied by all the manufacturers for over 33 years. That they apply for new upholstered furniture and mattresses. That's all in both cases. Thank you.

DR. MILKE: Thank you. Mr. Koffel, would you like to take it for the committee?

MR. KOFFEL: Yes, and the person who was going to represent the Technical Committee on Industrial Occupancies is no longer present.

If there is another committee member, they can offer a view from the microphone but in absence of that I will attempt to do that.

In reviewing these proposals and comments, I think the committee has stated that they do not believe that the introduction of upholstered furniture into an industrial occupancy or warehouse occupancy represents a hazard sufficient enough to require the additional testing.

And I might offer the example of a furniture warehouse. This would require the furniture that's in the warehouse to be used to meet

a certain test standard where the furniture that's stored in that warehouse might not meet that same standard. So with that I'll return it to you Mr. Chair.

DR. MILKE: Thank you. We can open up debate on the motion. Again, the motion on the floor is a group motion at this point to accept Comment 101-303 and 101-307.

Again, those are motions 101-23 and 101-24 for those of you keeping score. Any discussion please? People at the mikes? Anything further? Mike 5.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA, in support. Find out that we had not so long ago a massive fire in a storage occupancy where upholstered furniture was stored.

That issue would have been heat release but if you put new furniture in a storage occupancy, why are you going to try to get furniture that doesn't meet the smoldering requirement when all the furniture that's sold in the United States meets it?

And, two, if you're going to put mattresses, are you going to illegally import

mattresses that don't meet just to make sure that you don't require to meet? Please. This is common sense. Thank you.

DR. MILKE: Thank you. Any further discussion? Seeing none we move to a vote. Again, this is now a group motion where we're debating or considering Comment 101-303 and Comment 101-307.

All in favor of the motion raise your hands. All opposed? Motion fails. Anything further discussion on this document?

Hearing nothing we will move on to NFPA 5000. Thank you very much, Mr. Koffel, and all of the committee people that have helped out here.

MR. KOFFEL: Thank you.

DR. MILKE: The next report under consideration this afternoon is that of the Technical Correlating Committee on Building Code.

Here to present the committee report is the Technical Correlating Committee chair James Quiter. The committee report can be found in the blue 2011 Annual Revision Cycle ROP and ROC.

The Certified Amending Motions are contained in the Motions Committee report and behind

me on the screen. We will proceed in the order of the motion sequence number presented. Mr. Quiter,

MR. QUITER: Mr. Chair, ladies and gentlemen. The Building Code Technical Correlating Committee is presenting one report for adoption and can be found in the Report on Proposals and Report on Comments for the 2011 Annual Revision Cycle.

The Technical Committees and Technical Correlating Committee of the building code have published a report consisting of a partial revision of NFPA 5000 Building Construction and Safety Code.

The report was submitted to letter ballot of the Technical Correlating Committee and the Technical Committee.

The ballot results can be found on pages 5000-9 to 5000-155 of the Report on Proposals and pages 5000-9 to 5000-96 of the Report on Comments.

The presiding officer will now proceed with the Certified Amending Motion.

DR. MILKE: Thank you. We'll move on with the discussion of Certified Amending Motion, starting off with Motion 5000-1. We go to microphone 1 for a likeness of Mr. Thornberry who supplied this

motion.

MR. BEITEL: I'm going to get you for that. Jesse Beitel, Hughes Associates. I believe I'm the designated representative for Mr. Thornberry and you should have the paperwork up there. And with that, we will withdraw this amending motion.

DR. MILKE: Well, thank you very much. For the record, you were the proper designated representative for Mr. Thornberry and we will move on then to the next motion which is 5000-2. Microphone 5.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products move to accept the motion for returning -- to accept Comment 5000-45a.

DR. MILKE: Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. We have a second. Please proceed with the discussion of the motion.

MR. HOLLAND: There are a couple things going on here. The TCC made a recommendation that certain parts of 90A be extracted into 5000.

In addition to that, they also wanted to retain a provision that has been in the 5000 building

code since it was implemented in 2002, and that provision has to do with permitting the use of fire retardant-treated wood in a plenum.

The TCC when they reviewed this said, We like what you did, Technical Committee, but by including the fire retardant-treated wood, that's more than an extract from 5000 and you're creating a conflict.

So what we did is -- The reason why we submitted this motion to accept 45a is because based on our review of the pertinent documents having to do with 90A 5000 and also Standards Council decision, there is no conflict.

Because what I did is I looked in the scope for Standard 90A in section -- I believe it's 1.3.1 -- I could be wrong about that number because I didn't write that down, but it says, This standard shall apply to all systems for the movement of environmental air in structures that serve the following. And then there's four examples.

One. Spaces over 25,000 cubic feet in volume. So if you're less than 25,000 cubic feet this does not apply. This standard does not apply.

Two. Buildings of Type III, IV, and V over three stories regardless of the volume. So if you're a Type III, IV, or V building less than three stories, this does not apply.

But the real crux of it is in number 3. It says, Buildings and spaces not covered by other applicable NFPA standards.

I think 5000 is an NFPA standard. 5000 has said that we want to include fire retardant-treated wood, allow that in the plenums of buildings and because 90A says if there's another standard with a provision in it, then that's okay. So there is no conflict.

It also cited 101. 101 doesn't have any provisions in it about that, so there's no conflict there either.

So it was -- The TCC had some bad information about creating a conflict, because I just read number 3 in the scope of the standard that says if there's other NFPA standards, then that's fine, 90A does not have to apply.

The second thing has to do with I sit on the committee and we've been told that, Oh, the

Standards Council has made a decision. So I asked for a copy of the Standards Council decision.

And what the Standards Council decision says is that for the National Electrical Code and for cables and those sort of things, that 90 A controls. Doesn't say anything about the building code.

So again, the TCC was given erroneous information about, one, the Standards Council decision and, two, the applicability of 90A.

So what we're asking is that Comment 5000a as passed by the unanimous, I must say -- by the Technical Committee be approved. Thank you.

DR. MILKE: Thank you. Mr. Quiter, would you like to offer the committee position?

MR. QUITER: Yes. Normally I would defer directly to the committee chairman but as Mr. Holland rightly points out, the change was made by the Technical Correlating Committee.

He is right also about the reason, and that is we view there is a conflict with NFPA 90A and that is the reason that the change was made.

With that I would like to defer to Joe Versteeg who is chairman of the Technical Committee

on Building Construction.

DR. MILKE: Mr. Versteeg.

MR. VERSTEEG: Good afternoon. Joe Versteeg, chairman of the Building Construction Committee. That's essentially correct.

The history of this was that the section dealing with plenums was -- the choice was either to just simply refer to 90A or to extrapolate the text from 90A.

The committee chose to extrapolate the text from 90A and also leave in the provisions for fire retardant-treated wood. It was the TCC that changed it.

The substantiation of the committee was that the committee had not received any supporting documentation that fire retardant-treated wood in a plenum had been a problem, and that's why the committee kept that position.

DR. MILKE: Thank you. Microphone 2.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA and in opposition to the motion.

It has been pointed out here that the

Standards Council made a decision years ago that all materials that go into plenums are regulated by 90A, and that both the National Electrical Code, NFPA 70, the Life Safety Code, NFPA 101, and the Building Code, NFPA 5000, should just simply refer to 90A.

And at the time, I wrote to Standards Council I said that was a mistake. However, my opinion was not taken.

Now, we have to accept that. We can't just keep going back from jurisdiction. I'm a member of the 90A Committee and we are working very carefully every cycle on the issues and what is acceptable and what's not acceptable for 90A.

You heard that -- some of that discussion before. This is a moot point. The assembly should not stand here and overturn Standards Council decisions that we made years ago. Thank you. I urge you to reject the motion. Thank you.

DR. MILKE: Thank you. Microphone 4.

MR. KOFFEL: Bill Koffel, Koffel Associates, speaking for myself, in opposition to the motion.

Marcelo just addressed a conflict between

90A and 5000 if you accept this motion, so I'll address the conflicts between 101 and 5000.

NFPA 101 references NFPA 90A directly. NFPA 90A does not allow fire retardant-treated wood to be exposed to the air flow in a plenum.

If you accept this motion, NFPA 5000 will allow fire retardant-treated wood to be exposed to the air flow in a plenums.

Therefore you will have a permitted use in the NFPA 5000 for something that NFPA 101 does not permit. Thank you.

DR. MILKE: Microphone 5.

MR. HOLLAND: Joe Holland, Hoover Treated Wood, speaking in support of the motion. I want to read to you -- I guess the first thing I want to do is read to you the Standards Council decision.

Like I said, when I got this I said I'd like to see a copy of the decision. So this is actually what it says:

Jurisdiction over combustibles in plenums. As the Council has indicated earlier in this decision, the Technical Committee on Air Conditioning rather than the NEC project has for many

years and should continue to have primary jurisdiction over air distribution systems including the subject of combustibles such as cables and ducts, plenums and other handling spaces.

So apparently there was something going on between the NEC and the 90A and I'm not privy to that information, but this only applies to the NEC project, so what it says is the National Electric Code has to defer to 90A.

I read you the scope that says if other standards have provisions in them, they apply. There's no conflict. I don't know where these people are coming from with the conflict.

The standard clearly says there's no conflict. If other NFPA standards have provisions in them, then that's what you use. You use the other provision. There's no conflict.

I also -- This Standards Council -- I should tell you, the decision was made in July of 2005.

If this is to be -- Let's say that we don't prevail and you do decide not to accept the motion. If you do that, 5000 does not have any

provisions in it that doesn't say, you know, if you go back in and remodel a building, that it's not retroactive.

So you've got all these buildings with fire retardant-treated wood that have been allowed since 2002 that now won't be able to comply with the building code.

So now we've got nonconforming buildings. We're making headaches for the AHJ, what are they going to do.

So it doesn't make sense to take something away without some kind of juris -- I mean some kind of documentation that says we've got a problem here other than, Oh, there's a conflict.

And as I've already explained to you and demonstrated to you, that the standard says there is no conflict. So we would ask for you to support the motion. Thank you.

DR. MILKE: Thank you. Seeing no one else at a mike, it appears we're ready for a vote so we'll go ahead and vote on the motion on the floor which is to accept Comment 5000-45a.

All in favor of the motion raise their

hands. All opposed? Motion fails. Moving to 5000-3. Microphone 3.

MR. HOLLAND: Joe Holland, Hoover Treated Wood Products. This is essentially doing the same thing. What we're saying is we want to return the report back to -- return a -- Oh, I guess I have to make a motion first. I'm sorry.

Move that we accept motion to return a portion of the report in the for of proposal 5000-80a and related Comment 5000-45a.

DR. MILKE: Thank you. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Okay. Thank you. We have a second. Please proceed with the discussion on the motion, Mr. Holland.

MR. HOLLAND: Essentially the same thing but instead of adopting 45a basically what we're saying is leave what's in the building code now, do not accept the changes that have -- that were rejected or approved by the TCC but amended by the -- excuse me -- by the TC but amended by the TCC.

DR. MILKE: Thank you. Mr. Quiter?

MR. QUITER: On this one I'll defer directly to Joe Versteeg, chairman of the Technical Committee on Building Construction.

DR. MILKE: Mr. Versteeg.

MR. VERSTEEG: Good afternoon. Joe Versteeg. This essentially would revert back to the 2009 wording within the code which leaves in fire retardant-treated wood that is exposed to the plenums.

DR. MILKE: Okay. Thank you. With that we can open up debate on the motion. Microphone 2.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA, and against the motion. This is the exact same effect as the previous action. It's doing it a different way but, again, it would create the conflict with NFPA 90A. Please oppose this motion. Thank.

DR. MILKE: Any further discussion? Microphone 5.

MR. HOLLAND: I have a brief comment but I'm waiting for it to load here. The point I'm going to try to make here is that combustibles are allowed in --

DR. MILKE: I'm sorry, excuse me --

MR. HOLLAND: I'm sorry. Joe Holland, Hoover Treated Wood speaking for the motion. The point is that combustibles are currently allowed under 90A to be used in the plenums, and that you can have cables and all those sort of things that are combustible.

It also allows -- and I'm trying to get down to that section here. There's an inconsistency in that it does allow material used in the ceiling to be exposed to the air flow when the flame spread is 25 or less and the smoke developed is 50 or less.

Fire retardant-treated wood meets both of those requirements. It has a flame spread of less than 25 and smoke developed of less than 50.

So you're really not increasing anything because the whole ceiling can be combustible if it meets that requirement. We hope that you would support the motion.

DR. MILKE: Thank you. Any further discussion? Microphone 2.

DR. HIRSCHLER: Marcelo Hirschler, GBH International, for NAFRA. Just quickly --

DR. MILKE: For or against?

DR. HIRSCHLER: Against the motion. The way the requirement is worded in the existing 5000, FRTW would be permitted to be the material of construction of the plenum.

Material of construction of the plenum is not allowed to be a known combustible, a limited combustible. FRTW does not meet those requirements.

Material exposed to the air flow in the plenum can meet other requirements but material of construction of the plenum has to be non-combustible or limited combustible and FRTW does not do that. Thank you.

DR. MILKE: Any further discussion on this Motion 5000-3? Seeing none we'll move to the vote.

Again, the motion on the floor is to return a portion of a report in the form of a Proposal 5000-80a and related Comment 5000-45a.

All in favor raise your hands? All opposed? Motion fails. We move on to Motion 5000-4. Microphone 5.

MR. PAULS: My name is Jake Pauls. I'm a

sole proprietor, independent consulting, Building Use and Safety. I'm a member of several NFPA TC's and TCC's, serving mostly as an unpaid consumer representative on behalf of the American Public Health Association APHA.

I'm formally designated on behalf of comment submitter Eleanor Smith to make the motion for your acceptance of Comment 5000-137 which I now make and on which I will speak in support.

FROM THE FLOOR: Second.

DR. MILKE: There's a motion on the floor to accept 5000-137. I did hear a second. Please proceed, Mr. Pauls.

MR. PAULS: Yes. Your approval of this motion has the effect of recommending that the Standards Council accept my Proposal 5000-164.

This proposal introduces a requirement at NFPA 5000 of scoping Section 1005, not 1006 as printed in the goldenrod handout, and that's within the standard on Accessible and Usable Buildings and Facilities designated as ICC/ANSI A117.1, 2009 edition. So again, the section is 1005, not 6.

Quoting from this standard, quote,

1 Section 1005 of the standard provides criteria for
2 minimal accessibility features for one- and two-
3 family dwelling units and townhouses which are not
4 covered by the U.S. Department of Housing and Urban
5 Development, HUD, fair housing accessibility
6 guidelines.
7 The largest reason for being before you
8 today is the delayed publication of the standard
9 which we now have.
10 So it was the delayed publication of
11 standard which is being scoped by Proposal 5000-164.
12 The ICC did not release the printed standard dated
13 2009 to the A117 committee members until February
14 2011.
15 During that time between the committee's
16 final deliberations on the standard and availability
17 of the printed standard, many months passed.
18 This included the period during which two
19 responsible NFPA TC's were working on the Report on
20 Comments for NFPA 5000.
21 But early in January 2011, months after
22 ANSI approval, the Building Code TCC did not have the
23 printed standard to review.

Thus, its reason for rejecting comments supporting Proposal 5000-164 was, and I quote in part, The TCC, quote, directs the final action on this comment to be changed to reject. See action on Comment 5000-137, end quote.

Now, dealing only with the issues associated with the delayed publication, the TCC concluded, quote, Until such time that the final version is available, the TCC cannot support acceptance of the comment. So it was basically a process saying that the standard was delayed by ICC.

With the standard now available widely for some months and with the standard's text previously available to those testifying in opposition today, if anyone does, they were also members of the A117.1 -- sorry -- A117 Committee, so they had the text.

But we're in a position today to accept the motion on the floor with the standard published and widely available.

Most important today, we must note that two NFPA 5000 Technical Committees have central roles in this consideration.

The most experienced and relevant committee is the Building Systems TC responsible for scoping accessibility generally and NFPA 5000 Chapter 12.

That Technical Committee not only knew the topic better generally, its members all did the most thorough review of the original proposal and of the comments in the context of their broad knowledge of accessibility in NFPA 5000.

The Building Systems TC voted unanimously at both the ROP stage and the ROC stage effectively in support of the motion on the floor today.

Turning now to the Residential Occupancy TC, I'm a member of that TC. I disagree strongly with both the approach taken by the TC on this and some prior issues where TC has taken an initial position adverse to the published policies of the APHA.

In the past, the TC's initial and in some cases repeated rejections included mainstreaming of the stairway safety requirements for -- that are long adopted in NFPA standards for all buildings other than homes.

1 Also, in my view, for too long too many
2 members of the TC opposed home sprinklers before they
3 were required in 101 and 5000 several years ago.
4 For over a decade APHA has had public
5 policies encourage and model codes require better
6 stairways and home sprinklers, and now APHA also has
7 a public policy supportive of the motion before us
8 today.
9 From the formal record you might also
10 note, as I did in the residential TC meetings, that
11 those opposed to acceptance of the motion today are
12 on the same side as and with opposing arguments
13 provided largely the National Association of Home
14 Builders.
15 NAHB has fairly consistently taken
16 adverse positions to APHA's public policies both in
17 NFPA and ICC.
18 In summary, the issues today come down to
19 this. First, we should now move beyond the late
20 distribution of the standard. We have strong support
21 from the committee responsible for scoping.
22 Thirdly, we have the formal urging of the
23 world's oldest, largest organization of public health

officials.

The goals are, incidentally, both safety and usability. The most challenging aspect is the step-free entrance which is a great safety issue. Thank you.

DR. MILKE: We do have a correction. I'm told by staff here that the issue of the section number of the referenced ICC code, that will be editorially changed to reflect the proper section number. Mr. Quiter.

MR. QUITER: Yes. Jake is correct in his comments about the TCC action at the ROP stage where we did hold it because of the unavailability of the document.

Beyond that, I'm going to defer to Warren Bonisch who is chair of the Technical Committee on Residential Occupancies.

DR. MILKE: Mr. Bonisch.

MR. BONISCH: Thank you, Mr. Chair. Warren Bonisch with AON Fire, chair of Residential. The committee voted 20 to reject, one abstention, and two negatives.

If you look closely at the negatives we

have one from the proponent and one from the Home Builders Association where you see most of the text in the ROC.

Basically the committee was concerned that the document was not available. Although Jake was using the word widely available, all the way up through our last meeting where our last vote occurred, we did not have the document to look at.

There were multiple concerns related to -- as delineated in the ROC, related to the referenced A117.1 but, again, the document wasn't there to review.

Unfortunately, at the meetings there was primarily a discussion between the proponent and the home builders, those two being most familiar with the document, again with the committee not having access to that document.

DR. MILKE: Okay. Thank you. We'll now open debate on the motion. Again, please provide your name and affiliation and whether you're speaking in support of or against the motion. Microphone 5.

MS. GIBBS: I'm speaking on behalf of Motion 5000-4. My name is Kathy Gibbs. I'm director

of training at the Institute For Human-Centered Design, a non-profit organization located here in Boston that works to expand opportunities and enhance experience of people of all ages through excellence in design.

I provide technical assistance on the Federal Fair Housing Act, the Americans With Disabilities Act, the International Building Code, and ANSI accessibility standard throughout the U.S.

We encourage NFPA to take this important step and adopt scoping requirements for Type C dwelling units as specified in technical requirements of the ANSI National Accessibility Standards.

We see adoption of Type C units as closing a major hole in national accessibility requirements.

NFPA addresses safety, usability, and accessibility in public buildings. NFPA addresses accessibility, usability, and safety in multi-family housing.

It's time to take this next step of adopting these very minimal accessibility requirements for one- and two-family dwellings.

1 Quoting from NFPA's mission statement,
2 Reducing hazards on the quality of life in codes and
3 standards is part of our mission.
4 Although Type C units are called
5 visitable units, their importance goes beyond
6 visibility.
7 Yes, Type C units allow people with
8 mobility disabilities to visit their family and
9 friends and to use the bathroom.
10 But just as importantly, they support the
11 independence, functionality, and safety of people who
12 live in these residences.
13 For people who already have mobility
14 disabilities, Type C units will expand housing
15 options, and for the majority of us, Type C units
16 will allow us to stay home and function safely as we
17 acquire mobility impairments, either temporarily or
18 permanently. And we will.
19 According to the U.S. Census Bureau, at
20 the end of the 20th century approximately 35 million
21 people were 65 or older. The Bureau estimates that
22 figure doubling to 70 million by 2030.
23 And according to the National Center For

1 Health Statistics, approximately 22 million people
2 age 65 and older reported physical difficulties
3 functioning. That's two-thirds of the aging
4 population.
5 The current design of homes with steps at
6 all entrances, narrow interior doors, and small
7 bathrooms, force people to either live unsafely in
8 their home, to move to expensive assistive-living
9 situations which most of us can't afford, or to be
10 institutionalized in nursing homes.
11 One of the major inquiries we get at the
12 Institution for Human-Centered Design concern home
13 modifications for people who are leaving the hospital
14 or rehabilitation center.
15 Although it's often possible to modify a
16 home to support a person with a mobility impairment,
17 renovations are more costly than having basic
18 accessibility features included at construction, and
19 there's very little public or private funding for
20 home modifications.
21 A 2003 AARP respondent said that cost
22 was the major reason they did not make needed home
23 modifications such as widening doors, ramping an

entrance, or increasing the bathroom size to fit a walker or wheelchair.

What are the health hazards and safety risks for continuing as we are? Increased falls as people struggle with steps and the difficulty of negotiating a door at the top of the steps which is often a hazardous situation, increased injury for family members and caregivers who carry people in and out of homes so they can go to doctor's appointments an participate in the world outside of their home, complete isolation for those unable to even negotiate steps or for people who don't have caregivers able to lift them, difficulty or inability to use the bathroom resulting in people drinking less fluid to reduce need for urination which can lead to kidney, bladder, and other infections.

Again, caregivers are greatly stressed if a person they are taking care of cannot function in the bathroom.

To summarize, I encourage NFPA to broaden its horizons, to take the lead, and to adopt this next generation of minimal accessibility and safety design for one- and two-family homes. Thank you very

much.

DR. MILKE: Thank you. Microphone 6? Microphone 3 then.

MR. RICKARD: My name is John Rickard of Olicon Design and I rise to speak in favor of the motion.

I'm current chair of the NFPA 5000 Technical Committee on Building Systems which has responsibility for Chapter 12, Accessibility, though I'm not authorized to speak on behalf of the committee.

The Technical Committee on Building Systems looked at Comments 5000-140, 5000-140a, which are essentially identical to Comment 5000-137.

A little bit of background with respect to accessibility. NFPA 5000 provides scoping direction indicating where accessibility is required, and ANSI 117.1 provides technical requirements indicating how accessibility is to be ensured where required by the scoping.

To date the scoping provisions of the accessibility chapter of NFPA 5000 are consistent with every technical provision of ANSI 117.1.

This consistency was the key part of the Building Systems Technical Committee's discussion regarding Comments 5000-140 and 5000-140a.

Building Systems Technical Committee voted to accept in principle the accessibility provision at the ROP stage because the addition of ANSI 117.1 that addressed the accessibility of Type II residences was not yet available.

This edition of ANSI 117.1 is now available. The text was available to us at the ROC stage and we were able to review it and it is not changed in the final document, and the Building Systems Technical Committee accepted the disability provisions at the ROC.

The vote was unanimous in recognition of the committee's strong support of NFPA's policy to reference sister consensus standards, which ANSI 117.1 is, without modification. Thank you.

DR. MILKE: Microphone 6 now.

MR. LOSKEY: David Loskey speaking on behalf of the National Association of Home Builders. I want to just point out a couple technical problems with the testimony that was just given.

DR. MILKE: Are you speaking for or against please?

MR. LOSKEY: Speaking against the motion.

DR. MILKE: Thank you.

MR. LOSKEY: Previously you just heard that the ROC -- at the ROC stage for both Building Systems Council and the Building Residential Committee that the ICC standard was not available and not published.

It was also not published at the TCC meeting that was held in January of 2011, and that was the reason why the TCC overturned the Building Systems approval of the proposal.

Now, they did this because the regulations for governing committee projects requires that all standards are available for the Technical Committees to review and approve. That did not happen because we did not have a copy of it.

Now, some of the problems that I have with the proposal that is trying to be approved today is it gives you a couple of exceptions.

The very last one, They meet the site impracticability test set out in Section 12.33.3.2.4

or the base flood elevation conditions set out in Section 12.33.3.2.5. Those only apply to Type A and Type B units.

When this proposal was first proposed to the committee, they did not take into account that they needed to go back and address the exceptions for the flood elevations and the terrain to also include the Type C units.

If this gets approved and if you go to NFPA 5000 and look for the exception of Type C units for those two exceptions, you'll not find them because they're not in the building code.

The second thing I'd like to point out is there was a lot of discussion about the A117 standard. We had drafts of what the language had.

That language required that there was a circulation path. That path consisted of access from outside the dwelling to the interior of the dwelling.

There was no exceptions in A117 saying that if you were in a flood zone or if you had topographical conditions that would prohibit a ramp, that that unit did not have to be accessible.

The A117 standard also says if you could

not meet the ramp conditions, that you would have to put in elevators, lifts, wheelchair access.

That information wasn't provided to the building residential committee. The reason that the committee disapproved it was because there were so many requirements inside the new Type C dwelling units representing other parts of the A117 standard that was unavailable for us to review and see how this was going to change residential construction. I urge you to disapprove this motion.

DR. MILKE: Thank you very much. Microphone 5 please.

MR. MUEHE: Good afternoon. My name is Michael Muehe. My affiliation is the Cambridge Commission for Persons with Disabilities and I speak in favor of the motion.

I'm executive director of the Cambridge Commission for Persons with Disabilities here in Massachusetts. I'm also the ADA coordinator for the City of Cambridge.

The mission of our commission is to promote a more accessible and welcoming city for all people with disabilities in all aspects of Cambridge

community life.

I welcome this opportunity to speak in favor of the motion to establish scoping requirements for Type C housing units.

Following the civil rights movement in the 1960's, people with disabilities began their own movement in the 1970's demanding equal right in areas such as housing, transportation, employment, public accommodations, and government services.

Parallel to the disability rights struggle emerged an independent living movement begun by people with disabilities demanding equal opportunity to live independently in the community with the necessary support services like personal assistants and accessible housing and transportation to ensure decent quality of life.

Over the past two decades since the passage of the Americans With Disabilities Act, the Federal Fair Housing Act, and the adoption of state building codes for accessibility, we have made great strides in improving access and usability for people with disabilities both in public facilities, public transit, public accommodations, and multi-family

housing both in the greater Boston area and across the country.

But even as thousands of disability rights advocates and their allies around the country have seen real success in improving accessibility, increasingly we have realized three important things.

First, that simple literal compliance with accessibility codes and standards is simply not enough to realize our goal of full integration of people with disabilities into our society.

Now we have embraced the philosophy of universal design or sometimes it's referred to as human-centered design which says, Let's design all of our facilities, buildings, and products to be maximally usable to everyone with a minimum of retrofit.

Second, we have realized that people with disabilities still face tremendous amounts of social isolation and exclusion.

This isolation has real public health consequences including increased rates of depression and other mental health problems and significantly reduced quality of life.

1 If we are to really attack and eliminate
2 this isolation in all its dimensions, we must create
3 neighborhoods that are welcoming and usable by all.
4 This includes moving beyond mere
5 compliance with federal and state fair housing
6 standards to ensure that every new home, including
7 single-family homes, are visitable by neighbors and
8 others with disabilities.
9 Third, in this decade since 9/11 and
10 Hurricane Katrina, people with disabilities have
11 increasingly realized that our needs have not been
12 adequately taken into account both in emergency
13 preparedness and planning, and more generally in the
14 life safety arena.
15 This proposal will help move us in that
16 direction by providing that each single-family home
17 constructed will allow for at least one zero step
18 entrance that will help with evacuation as well.
19 Approximately 75 million baby boomers are
20 expected to reach retirement age in the next two
21 decades.
22 Public health statistics have
23 consistently shown that with increasing age comes

increasing rates of disability including mobility impairment.

In addition to being entirely consistent with NFPA's mission statement, adopting this motion is an important next step in addressing the public health, universal design, and quality of life challenges I have described. Thank you again for the opportunity to comment on this report proposal.

DR. MILKE: Thank you. Any further discussion on this motion? Microphone 5.

MR. PAULS: Thank you. My name is Jake Pauls. I'm for the motion and I'd just like to speak in rebuttal. I believe there's only one person that needs to be rebutted.

First of all, some clarifications. We were criticized for not having scoping in A117.1. Well, A117.1 doesn't have scoping and it's forbidden to have scoping.

So the issue of the flood plain and all that is irrelevant for the standard that goes with the scoping.

If there's a problem with that flood exemption and if it's indeed relevant, that can be

1 fixed in a TIA or even the Standards Council could
2 fix that. That's a minor issue.
3 What it comes down to, though, is this is
4 a potent symbol because the home builders simply
5 won't allow NFPA 5000 to be adopted and applied.
6 So on one hand they're arguing this isn't
7 going to work, but on the other hand outside this
8 meeting they've done their darndest to make sure that
9 NFPA 5000 will never be adopted and applied to
10 housing in the U.S.
11 So I think what they're afraid of -- and,
12 you know, a bit of conjecture, a bit of history. The
13 International Building Code had hearings on this
14 topic as well, on scoping of ANSI 117.1.
15 But the person who submitted that
16 proposal submitted a partial scoping proposal. In
17 other words, it was very complicated scoping.
18 And the committee, the IBC committee,
19 basically told him, Come back with a simpler scoping
20 which requires all new housing to be scoped.
21 And that's exactly what I had done before
22 that was even held, that hearing was held. So we
23 have a situation here where the appropriate scoping,

both in terms of committees in NFPA and in terms of -- even within the IBC process, is to have the broadest scoping possible.

And we heard from the two people from the public health and accessibility communities. That's what makes sense in terms of scoping. This is a powerful symbol.

Because NFPA, regardless of whether it's adopted or not locally, has a potent effect both internationally and within the U.S. as a precursor to what's adopted by other model codes.

And that's why the home builders are afraid of this passing. It's just too powerful a symbol.

And so I am very much in favor of this symbol being published by NFPA, because we've done it many times before, with home sprinklers, with stairways, and many other things, which eventually became adopted and became a major topic, for example, within NFPA.

On the issue of the references not being available within the standard for review because the book wasn't available, nobody has come up and said

that we misled them about any reference.

So there's no problem there. That was a totally academic issue and, indeed, the very people who are raising that had the standard in hand anyway, and they never raised any issues.

So there is no issue there in terms of us misleading people, because I presented the text to the best ability I could at both the ROP and ROC stage.

Nobody ever raised an issue on that even though the information was widely available. Thank you very much.

DR. MILKE: Thank you. Microphone 2.

MR. FINNEGAN: Good afternoon. My name is Dan Finnegan and I am representing myself and I'm speaking against the motion.

I've had the opportunity to see a rather detailed presentation on this concept of visibility and I can only share with you that I have significant concerns.

My feelings are very much of a concern about the invasion of direction on how our homes are to be built in such a way that I'm not sure really

affects life safety, fire protection, the things that NFPA is based around.

I understand the issues that are being presented but I think those need to be dealt with on a one-by-one basis.

I know my personal family has got issues and you know what? We dealt with it. We built ramps. We do what needs to be done.

I'm not sure we need to have this concept of visibility implanted into every single home that gets built as we move forward.

I just have a very uneasy feeling. I would like to see more research. I would like to see more information presented on this concept of visibility and let this thing mature a little bit further before it gets incorporated into a national building standard. Thank you.

DR. MILKE: Thank you. Microphone 4.

MR. KRAUS: Dick Kraus speaking for myself. Call for the question.

FROM THE FLOOR: Second

DR. MILKE: That's non-debatable. I heard a second. That's a non-debatable motion. We

go right to a vote. All in favor of calling the question raise your hands. All opposed? Motion passed.

We move directly then to the vote of the motion on the floor now which is to accept Comment 5000-137. All in favor of the motion please indicate by raising your hands. All opposed? Motion fails.

I'm told that the submitter of 5000-5 and 5000-6 would prefer to deal with these with 5000-6 first.

DR. HIRSCHLER: Yes. That's correct. Marcelo Hirschler, GBH International and NAFRA, and I hereby move to accept Comment 5000-31 and 5000-32.

DR. MILKE: Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: We'll advise the group again this is one of these motions that was similar to one of the ones that we started out with shall we say some time ago related to 703 and 101.

And we'll have an abbreviated discussion of where the differences are and that I think would be appreciated by all. Doctor Hirschler.

DR. HIRSCHLER: Marcelo Hirschler, GBH

International, for NAFRA. And all I want to say is if this gets approved we're going to have the exact same definition in 5000 and 101 and 703. Thank you.

DR. MILKE: Thank you. Mr. Quiter.

MR. QUITER: We support Marcelo on this.

DR. MILKE: Is there any discussion? Moving toward the mike I see microphone 1 when you get there.

MS. NEWMAN: Good afternoon. Kathleen Newman, FireTect. I am for the motion. It's the same thing as before.

We would be limiting different -- We would be limiting other processes and other choices that builders would have and so I would like to accept this motion. Thank you.

DR. MILKE: Thank you very much. Any further discussion? Seeing none I think we can go right to the vote then.

This is a vote to accept Comments 5000-31 and 5000-32. All in favor please raise your hands. All opposed? Motion passes. We go to 5000-5 now, I believe.

DR. HIRSCHLER: Marcelo Hirschler, GBH

International, for NAFRA. I will not pursue.

DR. MILKE: Thank you very much. That is appreciated. So we go to 5000-7 then, and once again --

DR. HIRSCHLER: Sorry. Give me one second please. Marcelo Hirschler, GBH International, for NAFRA, and I hereby move acceptance of Comment 5000-183.

DR. MILKE: Thank you. There's a motion on the floor to accept Comment 5000-183. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. There is a second so please proceed with the discussion.

DR. HIRSCHLER: This is again the same that we've discussed earlier but not on this item, but on the item of use of fire retardant-treated wood in plenums.

This section of the annex basically takes the old text from the previous edition of 5000 that allows FRTW in plenums, puts it in the annex so my motion is to eliminate that so we avoid any conflict. Thank you.

DR. MILKE: Thank you. Mr. Quiter.

MR. QUITER: I will defer directly to Joe Versteeg, chairman of the Technical Committee on Building Instruction.

DR. MILKE: Mr. Versteeg.

MR. VERSTEEG: Thank you, Mr. Chairman. As stated by Marcelo, this is now a valid annex note in that all of the prior wording has been eliminated and merely makes reference to NFPA 90A which is appropriate based on the prior actions. Thank you.

DR. MILKE: Thank you. Open debate on this topic at this point. Anyone at a mike? Seeing none we'll move right to the vote then.

This is -- The motion on the floor is to accept Comment 5000-183. All in favor raise their hands. All opposed? Motion passes. Thank you, Mr. Quiter.

So this is the word we've been waiting for, at least in a way. This is the last report --

MR. LATHROP: Before you wrap up the 5000 report, I'd like to have a personal privilege for a minute.

DR. MILKE: Please.

MR. LATHROP: As a chairman of one of the 101 committees and being on many of the 101 committees, I'd like to thank NFPA for the tremendous support staff that we have that we get to work with all through years.

Robert Solomon has put together a fantastic group of people including Ron Cote, Greg Harrington, Allan Fraser, Kristin Collette and Tracy Golinveaux -- I'm sorry, Tracy, I always screw that up -- along with the support staff of Jim McGovern, Linda McKay, Kelly, and Diane Matthews.

And I personally would like to thank NFPA for the tremendous help that they give us.

DR. MILKE: Thank you, Mr. Lathrop. Now let us go to the last report under consideration this afternoon, that of the Technical Committee on Electrical Safety in the Workplace.

Here to present the committee report is committee chair David Dini of Underwriters Laboratories, Northbrook, Illinois.

The committee report can be found in the blue 2011 annual ROP and ROC. Certified Amending Motions are contained in the Motions Committee report

and behind me on the screen. We will proceed in the order of the motion sequence number presented.

MR. DINI: Thank you, Mr. Chair, ladies and gentlemen. The report of the Technical Committee on Electrical Safety in the Workplace is presented for adoption and can be found in the Report on Proposals and Report on Comments for the 2011 Annual Revision Cycle.

The Technical Committee has published a report consisting of a partial revision of NFPA 70E Standard for Electrical Safety in the Workplace.

The report was submitted to letter ballot of the Technical Committee that consists of 25 voting members and the Technical Correlating Committee on the National Electric Code that consists of twelve voting members.

The ballot results can be found on pages 70E-3 to 70E-232 of the Report on Proposals and pages 70E-3 to 70E-127 of the Report on Comments.

The presiding officer will now proceed with the Certified Amending Motions.

DR. MILKE: We will proceed now with the discussion on Certified Amending Motions starting

with Motion 70E-1. Microphone 3.

MR. MILLS: I'm Dave Mills, Savannah River Nuclear Solutions, and I'm the duly designated representative for Bobby Gray and I'm here to move to accept Comment 70E-14.

DR. MILKE: Thank you. There is a motion to accept Comment 70E-14. Is there a second? Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. There's a second. Please proceed with the discussion on the motion.

MR. MILLS: The wording in Comment 70E-14 was offered as a revision to my original proposal 70E-12 as follows: New section 90.5, Enforcement.

This standard is intended to be suitable for mandatory application by employers and other entities that exercise legal jurisdiction over the safe electrical work practices.

The authority having jurisdiction for enforcement of the standard has the responsibility for making interpretation of the rules, for deciding on the approval of work practices, procedures, and methods, and for granting the special permission

contemplated in a number of the rules.

By special permission the authority having jurisdiction shall be permitted to approve alternative methods, for it has assured that equivalent objectives can be achieved by establishing and maintaining effective safety.

An informational note. The range of enforcement and allowance for the designated authority having jurisdiction may be limited by federal or local enforcement authorities that exercise jurisdiction over the safety of individuals or public work locations. That's the actual wording on which you will be voting.

This recommended enforcement provision does not require a regulatory or governmental agency to be the AHJ, although it does not prohibit it either.

The employer or an entity invoking the standard as a requirement still has the flexibility to designate an internal AHJ unless local laws or regulatory agencies require otherwise.

Within the NFPA regulations governing committee projects, there's still the requirement

that a standard be written such as it may indeed be suitable for adoption into law.

Clearly, without a written enforcement provision, the current document does not meet the requirement as stated in Section 3.3.6.1 as follows in the definition of standard:

A document the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by other standard or code or adoption into law.

With the incorporation of the recommended text per the Comment 70E-14, the standard will meet the requirement for being adoptable into law and provide the designated AHJ the necessary flexibility to differentiate between conflicting requirements for the improvement of the safety of the worker.

The definition in 70E for AHJ is similar to any other NFPA standard: An organization, office, or individual responsible for enforcing the requirement of a code or standard or approving equipment, materials, and installation or a procedure.

The AHJ for one standard is not necessarily the AHJ for another, such as NFPA 70 and NFPA 70E.

I have acted as the AHJ for the Savannah River site since -- for 70E since 2004 and during that time the DOE has indeed made it law through the Code of Federal Regulations 10 CFR 851.

Since that time it has become very difficult to enforce all parts of this standard as there are many cases where conflicts exist.

The original proposal, 70E-12, I made requested the indication of an enforcement clause such that I as the AHJ and others in similar positions could legitimately enforce the standard.

Every entity will, by default or by choice, have an AHJ for 70E, and this AHJ will be forced to make decisions on the implementation of this standard.

While you will most likely hear from the 70E Committee, the electrical section and others will probably be in opposition to this motion.

The reasoning stated to me has been based on fear that the AHJ will not be qualified to make

the needed decisions regarding the implementation of the standard.

I believe this fear to be unfounded as the organization, office, or individual responsible acting as the AHJ as designated by the employer will be a qualified individual regarding electrical safety.

What the committee has offered to me so far has been, and I quote, this document is a consensus standard suitable for adoption by employers.

The entity or employer that adopts NFPA 70E is responsible for enforcement of the requirement in the standard, unquote.

And I quote. The committee merely reinforces its previous position that NFPA 70E is a standard, not a code, and therefore enforcement of the requirements in the standard is the responsibility of any entity that chooses to adopt it.

Neither of these address the real concern and I please ask you to support this motion.

DR. MILKE: Thank you. Mr. Dini, would

you like to offer the committee position?

MR. DINI: Yes. On the original proposal associated with this comment our committee did reject the proposal.

And as David just read, our statement was that the document is a consensus standard suitable for adoption by employers.

The entity; namely, the employer, that adopts NFPA 70E is responsible for enforcement of the requirements in the standard.

Our vote on this proposal was 22 in favor and only two against. We again reaffirmed our position during the comment phase and we did indicate that the committee reinforces its previous position that NFPA 70E is a standard, not a code, and therefore enforcement of the requirements in the standard is the responsibility of any entity that chooses to adopt it.

I did re-poll my committee and they did indicate that nobody wished to change their vote on this particular item.

DR. MILKE: Thank you, Mr. Dini. We will now open up debate on the motion. Microphone 2.

MR. KOVACIK: Thank you, Mr. Chairman. John Kovacik, Underwriters Laboratories speaking on behalf of the electrical section of NFPA and speaking against the motion.

The members of the electrical section met yesterday morning and at that meeting they voted in opposition to Certified Amending Motion 70E-1.

In effect the members of the electrical section do not support the motion on the floor. Thank you, Mr. Chairman.

DR. MILKE: Thank you, sir. Any other discussion? Seeing none we can move to a vote. This is -- The motion on the floor is to accept Comment 70E-14. All in favor please raise your hands. All opposed? The motion fails.

We move to 70E-2. Thank you. Microphone 1.

MR. HAMER: Thank you, Mr. Chair. My name is Paul Hamer with Chevron Energy Technology Company. I'd like to move to accept Comment 70E-107.

DR. MILKE: Thank you. There's a motion on the floor to accept Comment 70E-107. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. Mr. Hamer, please discuss.

MR. HAMER: Thank you, Mr. Chairman, I'll make some introductory comments but won't repeat them with every motion.

DR. MILKE: Appreciate that.

MR. HAMER: My background is in electrical engineering. I have both a BS and MS degree with Chevron Energy Technology Company and I am an IEEE fellow and a Chevron fellow.

I have been a member of the Technical Committee on Electrical Safety in the Workplace for 15 years and just recently left the Technical Committee in 2010.

I've come here to offer constructive suggestions and observations, not to be obstructive. I've been a champion of 70E and electrical safety for many years and I'm concerned that the changes for 2012 seriously affect the document's credibility at both the national and international levels, particularly having to do with the dilution of the energized electrical work permit, elimination of the

120-volt ground exception from the requirement for an arc flash analysis, unsubstantiated increase in personal protective equipment and the introduction of extraneous information in the hazard risk category tables.

The following motions are intended to correct most of those observed difficulties. I've decided to concentrate on those that have the highest potential impact and changes I feel are necessary to avoid a motion to return the entire report.

The following seven motions advance specific proposed actions that can be taken and save the thousands of hours of work that have been expended by all those devoted people in the past cycle.

I do not believe that many people fully realize the impact of the proposed changes for 2012. This is not surprising considering the large number of proposals and comments and the complicated ROP and ROC actions.

It's really part of my job to look at this as it affects Chevron and how it affects our internal standards.

1 Please consider my credentials,
2 especially related to the international advocacy of
3 70E, my active engagement as the TC member, and my
4 leadership role in the origination of the hazard risk
5 tables.
6 Chevron actually gave its tables to NFPA
7 in the 2000 edition to form the basis for the hazard
8 risk tables.
9 Within Chevron we've adopted 70E 2009 as
10 a basis for international application of our internal
11 safe work practice standard which supplements 70E.
12 It's been successfully rolled out
13 worldwide, the first Chevron-wide safe work practice
14 standard.
15 Even confined space entry and working
16 from heights, safe work practices have not gained
17 worldwide acceptance.
18 Two companies have applied 70E as
19 extensively as we have. We operate in 31 countries
20 world wide.
21 Over 60 percent of Chevron's operations
22 are outside the U.S. We truly need a document that
23 maintains high credibility internationally and the

70E product for 2012, without the revisions proposed in these amending motions, does not satisfy that goal. Again, my only motivation is to assure worker safety and to maintain the credibility of 70E.

Getting to the motion which is on ROC page 70-24 and also on ROP page 70-25, this motion would change -- It's a training documentation and it would change the last sentence to read, The documentation shall contain a description of the training, each employee's name, and the dates of training, and this change is away from crossing out the content of the training.

Including the content of the training in the records could be interpreted as meaning training materials, presentations, tests, videos, etcetera.

A brief description of the training should be sufficient. We wonder about the intellectual property issues and mandating that we turn over copyrighted videos as part of our records. Thank you, Mr. Chair.

DR. MILKE: Thank you. Mr. Dini.

MR. DINI: Yes. Thank you. Our committee did accept this original proposal. We

agreed with the submitter's substantiation where he indicated that it has been long understood that the content of the training needs to be included in order to comply with the requirements of OSHA 1910.332.

The vote of our committee was 20 in favor, three against, and one abstained. The one abstained was the representative from OSHA who abstained in accordance with agency policy against voting on technical issues.

However, the representative from OSHA did indicate that he did agree with our action on this particular proposal.

DR. MILKE: Thank you. Microphone two.

MR. KOVACIK: Thank you, Mr. Chairman. John Kovacik, Underwriters Laboratories, speaking on behalf of the electrical section of NFPA.

The electrical section met yesterday morning, and at that meeting the members voted in opposition to Certified Amending Motion 70E-2.

In effect, the members of the electrical section do not support the motion on the floor. Thank you.

DR. MILKE: Thank you. Continuing

discussion? Microphone one.

MR. KRAUS: Dick Kraus, API, speaking in favor of the motion. If the electrical section would define what they meant by the contents up front, then, you know, this could be acceptable, but having an undefined thing leaves it -- as Paul said, leaves it wide open to interpretation.

Description is much easier, much better. In effect, when this is adopted by other countries you get into this some of this foreign -- Do you expect people to give you things in different languages to look at? I don't think so, but I would urge your acceptance of this. Thank you.

DR. MILKE: Thank you. Microphone 4.

MR. HICKMAN: Thank you. My name is Palmer Hickman. I represent the electrical workers on the 70E Technical Committee. However, I'm speaking for myself in this particular instance.

I speak in opposition to the motion. We are clear as a committee in our vote what we wanted. A description is inadequate.

We want to know the content. I liken it to a course catalog. Maybe you're going to take a

college course in a flyer you got in the mail.

A description of the course is not sufficient for documentation of what training that you got.

The committee was clear. They want the content of the training. They want to know what training was given.

So the term description would provide an overview of the training and that's all that it would do. It would remove the requirement to provide supporting documentation.

In order to determine training requirements for a worker and in order to determine that the worker possesses the skills and knowledge the employer would need, we'd need the content of the training materials, test, etcetera.

In 2007 OSHA changed their definition of qualified persons to include, quote, demonstrated skills and knowledge, end quote.

A description would not provide the necessary information to evaluate if a worker is adequately trained.

The term content provides the correct

criteria to evaluate and assure a worker's qualified. Please join the committee in their 20 votes to not support this motion. Thank you.

DR. MILKE: Thank you. Any further discussion? Microphone 3.

MR. McLAUGHLIN: My name is Stewart McLaughlin. I'm with All Star Facility Services, AKAG4S. I'm facility manager at a federal building. We --

DR. MILKE: Are you speaking for or against please?

MR. McLAUGHLIN: I'm going to speak against. The reason I'm speaking against is I don't want to see anybody do something that's going to take a lot of extra time for little effect, and I think that's what this is going to do.

I've been managing maintenance operations for 25 years. As a professional engineer -- I've been a registered professional engineer for 20 years in a couple of states.

So I manage maintenance operations with that educational level and I manage them very -- at close range. I deal with maintenance every day.

In fact, I just work in one building and my concern -- The reason I'm voting against this is because the content -- What I would really push for is more training than you could actually get content on a few sheets of paper to describe.

There's a very large deficiency in the knowledge required for qualified workers as currently, I believe, stated in 70E and OSHA.

I believe that people need training. An OSHA representative described to me yesterday or day before -- and I believe him -- that OSHA does not support licensure because people who are licensed electricians are -- they do installation and they really don't know that much about maintenance.

Well, I believe that very much. He makes a good point. I was thinking, Well, that's the best you could do, but without licensure how does a person know that someone is qualified?

How can any one of us -- Unless you've received training which is very technical, how can any one of us provide some kind of certification that so and so's training is acceptable?

And I don't think that even you or I or

anybody else, unless you've had some training in maintenance in electrical safety -- and I'm talking about maintenance. I'm not talking about installation.

I'm talking about troubleshooting and things of that nature. If we don't have training in this stuff, how can you, even looking at a description of, you know, what they've learned, determine that their training is acceptable?

So I believe that the NFPA needs to move toward apprenticeship in building maintenance and electrical safety.

People who actually work on electricity all the time, there's no training in it, I think you're just wasting your time by creating lists of stuff that they -- That's not going to tell you anything. It's just going to waste your time. That's my opinion.

DR. MILKE: Number 6.

MR. HICKMAN: Thank you. Palmer Hickman with the IBEW, speaking against the motion. Again, very quickly, a description just simply isn't enough.

Saying that you were, quote, trained in 70E, end quote, would not give anyone looking, including OSHA, any clue of what you were trained in, so the content is what the committee intended.

I know Paul's comments were it's not clear what's meant by the content. I think content is very clear. Again, please support the committee in the electrical section. Thank you.

DR. MILKE: Any further discussion? Microphone 1.

MR. HAMER: Mr. Chair, Paul Hamer from Chevron Energy Technology Company speaking in favor of the motion. I'd like to address remarks by Mr. Hickman.

The substantiation for the original proposal cited OSHA 1910.332 as requiring content. If you refer to that, there's no such requirement in that OSHA directive.

I'd also like to cite that a recently released OSHA field and safety and health manual which is numbered OSHA Directive No. ADM-04-00-001, dated May 23, 2011 -- this applies to the inspectors for OSHA -- has a section on training for their

electrical workers.

It says, Written records will include the source of the training, the OSHA employees trained, a description of the training provided, and the dates when the training occurred. It does not include content.

DR. MILKE: Thank you. Any further discussion? If not, we will move to the vote. Microphone 5.

MR. KAMALASANAN: My name is Kutti from Saudi Arabia. The procedure in Saudi Aramco for any work --

DR. MILKE: You're for or against please?

MR. KAMALASANAN: There is a work procedure we have to submit to the issue. The receiver who's taking work permits, then only he can take the work permit.

So what the procedure will go to the issue he will study. Based on that one for each work the permit will be issued. This is a procedure we have following. There is no problem for work.

THE CHAIR: Are you speaking for --

MR. KAMALASANAN: In support. There is -- One minute, sir. There is the issuer and the receiver. The issuer has to receive the work procedure based on that one. He will issue the work permit and the receiver should be -- There's a procedure going on. There is no problem.

DR. MILKE: Thank you. Any further discussion? Move on to a vote then. Motion on the floor is to accept Comment 70E-107.

All in favor raise your hands. All opposed? Motion fails. Move then to motion 70E-3. Microphone 1.

MR. HAMER: Paul Hamer from Chevron Energy Technology Company. I'd like to make a motion to accept Comment 70E-180.

DR. MILKE: There's a motion on the floor to accept Comment 70E-180. Is there a second?

FROM THE FLOOR: Second.

DR. MILKE: Thank you. Please proceed with the discussion.

MR. HAMER: Thank you, Mr. Chair. This particular motion is on energized electrical work permit. The comment is on page 70E-39 of the ROC and

the proposal was on 70E-52 and 53 of the ROP.

What this motion would do would reverse the action on the proposal and go back to the original text of 130.1(B)1 where it would state, When working on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition, that is, for the reasons of increased or additional hazards or infeasibility per 130.1, work to be performed shall be considered energized electrical work and shall be performed by written permit only.

The reason for this is that this particular Proposal 199 changed the wording to say that you have to have an energized electrical work permit when operating within the limited approach boundary or the arc flash boundary of exposed parts.

This is really an unsubstantiated increase in the requirement for an energized electrical work permit.

Unlike a shock approach boundary, the arc flash boundary cannot be conclusively determined because it varies significantly by the calculation method assumptions, etcetera.

Now, the significance and effectiveness of the energized electrical work permit would be diluted.

To require site management authorization for all tasks within the two boundaries as anticipated becomes very onerous without significantly improving existing safe work practices.

In effect, due to the large number of permits, approval would be pushed down to low supervision levels, and basically what we have now is we have -- Mr. Chair, am I in order? Did I jump ahead to my explanation or --

DR. MILKE: I think you're in the time line.

MR. HAMER: Good. Thank you. The arc flash boundary can vary widely based on the chosen method of termination parameters used.

And as such, the new proposed requirement is unenforceable, whereas the limited approach boundary, the restricted approach boundary, and prohibited approach boundary are very well defined in Table 130.2c of 79.

We're using this electrical work permit

now with the definition working on and elevating the requirement to approve this at a very high level.

And consequently, when the general manager of facilities is asked to approve an energized electrical work permit, that work usually doesn't get done. They find a way to deenergize the parts before working on them.

By diluting it you're going to be having this done at a much lower supervision level and probably decreased worker safety.

Substantiation of 70E-199 incompletely represented the comments during the last revision cycle. See Tom Carpenter's explanation of negative for Proposal 199. That's on page 70E-53 at the very bottom.

The proposal only referenced the committee action on Comment 70E-403 for the 2009 standard. That's the ROC for the A 2008 which changed live energized electrical conductors of circuit parts.

However, the committee meeting action on 70E-404 for 2009 standard -- that's the ROC A 2008 -- revised the wording to what now exists in the 2009

standard which requires the permit when working on.

The committee statement for Comment 70E-404 in 2008 was committee action meets the intent of the submitter and correlates with the action taken on Comment 70E-403 and 70E-363.

In addition, the committee understands that this action modifies the action taken on Comment 70E-403.

I ask you to refer to the vote and negative comments on Proposal 70E-199. The vote was 17 to 6 on this particular proposal. This is a very far-reaching requirement and should be overturned. Thank you, Mr. Chair.

DR. MILKE: Thank you. Mr. Dini?

MR. DINI: Yes. Our original action on the Proposal 70E-199, which began all this, was accept in principle.

Our committee made what seemed like small changes to 130.1(B)1 where we changed where required to when required, and then we said when working within the limited approach boundary of the arc flash protection or the arc flash protection boundary of exposed energized electrical conductors or circuit

parts and so on.

It did not seem like it was a lot of change, but we later realized that it did have some far-reaching potential difficulties with it.

So in response to that and after receiving the Certified Amending Motion from Mr. Palmer -- Mr. Hamer rather, I did reorganize a task group that I originally had with my committee that was addressing the particular proposals and comments associated with this section.

They recently provided me with a three-page report. The recommended of this report, which consisted of a task group of 12 members of my Technical Committee, said, This Task Group recommends rejection of this amending motion.

They indicate that protection from only an intentional contact to the circuit parts and equipment is not adequate for practical safeguarding of employees.

Any contact, intentional or unintentional, can result in injury to the employees. In summary they said that for performing any work in an area where injury potential exists, such at the

limited approach and arc flash boundary, an energized work permit is the method to evaluate electrical hazards and mitigation such -- and mitigation of such hazards and obtain management approval for this justification.

DR. MILKE: Thank you. We'll open up debate on the motion. Microphone 2.

MR. KOVACIK: Thank you, Mr. Chairman. John Kovacik, Underwriters Laboratories, speaking on behalf of the electrical section of NFPA and speaking against the motion.

The electrical section met yesterday morning and the members voted in opposition to Certified Amending Motion 70E-3.

In effect, the members of the electrical section do not support the motion on the floor. Thank you.

DR. MILKE: Thank you. Microphone 6.

MR. HICKMAN: Thank you. Palmer Hickman with the IBEW, speaking for myself against the motion.

I just ask the body to please join the 21 committee members who voted against this, join the

electrical section who voted against this, and join the Task Group that looked at this with the three-page report rejecting this. Thank you.

DR. MILKE: Thank you. Any further discussion? Microphone 1.

MR. HAMER: Paul Hamer, Chevron Energy Technology Company. I just ask that you consider that, respectful to the Technical Committee and the task force, that they really need to look more thoroughly into this as to what the actual effects may be.

If you're within 35 feet of 15 kv switch gear, by some definitions you're going to need an energized electrical work permit.

If you're within three and a half feet of most fixed parts, any fixed part energized, you're going to need an energized electric work permit. You're going to need an energized electric work permit for everything. Thank you, Mr. Chair.

DR. MILKE: And you are speaking in favor?

MR. HAMER: I'm speaking in favor of the motion. I'm sorry.

DR. MILKE: Any further discussion? Microphone 1.

MR. GOLDSMITH: Jeff Goldsmith, GE Water & Process Technologies, speaking for myself in favor of the motion.

Many of the requirements of 70E are rather onerous and human nature is to -- is that if you make things unnecessarily onerous, they're less likely to be complied to.

Wearing PPE is very onerous but it is extremely valuable in providing protection. Paperwork. Work permits can be very onerous and by themselves don't provide any protection.

I believe that we probably had a good balance for the minimum requirements for work permits previously, and we're probably -- whereas certain facilities who choose to adopt this can choose to require work permits where they think it's appropriate, I think that maybe we've gone a little too far with the minimum requirements.

DR. MILKE: Thank you. Further discussion? Microphone 5.

MR. KAMALASANAN: My name is Kutti from

Saudi Arabia working for Saudi Aramco. I am speaking in favor of the motion.

DR. MILKE: Thank you.

MR. KAMALASANAN: There is safe working space there based on the work that is going on in Saudi Arabia, Dubai, Abu Dhabi.

For example, cable on above ground, that pulling the cable with the same spacing. They're not switching off the things.

So that we can do the job without switching off, the work is going everywhere. I have already been to Abu Dhabi, Dubai. The name of the company is Cobra. They're doing the work like that.

DR. MILKE: Thank you. Microphone 3.

MR. McLAUGHLIN: The name's Stewart McLaughlin with All Star Facility Services, a division of G4S. I'm in opposition to the motion.

In the name of safety I disagree that these measures are too onerous. We in fact do require permits for -- any time we're going to be doing hot work.

I sign a lot of them. We do it every time somebody gets ready to open a panel, and now I

1 understand that there's modifications that would
2 require -- I understand, I should clarify, from
3 meetings that I was in a couple days ago -- that, you
4 know, even if the panel is closed, we may have an
5 issue there.
6 I don't think it's been nailed down yet
7 as to whether or not if you're just walking by a
8 closed panel, I think there's still some discussion
9 about whether or not if you're actually going to do
10 something at that panel.
11 And I would agree, having had breakers
12 blow up -- one breaker blow up in my face, 400 amp,
13 and thank God I'm still here to talk about it. I
14 just flipped the breaker. Something shorted but, you
15 know, the thing blew up.
16 So I can tell you that when you react
17 with a breaker, even if the thing's closed, you might
18 have issues.
19 Now, just walking by it, I don't see that
20 much of an issue. And so hopefully further
21 discussion on this matter will be had and we'll get
22 some clarification on that.
23 But we -- There's no problem with having

1 people do permits. Our folks do permits -- and by
2 the way, when I say our folks, I mean G4S is the
3 second largest employer in the world behind Wal-Mart.
4 We're in 160 countries.
5 Our employees will do the necessary
6 permits and the -- that labor causes our employees to
7 be safer. It brings the requirements of the work to
8 the forefront. We do not find it too onerous and I
9 therefore reject the proposal.
10 DR. MILKE: Thank you. Microphone 2.
11 DR. HIRSCHLER: Marcelo Hirschler, GBH
12 International. Call the question.
13 FROM THE FLOOR: Second.
14 DR. MILKE: That's not debatable. All in
15 favor of calling the question raise your hands. All
16 opposed? We'll move right to -- That passes.
17 We'll move right to the vote of the
18 motion at hand. That motion is to accept Comment
19 70E-180. All in favor, raise hands. All opposed.
20 Motion fails.
21 FROM THE FLOOR: Mr. Chairman, I have a
22 procedural question.
23 DR. MILKE: Yes, sir.

FROM THE FLOOR: I request a ruling as to whether we have a quorum to continue.

MR. HAMER: Point of order.

DR. MILKE: Thank you. In order to confirm the quorum, would the voting members stand up to be counted and I will please ask NFPA staff to count the membership standing.

All the NFPA staff who are counting, please come to the front so we can get this organized.

Okay. You may be seated unless you enjoy the standing just for a change. So as presiding officer, I have determined with the help of friends that the required quorum of 100 as noted in Section 4.2 of the NFPA bylaws is not present.

Without a quorum the session must be terminated. If due to the lack of a quorum at an Association Technical Meeting the Association fails to make a recommendation concerning a report or a portion of a report, the document shall be forwarded directly to this Council without recommendation for action in accordance with Section 4.7.

Notwithstanding the foregoing, any

motions to amend or return a report that have passed prior to the loss of the quorum shall be processed and forwarded to the Council in accordance with 4.5 and 4.6.

So with that, first of all, thank you, Mr. Dini for your efforts and for your report.

MR. DINI: I'm from Chicago. If you want to vote twice I have no problem. (Laughter.)

DR. MILKE: This officially concludes this portion of the 2011 Annual Association Technical Meeting. I want to thank you, especially those of you hanging in this late, for your participation, interest and support. I now declare this part of the meeting officially closed.

(Whereupon at 6:17 p.m. the meeting closed.)

C E R T I F I C A T E

I hereby certify that the foregoing 293 pages contain a full, true and correct transcription of all my stenographic notes to the best of my ability taken in the above-captioned matter held at the Boston Convention Center on Wednesday, June 15, 2011, commencing at 12:30 p.m.

Linda J. Modano, Registered Professional Reporter

My commission expires May 11, 2018

A

a117 231:21 232:13 233:16,16 237:11 245:14,19,23 246:7 250:16 250:17
aarp 240:21
abbreviated 255:20
ability 101:13 253:8 294:7
abject 17:12
able 3:5 92:16 105:16 132:1 151:23 152:7 155:21 191:2 226:6 241:12 243:11
ablebodied 146:15
abovecaptioned 294:8
absence 38:19 214:14
absolutely 79:4
absorbance 71:19
abstained 272:6,7,8
abstention 236:21
abstentions 114:9
abu 289:6,12
abuse 72:20,22 73:3 73:11 74:8 78:15,20 118:9
abused 74:17
academic 204:4 253:3
accept 7:20 30:6 41:8 50:14 51:13 52:5 53:21 54:2 60:8 62:4 76:9,9 76:11 82:10 82:21 85:20 85:22 87:21 88:1,9,12 89:8,18 94:20 99:10 99:23 100:2 104:4,13 109:15 123:4 124:3,6 128:14 131:7 131:17,20 135:12 139:14,17 140:1,2 141:14 155:10 156:21 157:16 159:5 159:13,20,23 160:1 166:6 166:9,20 170:15,21 171:1 179:9 187:23 195:17 201:6 201:20 202:17,20 211:21 212:17 215:7 218:13,14 219:10 223:9 224:1,6 225:22 226:22 227:8 227:20 231:12,16 233:18 243:5 255:5,13 256:15,19 257:10 258:15 261:5 261:7 267:13 267:20,22 271:23 280:9 280:15,17 284:17 291:18
acceptable 41:13 63:19 76:1,2 161:6 165:17 172:18 175:7 178:18,21 223:13,13 273:5 276:22 277:9
acceptance 42:18 89:15 187:21 188:7 191:6 231:8 233:10 235:11 257:7 270:17 273:13
accepted 5:6 7:19 10:5 10:23 16:16 16:16 40:15 69:10 73:20 77:4 92:11 93:12 106:21 107:9 111:15 114:14 116:7 124:18 140:4 151:15 157:3 172:21 177:19 182:1 186:6 193:1 209:2 243:13
accepting 88:22,22 96:21
access 108:12 188:15 237:16 245:17 246:2 247:21
accessibility 232:2,5 234:3 234:9 238:9 238:13,15,18 238:19,22 240:18 241:22 242:9 242:16,17,19 242:22 243:5 243:7 247:20 248:5,8 252:5
accessible 231:20 245:22 246:22 247:15
accommodations 203:16 247:9 247:23
accomplish 54:20 117:18 130:15
account 22:2 56:19 92:9 245:5 249:12
accredited 71:9,9
achieve 70:23 71:6 90:23 92:12 92:17
achieved 70:16 93:15,17 262:5
achieving 70:20
acoustical 111:17,20 120:5
acquire 239:17
acre 151:17,17 200:9,9
act 193:20 204:16 238:7,8 247:18,19
acted 87:12 264:4
acting 265:5
action 8:4,9 14:7 17:13 24:2 29:17 34:22 41:21 42:11 50:21 86:14 86:19 93:17 103:4,5 111:3 128:14 133:20 135:22,23 136:4 143:9 165:13 170:3 170:6 173:9 173:14 174:13 175:17 177:10 182:18 192:19 228:14 233:3 233:4 236:12 272:11 281:3 283:17,21 284:3,4,7,7 284:15 292:22
actions 52:16 103:1 117:18 204:9 258:10 269:12,20
activate 134:4,9
activated 133:18
activating 96:14
activation 19:3
active 34:16 90:9,22 270:3
activities 205:18
activity 137:13
actual 23:14 160:15 262:12 287:10
ada 246:19
add 31:7 33:2 40:5 88:16 102:9 116:21 181:3 185:3,3 211:5,8
added 33:9 36:9 39:12 41:3 54:8 65:22 68:12 180:6 189:23 190:3 194:13 209:16
adding 50:12
addition 11:15 14:2 38:12 98:6 111:23 163:14 218:22 243:6 250:3 284:6
additional 11:9,15 50:22 56:10 115:5 116:7 119:20 162:17 165:18 166:3 168:13 172:10 182:17 189:21 190:3 193:11 194:13 214:20 281:8
additionally 156:1
additive 178:4
address 27:5,9 35:4 59:11 93:5 95:11 104:23 114:18,20 115:9,12 129:1 135:15 142:21 162:9 175:18 181:15 193:23 209:13 224:2 245:6 265:21 278:13
addressed 36:22 135:19 191:11 211:17 223:23 243:7
addresses 94:7 191:10 238:17,18
addressing 86:17 98:8 104:1 213:5 250:5 285:9
adds 86:7
adequate 21:11 103:23 129:18 141:6 285:18
adequately 94:6 249:12 274:22
adm0400001 278:21
administration 153:10,13 154:8
administrators 202:17
adopt 238:11 241:21 265:19 266:18 288:17
adoptable 263:14
adopted 95:3 96:3 234:22 251:5 251:9 252:9 252:11,19 270:9 273:9
adopting 227:18 238:22 250:4
adoption 3:22 61:7 84:10 95:6 188:12 217:5 238:14 247:19 260:6 263:2,11 265:10 266:7
adopts 265:12 266:9
adrian 37:16,17
adults 203:16
advance 269:11
adverse 166:4 234:17 235:16
advice 124:11
advise 255:16
advised 212:1
advisory 9:16
advocacy 270:2
advocate 144:11
advocates 248:4
affairs 129:4 132:6 134:21 135:2 139:14 141:20,22 156:17 162:13 168:4 174:19 181:20 194:5
affect 67:16 125:1 140:15 153:17 154:23 160:14 268:20
affiliation 122:10,16 130:19 176:2 176:7 237:20 246:14
affirmative 93:16 114:8
afford 101:18 240:9
afforded 152:3
afraid 251:11 252:13
afternoon 1:13 3:1,8 60:15 69:5 70:7 83:18 216:16 222:3 228:5 246:13 253:14 256:9 259:16
age 240:2 249:20 249:23
agencies 71:10 262:21
agency 262:15 272:8
agenda 73:15,19 212:5 212:11
agent 4:4 6:2,19 7:8 9:6,21 11:20 12:6,21 13:6 13:19 32:13 32:16 33:11 36:9,12 42:7 44:2,7,15 45:14 47:19 48:21 49:5,7 49:19 50:7 50:10,22 53:10 55:19
agents 5:4 7:7 9:6,20 14:8,9 15:5 17:15 21:3,5 23:8 24:23 33:7 59:17 59:22
ages 238:4
aging 240:3
ago 39:6 142:12 199:3 210:14 215:15 223:1 223:17 235:3 255:19 290:3
agree 41:6 57:19 77:12 108:19 120:21 138:22 195:10 272:11 290:11
agreed 87:13 129:8 272:1
agreedupon 38:17,20
agreeing 5:23
agreement 15:19 33:2 93:15 149:17 155:20
ahead 22:18 59:2 81:5 125:12 131:21 226:21 282:12
ahj 91:11 171:23 172:3 175:15 178:2,18,19 200:9,11 226:9 262:16 262:20 263:15,18 264:1,2,4,13 264:16,16,23 265:5
air 56:13 219:19 224:5,8,22 225:2 229:11 230:9
akag4s 275:8
alarm 132:9 135:15 163:9,12 169:3,7 206:2,8
alarms 132:21 133:15 133:18 134:1 134:4,10,16 136:1,2,6 137:11 138:13 206:5 207:13,15
alcohol 106:9 107:2,8 107:13 207:3
alcoholbased 108:13
alerting 137:18
align 140:18
aligned 141:11 143:4 143:21
alignment 145:1
allan 259:8
alleviate 188:10 189:6
alleviating 191:8
alliance 88:9 178:6

allies 248:4
allow 47:18 59:2 64:4 75:16 76:13 99:2 101:5 120:7 133:10 137:15 144:2 156:21 158:16 198:20 220:10 224:4 224:7 229:10 239:7,16 249:17 251:5
allowable 188:8,13
allowance 262:8
allowed 67:7 78:6 94:1 107:2,8 120:20,21,22 121:10,13 122:3 126:9 151:7 154:17 161:2 164:17 164:23 167:15 188:23 190:9 191:15 195:22 199:5 200:18 226:5 228:22 229:4 230:7
allowing 38:13 127:12 127:14 133:12 180:23
allows 94:10 157:3 180:6 191:11 193:2 229:8 257:21
altered 95:8
alternate 178:16 180:20 185:13
alternative 91:2 102:2 262:4
alzheimers 191:4 196:1,6
ambulatory 106:13
amend 38:3 87:5 293:1
amended 227:21,22
amending 3:15 4:12,15 38:1,19 45:17 60:23 61:21 84:3 85:1,7 99:17 159:23 161:23 166:20 171:1 212:7,10 213:3 216:22 217:19,21 218:6 259:22 260:21,23 267:7 271:2 272:19 285:6 285:15 286:14
amenities 203:20
american 88:8 138:4 164:11 178:6 196:21 231:4
americans 238:7 247:18
amount 36:12 49:4,7 50:11 56:20
amounts 205:8 248:18
amp 290:12
analogous 39:21
analysis 53:11 211:9 269:2
analytical 93:21
andress 94:20
ane 46:2
anecdotal 199:2
annex 145:8 163:13 163:18 169:9 169:13 172:22 198:7 257:19,21 258:7
annexed 42:12
annual 1:1 60:22 61:9 84:2,11 216:21 217:7 259:22 260:7 293:10
ansi 231:21 232:22 238:9,13 242:18,23 243:7,9,17 251:14
anthony 202:13
anticipated 282:6
anticipation 143:20
anybody 22:11 275:14 277:1
anybodys 183:9
anyway 126:16 201:2 253:4
aon 210:8 236:20
apart 32:1 82:14
apartments 204:21
apha 231:5 234:18 235:4,6
aphas 235:16
api 273:2
apologize 56:17 65:15 177:17 185:12
apparently 225:5
appears 209:5 226:20
appliance 206:6,7,10
appliances 205:21 206:15
applicability 221:9
applicable 94:4,9 220:7
application 42:4 70:9 96:2 96:18 150:3 175:20 177:22 188:10 190:12 191:8 191:22 200:16 261:16 270:10
applications 32:8 39:16 95:16 96:13 121:12
applied 13:16 43:17 74:18 111:14 111:18 118:23 175:20 201:13,14 214:3 251:5 251:9 270:18
applies 225:7 278:22
apply 101:13 111:7 118:17 150:7 150:9 181:2 185:19 214:4 219:18,23,23 220:4,21 225:11 245:2
applying 120:3 136:17
appointments 241:9
appreciate 136:22 152:10 268:7
appreciated 255:22 257:3
appreciation 34:20
apprenticeship 277:11
approach 185:13 209:14 234:15 281:15,20 282:19,20,21 284:21 286:1
approached 35:6
approaches 72:15 102:2
approaching 72:20
appropriate 44:8 103:20,22 116:2 173:18 212:22 251:23 258:10 288:19
appropriately 101:13 115:21
approval 11:19 74:2 182:12 231:14 232:22 244:13 261:22 282:9 286:4
approvals 182:15
approve 106:7 244:17 262:3 283:2 283:4
approved 74:1 89:2 97:8 97:9 108:8 121:16 175:18 177:21 178:2 182:16,19 183:22 198:18,19 199:19,21 221:12 227:21 244:20 245:9 256:2
approving 263:21
approximately 16:9 39:8 239:20 240:1 249:19
arabia 81:7 122:20 176:9,10 279:11 289:1 289:6
aramco 81:7 122:20 176:9 279:11 289:1
arc 269:2 281:16 281:20 282:15 284:21,22 286:1
arch 67:22
architect 127:3 149:13 202:11
architects 104:6 130:23 148:4 149:12 155:16
architectural 205:1
architectures 203:22
archives 28:17
area 31:22 102:14 125:8,10 130:13 133:7 133:11 134:15 144:3 144:20,21 147:6,9 151:21 152:19 183:13,17 209:17 248:1 285:23
areas 48:17 76:5 98:23 101:10 144:18 150:11 188:23 189:9 190:10 191:1 191:14 247:7
arena 249:14
arent 41:6,13 207:22
argue 157:5 207:20
arguing 251:6
argument 190:21
arguments 29:14 50:20 149:11 155:16 213:18 235:12
arkansas 151:17 200:9
arrangements 145:10 200:18 205:1
arson 207:18
ashi 196:20
asked 8:12 41:5 93:3 133:14 203:2 221:1 283:4
asking 8:6 12:19 47:13 48:1 135:11 139:23 167:17 192:7 210:14 221:10
asks 213:22
aspect 236:3
aspects 246:23
assemblies 90:8,15 107:4 110:19,21 111:1,6,7,21 112:23 113:23 114:2 114:5 117:3 119:10,13
assembly 12:19 24:1 33:19 67:17 91:7,12 107:4 145:18 205:9 212:9 223:15
assessment 125:6
asset 60:19
assistance 238:6
assistants 247:15
assistiveli... 240:8
associate 202:11
associated 18:7 42:12 157:11 233:7 266:3 285:10
associates 14:21 21:17 39:3 59:8 65:10 83:22 97:2 104:16 105:4 113:14 136:14 138:4 143:13 149:23 157:20 181:10 184:4 186:14 195:19 201:9 211:3 218:3 223:21
association 1:3 11:6,8,14 18:19 30:18 30:19 32:19 116:15 138:5 178:9 196:21 231:5 235:13 237:2 243:21 292:18,18 293:10
assuming 24:18
assumptions 281:23
assure 271:3 275:1
assured 262:4
asterisk 45:9
astm 63:6 71:7 90:5 95:17 97:17 121:15 185:15
atmosphere 137:16
atrium 99:1 100:12 126:7 128:5
attack 249:1
attempt 25:17 71:13 100:7 141:22 189:7 214:14
attempts 188:10
attendants 137:18
attention 128:12
augment 45:14
authorities 6:9 71:3 90:12 95:21 189:1 189:3 262:10
authority 96:4,5,17,17 116:18 117:13 137:6 172:16 174:5 175:1,7 261:19 262:2 262:9
authorization 282:4
authorized 242:10
automatic 95:16 96:10
availability 232:16
available 33:15 36:6 94:7 126:5 130:7 162:20 165:20 168:15 182:2 188:20 233:9 233:12,14,20 237:5,6 243:8,10,10 244:8,16 252:22,23 253:11
averill 99:22 124:2
avoid 93:1 104:19 135:3 138:13 181:11 191:7 257:22 269:10
avoided 96:16
avoids 191:21
awaiting 182:9
award 14:19

B

baby 249:19
back 3:4 6:22 9:22 14:6 22:21 28:17 34:10 39:15 41:5 43:14 44:17 44:23 54:10 55:21 67:9 68:19 69:11 73:18 102:8 102:19 113:3 113:4 129:15 133:19 146:17 166:14 184:16 196:5 199:10 223:10 226:2 227:6 228:6 245:6 251:19 281:3
background 46:10 143:5 242:15 268:8

backing 156:9
backup 49:12
backwards 201:4
bad 24:10,19 25:2 25:2 26:9,22 106:7 161:19 220:17
badge 30:4 51:11 82:17 131:13 159:10
balance 288:15
ballot 4:5,8 61:14,17 66:3 84:17 84:20 92:13 217:12,15 260:12,17
balloting 30:12 51:19 82:22 93:16
ballots 97:9
barrier 126:11 141:4,5 142:19 143:1 145:12,13 146:2,3 147:12 150:4 150:9,13,19 154:11,12 157:9
barriers 98:11 126:5 140:5,9,18 140:19 141:10,12 142:13 143:3 143:20 144:7 145:9 146:11 147:2 150:6 154:23 157:1 157:4,11
base 44:3 59:3 111:10,11 200:13 245:1
based 12:2 19:16 20:4,5,7,10 21:12 25:14 32:21 33:3 38:19 40:17 42:14 43:3,9 44:20 45:2 50:1,3 53:4 58:11 68:3 86:18 98:3 108:8 113:23 145:1 158:8 174:6 176:17 181:23 188:16 194:19,19 196:6 197:15 219:10 254:2 258:10 264:22 279:20 280:4 282:16 289:5
baseless 44:23
basic 16:23 127:16 190:2 240:17
basically 8:18 34:14 45:20 47:10 65:16,21,22 66:11,19 95:14 168:7 168:7 177:3 197:12 201:14 227:18 233:10 237:4 251:19 257:19 282:10
basing 19:22
basis 8:21 9:5 35:4 41:12,18 54:5 94:13 96:19 210:11 254:5 270:7 270:10
bathroom 239:9 241:1,14 241:19
bathrooms 240:7
battery 163:8,11 169:3 169:7
bds 9:9
bear 123:2
beat 122:2
becoming 205:6,11 207:1
bed 145:14,14
beds 207:14,14
began 247:6 284:16
beginning 75:20 80:2
begun 247:11
behalf 13:5 18:19 24:8 42:6 48:6 57:18 62:4 93:5 102:21 104:7 104:23 108:5 108:7 129:2 131:1 137:6 145:7 162:10 165:11 170:1 173:19 177:8 181:10,15 200:2 231:4 231:6 237:22 242:10 243:21 267:3 272:16 286:10
behaviors 206:21,21,23 207:6
beitel 65:9,9,15 218:2,3
belief 20:7,10
believe 5:9 6:21 7:14 26:9 29:15 34:11 38:21 46:8,12 70:15 100:8 130:9 134:12 135:9,14 136:18 137:21 138:11 162:6 177:1 214:17 218:3 219:15 250:13 256:22 265:3 269:16 276:8 276:9,11,15 277:10 288:14
believed 103:9
believes 11:15
belong 120:9
belonging 163:3 168:21
benches 125:11
beneath 207:14
benefit 141:13
best 50:14 204:17 253:8 276:16 294:7
better 34:17 47:9 59:22 185:5 198:17 234:6 235:5 273:8
beyond 63:9 172:9,10 172:20 206:20 235:19 236:15 239:5 249:4
big 6:1 36:11 50:12 57:20 67:6 144:2 186:10,17 199:15
bigger 17:5 184:14,16
bill 97:3 223:20
bit 15:2 22:3 23:23 39:4 45:9 47:2,7 47:22 49:2 57:4 77:8 85:16 157:10 212:21 242:15 251:12,12 254:15
bladder 241:16
blanket 95:15
blew 290:15
block 96:14
blow 290:12,12
blue 60:22 84:2 216:21 259:22
blunt 196:12
board 104:8 105:18 131:2 147:21 165:14 183:6
bobby 261:4
body 163:13,17 169:8,12 286:22
bona 128:4
bonisch 210:3,6,7,8 236:16,18,19 236:20
book 252:23
boomers 249:19
booth 125:9
boston 1:5,9 3:2 238:3 248:1 294:8
bottom 126:12 283:15
boucher 69:16,17
boundaries 282:5
boundary 36:21 281:16 281:16,20,21 282:16,20,20 282:21 284:21,22 286:1
bounded 101:7
brad 4:17 25:22 28:6 45:7 52:3 57:22
brads 50:15
break 187:7,9 189:10
breaker 290:12,14,17
breakers 290:11
breeds 207:8
brief 228:20 271:16
briefly 18:22
bring 121:2 134:5 161:1 164:15 167:16 199:2 206:20
bringing 120:9 146:4 166:1
brings 120:16 157:21 291:7
broad 234:8
broaden 241:20
broader 174:3
broadest 252:3
brought 36:2 79:20 81:17 158:3 158:14 164:13 206:18
bruce 21:16
bs 268:9
build 208:18
builders 71:3 235:14 237:2,15 243:21 251:4 252:12 256:14
building 2:14 18:16 61:13 69:8 71:16 90:2,3 90:17 92:8 95:5 96:12 101:17 107:3 110:15 111:1 112:10,14,16 118:19 134:4 134:5 141:1 142:13 144:15 146:8 146:15 152:17 156:3 158:7 201:14 203:18 206:2 216:17 217:4 217:9,11 218:23 220:3 221:6 222:1 222:4 223:4 226:2,7 227:19 228:3 231:1 232:22 234:2,10 238:8 242:8 242:12 243:2 243:4,12 244:6,7,12 245:12 246:4 247:20 251:13 254:17 258:4 275:8 276:1 277:11
buildings 91:20,21 92:3 98:11 107:7 198:8 203:21 205:8,20 220:1,6,11 226:4,8 231:20 234:22 238:18 248:14
built 126:21 204:20 253:23 254:7 254:11
bulb 56:9
bunch 156:12
bundles 31:17 53:15
bunji 145:4,5
burden 91:11,14
bureau 239:19,21
burn 26:14 158:12
burner 14:4 16:2 19:18 24:23 25:5,16
burners 63:10
burning 26:19 36:13 111:6 180:13 186:18,19
business 3:14 23:2 68:3 107:6,10 128:1 145:21 145:22 146:1 146:5,9 150:18 154:5
businesses 203:15
busy 82:4
bylaws 292:15

C

cable 31:17,20,23 46:6,10 53:15,15 99:21,21 100:7 124:1 124:1,10,11 127:21 128:8 289:7,8
cables 31:18 40:20 46:6,7 221:5 225:3 229:6
calculation 281:22
calculations 9:8
california 28:13 70:9 121:9
call 30:3 81:21,22 82:5,15 123:10 128:12 158:20 159:1 159:8 170:9 179:2,4 196:3 210:13 254:20 291:12
called 45:18 102:10 184:4 239:4
calling 30:1 123:13 159:2 170:10 170:12 179:6 255:1 291:15
calls 40:22
calorimeter 185:21 186:3
cam 3:13 8:6 10:8 89:1
cambridge 246:14,17,20 246:23
campbell 21:16,16
campus 204:21 205:23 207:22 208:10,14
cancer 28:12
candles 206:13
cant 21:18 41:10 107:22 178:14,15 180:17 192:21 193:19 223:9 240:9
capability 15:13
capable 34:7 110:17
capacity 182:5,10
car 199:12
carbon 23:7
care 80:12 100:14 104:7 106:11 106:12,13,14 107:7 108:18 108:22 124:15,17 126:4,6,9,20 127:10 128:2 128:4 129:1 129:6,10,19 130:7 131:1 132:7,22 133:1,3,5,7 134:11,23 135:5 137:7 137:8 138:4 138:19 140:6 140:6,10,11 140:15 141:8 141:13 142:19 143:1 144:4,16 145:16,21 146:5,10,17 147:1,3,18 147:20 148:10,10,13 148:16,19 149:19 150:12,13,17

150:22 151:1 151:3,5,8 153:17,22 154:2,6,14 155:6,7 156:20 157:1 160:11 162:9 162:14,20,23 163:23 164:3 165:12,14,19 165:22 168:1 168:5,10,15 168:18 169:17 170:2 170:4 171:22 173:19 174:15,20 177:9 181:1 181:14,21 183:3,4 188:9,15 190:6,23 193:23 194:6 194:7 196:21 198:4 200:2 200:3,5 241:18
carefully 223:12
caregivers 241:8,12,17
carpenters 283:13
carried 108:22 188:19
carries 82:8
carry 197:9 199:1 241:8
case 70:16 94:8,12 95:10 130:2 130:15 133:11 144:7 153:14 184:4 194:21 195:1
casebycase 96:19
cases 28:10 90:18 91:5,18 92:2 213:22 214:6 234:20 264:10
catalog 273:23
category 269:4
cator 149:22
caucus 212:21
caucused 213:2
caused 17:2 22:8 133:17 137:11 206:5
causes 291:6
caveat 46:20 53:6
caveats 54:8
ceiling 21:23 111:17 111:20 115:23 120:5 120:5 145:18 229:10,17
ceilings 113:18 119:8
census 239:19
center 1:5 3:2 28:12 44:11 49:9 63:9 125:14 239:23 240:14 294:9
centers 43:21 46:5 47:20 56:21 57:3
centimeter 49:23
central 233:22
century 239:20
certain 9:20,21 47:17 62:16 95:13 95:15 121:12 158:3 176:13 176:22 182:6 215:1 218:21 288:16
certainly 48:20 152:2 165:23
certification 276:21
certified 3:15 4:12,14 37:23 38:19 60:23 61:20 84:3 85:1,7 99:17 212:10 216:22 217:19,21 259:22 260:21,23 267:7 272:19 285:6 286:14
certify 294:5
cfr 264:7
chair 3:5,11,19 11:4 15:4 27:6,8 27:15,15 55:6 60:18 61:4,5 69:8 69:16 82:4 83:21 84:7 86:13 92:21 93:3 102:22 103:12,17 104:21 113:6 128:11,23 129:3,5 132:4 134:19 134:22 141:20 153:9 156:16 162:8 162:12 167:23 168:3 168:4 174:18 174:19 177:14 181:13,19,20 186:6 192:6 194:5 210:3 210:7,9 215:4 216:19 217:3 236:16 236:19,20 242:7 259:19 260:3 267:18 271:20 278:11 279:23 280:21 282:11 284:13 287:19
chairman 13:2 14:15,20 19:12 23:10 30:16 31:6 34:1 37:16 42:2 45:4 57:13 59:4 62:2,9 67:21 69:6 85:18 89:12 93:9 132:17 139:12 145:4 159:18 160:6 170:19 187:18 194:4 212:13 221:16,23 222:4 228:2 258:3,6 259:1 267:1 267:10 268:4 272:14 286:8 291:21
chairmans 39:4
chairperson 18:18 181:8
chairs 125:10 162:14
challenges 250:7
challenging 236:3
champion 268:18
chances 157:9 207:6
change 7:15 10:15 13:22 38:6 41:19 64:9 67:14 72:13 76:8 81:8 87:11 88:16 88:17 93:13 93:23 94:14 94:14 107:19 110:20 111:22 112:19 118:22 120:1 129:8 132:22 132:23 136:23 138:9 150:5 156:7 156:8 157:3 174:21,23 175:3 195:11 208:1 209:8 221:17,21 246:9 266:20 271:7,8,11 285:3 292:12
changed 58:20,21 93:18 98:3 133:22 196:6 222:13 233:4 236:9 243:12 274:17 281:13 283:19 284:19
changes 40:21 62:10,11 94:15 114:15 119:2 162:15 168:11 210:15 227:20 268:19 269:9 269:17 284:19
changing 21:20 42:11 65:12 73:22 119:4
chapter 94:10 106:12 106:16,17 107:9,10 111:4 124:12 125:1 128:22 141:1 146:19 147:2,9 157:14 160:21 162:3 162:5 165:2 190:4 191:11 209:9,12 211:13 213:15,16 234:3 242:9 242:22
chapters 103:22 106:20 106:21 107:15,17,20 108:10,11 182:4 194:7 203:4 209:4 210:17 211:9
character 146:6,21
characteris... 153:18 175:13
charge 193:22
charitable 56:2
cheater 78:3
cheating 75:18
checked 149:4,6,7
chemical 25:7,8,9 70:1 209:19
chemicals 66:12
chemistries 68:12
chemistry 25:11
chevron 267:19 268:10 268:11 269:22 270:6 270:9 278:12 280:13 287:6
chevrons 270:21
chevronwide 270:13
chicago 293:7
chief 199:10
chiefs 116:16
children 191:2
choice 106:7 107:21 222:7 264:16
choices 256:13
choose 288:17,17
chooses 265:19 266:18
chose 63:17 72:17 73:14 222:10
chosen 63:18 282:16
circuit 281:5 283:20 284:23 285:17
circulation 245:17
circumstance 96:7
circumstances 95:13 96:1,18 110:16
cite 278:19
cited 220:14 278:16
city 246:20,22
civil 247:5
claiming 43:8 90:14
claims 42:10,12,18 43:3 91:9
clarification 92:17 109:5 117:14 290:22
clarifications 250:15
clarified 130:11 192:15
clarify 54:16 89:21 90:20 142:9 290:2
clary 3:4 4:13,20,22 7:23 11:2 12:23 14:16 18:2,13 19:10 21:14 22:14,18,21 23:4 24:3 25:20 26:2 27:1,5,14 28:1,4,19,23 29:8,18 30:23 31:3 34:2 37:6,14 38:23 41:22 45:5 46:15 48:3,8,10 50:17 51:1 52:2,7,13 53:19 54:1 54:21 57:14 58:1 59:5 60:3,6 61:22 62:5,7 64:16 65:7,13 67:19 69:2 69:14 70:5 72:2,7 75:4 77:17 78:8 79:9,15 80:4 80:12 81:5 81:10,15,20 81:22 82:2 83:5
class 5:2,7,8,12,12 5:16,23 6:14 6:14,17 7:3 8:16,19,22 8:23 9:3,16 9:20 10:12 10:17 11:11 11:18,21,22 12:2,3,4,21 13:10,11,12 13:15,22 14:3,4 16:8 16:14 19:16 19:17,18,22 19:22 20:1,2 20:5,6,8 23:12 24:10 25:7,18 28:9 31:8 32:13 32:21 33:21 34:12,14,15 34:17 35:5 35:12,19 36:17 37:3 38:4,11 42:13 44:4 44:19 45:11 45:22 47:1 47:10,10,17 50:22 52:21 53:17 54:20 55:7,14,15 116:6
classification 17:10 209:8,10
classrooms 205:10
clause 264:12
clean 4:4 5:3 6:2,19 7:7 9:6,6 11:20 12:6 12:21 13:6 13:19 21:2 23:8 24:23 32:13,16 33:7,10 42:7 47:19 49:4
cleaning 182:8
cleanup 116:23
clear 7:1 17:3 33:3 46:2 63:21 120:19 135:10 138:19 148:6 148:6 160:23 176:15 185:13 273:20 274:5 278:6,7
clearly 33:16 40:8 59:13 121:1 126:15 145:15 177:2 189:9 191:4 225:14 263:3
client 22:5,11 97:2 105:4 153:19 181:10 184:4
clinical 188:16 189:2,5 189:9,12,13 189:17,19 190:10,22 191:5,15,17 192:14 194:9 194:17,20,21 195:6 196:6 196:12 200:13,17
clock 41:5
close 33:19 51:20 94:23 187:10 275:23
closed 30:12 51:19 82:23 159:15 180:13 290:4 290:8,17 293:14,15
closely 236:23
closest 134:15
closing 38:18 41:8 238:15
clue 278:3
co2 9:2 16:1,11 37:18 39:17
coalition 138:7
coat 115:23 176:19
coated 63:22,23 75:21 75:23,23 76:3,4,21 114:21 115:18 116:5 119:10
coating 75:19 78:17 115:2,3 118:17,18 119:3 120:3 175:19
coatings 61:13 71:15 77:21 78:18 117:7 118:5

118:5,6
coats 114:23 120:18
coauthored 43:4
cobra 289:13
code 2:14 68:5,17 69:11 70:16 75:14 76:12 79:1 81:8 84:16 89:23 90:4 92:6,18 92:23 94:5 94:10,11 95:5,8,12 96:2,5 97:21 103:23 106:22 111:15 116:14 118:13 120:10 121:9 121:9,13,14 129:6,16 130:2,3,4 132:9 137:15 142:12,16 145:19 155:5 156:1 157:3 160:16 161:14 163:3 163:13,17 168:21 169:8 169:12 171:11 188:13 189:8 192:23 194:8 194:12 195:21 196:17 197:5 200:11,14,17 201:10 205:23 208:1 209:17 210:1 216:17 217:4 217:9,11 219:1 221:4 221:6 223:3 223:4,5 225:9 226:7 227:19 228:7 232:22 236:8 238:8 245:12 251:13 260:15 263:11,21 264:7 265:17 266:15
codes 62:15 235:5 239:2 247:20 248:8 252:11
collaterally 184:20
colleagues 14:22
college 207:12 274:1
collette 259:8
colorado 123:10
columns 90:18 113:18 119:8
combination 90:17
combine 212:17
combined 161:22
combining 91:23
combustible 5:7 208:7 229:7,17 230:7,8,12
combustibles 5:3 182:11 186:18 206:14,17 224:20 225:3 228:22 229:4
combustion 63:8 133:16
come 27:22 64:5,22 67:12 75:9 76:14 81:8 85:7 98:22 117:10 137:12 172:22 184:21 235:18 251:19 252:23 268:16 292:9
comes 66:14 91:9 103:3 249:23 251:3
coming 73:4,11 78:15 118:10 158:3 171:14 184:21 225:13
comma 79:22
commencing 3:3 294:10
commend 209:3 211:14
comment 5:5 7:5,6,18 8:7 10:9,14 10:23 13:14 19:21 22:15 22:17 29:21 30:10,21 40:3 42:19 51:5,17 52:5 52:6,19,20 53:7,21 54:5 54:10,23 60:8 62:4 82:10,21 85:20,22,23 86:14,20 87:21 88:1,9 88:12,22 89:8,15,18 92:10,15 94:21 95:11 96:21 99:11 99:16 103:3 105:11,21 109:8 110:23 111:5 113:23 114:15 118:14 128:17 129:13 132:10,12 133:23,23 135:11,12,21 135:23 136:3 136:7,12 139:5,8,15 139:17 140:1 141:14 143:6 143:7,8 149:6 152:10 154:10 155:11 156:14 157:16 159:6 159:20,20,23 160:1 161:23 166:6,7,9,10 166:17,18,20 170:5,15,21 170:21 171:1 173:22 175:17 179:18,22 181:9,22 182:1 186:5 187:3,21,23 192:10,16 195:17 201:6 201:21 202:18,20 211:21 212:18 215:7 216:7,7 218:14 221:10 226:22 227:10 228:20 230:19 231:7 231:8 233:4 233:5,10 242:14 250:8 255:5,13 257:7,10 258:15 261:5 261:7,12 263:13 266:3 266:13 267:13,20,22 280:9,15,17 280:23 283:17 284:2 284:5,7 291:18
commentary 94:3,4
commenter 114:14
comments 3:23 4:10 12:5 28:8 55:2 60:4 61:8,19 64:22 72:14 84:11,22 99:8 105:7 109:17,22 123:18 128:13,16 135:19 136:9 154:10 156:13 161:8 173:10,20 179:9 192:7 192:10,20 209:1 210:2 211:8 214:16 217:7,17 232:20 233:1 234:8 236:12 242:13 243:3 256:19 260:7 260:19 268:5 269:19 278:5 283:12 284:10 285:10
commission 125:5 127:2 196:20 246:15,18,21 294:15
committed 44:4
committee 3:8,11,13,16 3:20 4:2,6 6:13,21 8:3 8:4,9 10:3,5 10:6,11,13 10:21 12:16 13:4,6,18 14:5 15:1,3 15:4,7 16:6 16:13 17:2 23:1,10,22 24:2,7 27:17 29:11,12,15 33:1 34:9,16 34:21,22 37:11 39:5 39:23 41:7 41:17,20 42:6,7,10,11 43:8 44:19 44:23 46:19 46:21 48:6 50:20,20 54:4,17 55:6 55:7 57:8,18 60:15,18,21 61:1,6,10,15 64:17,23 65:11,12,16 65:19 66:6 69:7 70:11 72:17 73:13 73:21,22 74:2 79:5,13 83:19,20,21 84:1,4,9,13 84:14,18,19 88:21 92:11 92:22,23 93:4,6,9,11 93:12 94:23 97:8,9 102:21,23 103:4,12,13 103:17,19 104:22,23 106:16 108:6 108:8,8 110:8,9,11 110:12,13,21 111:2 112:20 112:22 113:7 113:8,10,11 113:15,21 114:8,14 119:15 121:15 124:4 124:12,17,22 128:15,18,23 129:2,5,7,11 129:13,17 132:7,9 134:22 135:5 135:7,7,22 135:23 136:1 136:3,7 138:14,19 140:13 141:21,23,23 142:17 143:5 148:5 156:20 158:9 161:11 162:1,8,10 162:14,15,19 164:4 167:23 168:5,11,14 169:19 170:6 173:7,19 174:1,8,15 174:20,21,22 175:16,21 177:14,19 180:6,23 181:7,14,16 181:21 182:2 182:16,17,19 183:19,20,21 186:6 189:10 192:5,15,22 193:22 194:6 194:16,18 195:10,12,13 196:14 210:4 210:10,11,14 210:19 211:4 211:5,8 212:19 214:8 214:10,12,16 216:13,17,18 216:19,20,23 217:5,9,13 217:14 219:5 220:23 221:12,14,16 221:18,23 222:5,10,14 222:15,18 223:11 224:22 228:3 232:13 233:16 234:2 234:5 235:21 236:16,21 237:4,16 242:8,11,12 243:4,13 244:8,15 245:5 246:4 246:5 251:18 251:18 258:3 259:16,18,19 259:21,23 260:4,9,13 260:14 262:23 264:20 265:8 265:15 266:1 266:3,14,19 268:13,15 271:23 272:5 273:17,20 274:5 275:2 278:4,7 283:17,21 284:2,3,6,18 285:8,14 286:23 287:8
committees 3:10 17:12 34:4 39:6 42:17 60:17 86:12 87:12 88:19 92:20 93:10 103:2 103:18 111:5 113:5 115:10 128:10 134:18 141:17 143:8 165:13 170:3 173:9,20 177:10 208:22 210:5 217:8 232:15 233:22 243:2 243:16 244:17 252:1 259:2,3
common 33:6 47:1,20 205:6,12 216:2
commonly 205:18,22
commonplace 206:18
communal 205:5
communicating 124:16 126:8
communications 18:17
communities 252:5
community 40:2 247:1,13
companies 5:16 68:10,19 71:5 270:18
company 13:3 37:21 42:5 58:4 68:1,3 70:2 97:4 184:13 267:20 268:10 278:12 280:14 287:7 289:13
compared 16:10
compartment 127:14,15 147:6 149:18 151:21 152:20,21,23 155:17 157:15
compartment... 157:11
compartment... 151:2
compartment... 156:3
compartment... 127:17,19 151:22
compartments 127:10 148:8,9 148:16,21 150:21 151:8 151:12 153:21
compelling 20:22
complacency 207:8
complaint 199:17
complete 241:11
completely 171:9,10,16 180:4
complex 205:2
compliance 93:21 183:17 248:7 249:5
compliant 127:8
complicated 40:4 251:17 269:19
complied 288:9
comply 63:5 71:14 180:11 185:21 186:2 226:6 272:4
complying 71:4 150:13 171:19
component 66:21
components 67:5
composite 68:23
composites 68:16 121:10
compounds 25:9,12
compress 66:23
compromise 10:14,15 23:23 38:21 40:1 50:21 156:1 156:4 196:23
compromised 155:3
computer 31:14
concealed 149:3
conceive 24:20,21
concentrate 269:8
concentration 5:2,7,16,23 6:6,14,16,20 7:2 8:14,15 9:20,23 10:18,23 11:10,12,23 13:22 14:1,3 14:5 15:18 16:2 18:6 19:19 20:5 21:5 22:1 23:12,17 24:15,18,19 26:6 29:4 32:21 38:4 39:7,9,11,14 39:16,21 46:3 52:21 53:5,18

54:15,19
concentrations 7:9 11:18 12:2 12:21 15:10 15:11 16:7,9 17:8 18:8,8 18:10 19:17 20:8,23 21:6 23:15 25:1 27:18 31:8 31:11,13 32:13,17 33:3,6,22 34:14,15 40:16 41:12 43:1,10,12 43:16,19 44:20 45:21 46:13,23 47:16 52:22 53:7 54:7 55:15,16 56:11,19 58:8
concept 102:6 154:15 192:14 253:18 254:9 254:14
concern 17:2 87:14 90:12 189:6 198:15 240:12 253:21 265:21 276:2
concerned 15:7 111:9 112:6 237:4 268:19
concerning 182:18 292:19
concerns 67:10 93:14 104:1 116:17 152:11 210:15 237:9 253:20
concert 205:11
conclude 60:12
concluded 162:16 168:12 233:8
concludes 293:9
conclusion 27:23 141:7 208:16
conclusions 36:3,8
conclusively 281:21
condition 31:17,20 101:2 281:7
conditioning 224:23
conditions 21:20 22:4 31:9,15 32:7 32:9,18 54:9 125:5 245:1 245:21 246:1
conduct 125:4
conducted 26:20
conducting 44:6 126:23
conductors 281:5 283:19 284:23
cone 185:15,21 186:3
conference 35:18
confined 145:13 270:15
confirm 105:17 136:22 212:21 292:5
confirming 44:10
confiscated 206:8
conflict 93:2 104:20 135:4 181:12 219:8,13 220:13,15,18 221:20 223:23 225:12,13,15 225:17 226:14,17 228:16 257:22
conflicting 263:16
conflicts 209:1 224:2 264:10
conforming 68:6
confused 69:22
confusion 93:23 116:18 127:7 137:2 189:7
congratulat... 14:18
conjecture 251:12
conjunction 206:3
connect 126:1
connecticut 60:20
consensus 9:14 10:6 20:13 29:13 54:18 243:17 265:10 266:6
consensusbased 197:2
consequences 110:17 248:21
consequently 283:3
consider 55:9 57:2 81:18 127:12 173:21 174:12 205:15 270:1 287:7
considerably 68:20
consideration 3:7 60:14 83:17 216:16 233:23 259:15
considerations 175:10,12
considered 37:10 78:3 117:19 126:13 127:3 153:2 162:15 168:11 174:21 175:6 212:9 281:9
considering 58:6 216:7 269:18
consisted 196:19 245:17 285:13
consistency 243:1
consistent 42:19 86:15 88:21 89:1 151:14 173:10 193:7 242:22 250:3
consistently 235:15 249:23
consisting 4:3 61:11 84:15 217:10 260:10
consists 4:6 61:15 260:13,15
constitute 205:19
constituted 200:21
constitutes 127:7
constructed 249:17
construction 2:4 60:16 61:6 68:23 69:8 111:2 113:17 115:21,22 116:21 119:7 120:7,23 125:1 161:9 161:10 189:21 208:4 208:8,19 217:11 222:1 222:4 228:3 230:5,6,11 240:18 246:9
constructive 268:16
consultant 19:13 116:12 124:2 145:5
consultants 99:22
consulting 89:13 137:6 149:23 165:11 170:1 177:8 187:19 200:2 231:1
consumer 231:3
consumption 32:2
contact 285:17,20
contain 138:12 150:11 271:9 294:6
contained 3:16 33:22 60:23 84:3 148:13,14 180:21 216:23 259:23
container 186:16,17,18 186:21
containers 182:5,7,10,11 184:12 185:14 186:2 186:11
containing 31:18 53:8
contains 263:8
contaminating 148:22
contemplated 262:1
content 110:22 271:12 271:13 272:3 273:22 274:6 274:15,23 276:3,4 278:4,6,6,16 279:6
contention 20:12
contents 110:12,15 111:5 113:11 119:15,15 180:13 273:4
context 200:14 234:8
continue 68:11,15 142:18 190:13 191:13 198:20 207:15 225:1 292:2
continuing 241:4 272:23
contract 155:23
contracting 154:5
contractor 35:14
contravention 120:17,19
contributed 41:4
control 77:21 157:15 188:15,18 189:23 201:1
controls 127:19 221:5
convenience 100:9 101:4,13 102:10,17 124:14 126:14 127:4 128:8,20 129:9,15,18 129:23 130:5 130:11,12,14
convenient 127:8
conveniently 78:14
convention 1:5 3:2 294:9
conversation 172:6,11
convoluted 47:22
cooking 134:8 135:17 137:12,13 205:4,20
cooling 96:15
cooperative 35:11 197:6
coordinator 246:19
copious 206:14
copy 201:10 221:2 224:18 244:18
copyrighted 271:19
corporation 4:18 25:23 45:8 52:4
correct 25:23 45:12 47:5 64:19 88:15 136:23 142:4 222:5 236:11 255:11 269:7 274:23 294:6
corrected 109:3
correction 236:6
correctional 173:23 193:5,8 193:11
correctly 14:6 43:17 44:3 130:5
correlate 103:1
correlates 284:4
correlating 74:2 83:18,21 84:9,14,18 88:21 102:23 113:6 132:8 135:7 141:23 173:9 192:22 216:17,19 217:4,9,13 221:18 260:14
correlation 103:5,9,11 113:8 173:11 173:15 192:18,23 193:19 210:2
corridor 100:17,19 101:7,11,12 102:13 133:6 133:8,11,13 135:18 147:5 147:11 152:20
corridors 125:19,23 126:2,15,17 126:18 138:10 203:23
cost 37:5 240:21
costly 240:17
cote 259:7
council 83:7 89:14 164:11 199:18 219:12 221:1 221:2,3,8 223:1,7,16 224:16,21 225:18 231:16 244:7 251:1 292:21 293:3
councils 70:12
count 292:7
counted 292:6
counting 292:8
countries 270:19 273:9 291:4
country 160:8 208:3 248:2,4
couple 22:12 80:16 85:6 186:4 218:19 243:22 244:21 275:20 290:3
course 152:16,17 153:1 161:2 180:17 273:23 274:1 274:2
cover 73:8,9
covered 19:3 115:11 220:6 232:4
covers 80:3 111:4,6
create 67:1 103:9 116:18 117:12 134:10 190:5 228:16 249:2
created 29:3 54:6 133:17 165:21 205:8
creates 7:10 14:7 93:23 154:20
creating 140:14 219:7 220:18 277:15
credentials 270:1
credibility 268:20 270:23 271:4
credible 14:11
credit 92:3
crib 26:11
crimi 89:12,13,19,20
criteria 31:12 33:4 38:13,16 40:4,5 41:5 41:7 45:1 46:9,22 56:4 56:16 80:3 190:21 193:12 232:1 275:1
critical 20:9 22:8
criticized 250:16
crossing 271:11
crosssectional 31:22
crux 220:5
cubic 219:21,22
culminating 35:12
cultural 138:9
culture 132:23
cup 14:4 16:2 19:18 24:23 25:5,16
current 4:19 12:17,20 17:7 18:22 20:8 26:6 28:9 33:16 33:20 34:13 35:2 55:21 57:3 79:21 103:23 163:2 168:20 175:3 182:5 210:15 210:16,20 240:5 242:7 263:4
currently 40:18 44:6 45:22 71:23 129:15 150:3 191:17 202:10 203:12 229:4 276:8
curtain 96:14
curtains

96:11
cut 80:9
cutter 158:19,19
cycle 3:14 4:1 34:23 35:2,3 37:10 44:19 60:22 61:9 84:2,12 157:3 165:1 216:21 217:7 223:12 260:8 269:15 283:13
cycles 34:10 94:16 186:4

D

daily 207:22
dallas 104:6 130:23 148:4 155:16
damage 17:19
dampers 149:5
dan 253:15
dance 205:11
danger 205:19
dangerous 205:21
daniel 187:18,19,19 188:4,6
darndest 251:8
data 13:14 14:11 15:20 16:10 18:5,6 20:11 23:13 27:11 27:18 32:10 35:21 36:19 38:7,9,20 39:11 42:22 42:23 43:2,8 43:9,10,11 43:13,18,21 44:2,11,20 45:3,12 46:4 47:20 49:9 56:15,21 57:3 58:9,11 58:19,20,22 59:3,12,16 59:18
date 13:20 38:10 242:21
dated 232:12 278:22
dates 271:10 279:4
dave 261:2
david 18:16 69:16 128:22 129:3 134:23 136:9 162:7,13 167:22 168:3 173:18 174:14,18 181:13,19 192:7 193:21 194:5 202:9 243:20 259:19 266:5
day 74:14 82:14 106:14 275:23 276:10
days 9:2 290:3
de 95:12,20 96:2
deadbolt 197:13,14
deal 5:1 6:13 133:20 148:20 172:2 204:12 209:13 255:9 275:23
dealing 63:21 154:6 180:4,5 204:14 213:12,20 222:7 233:6
deals 167:5 173:23
dealt 151:18 211:12 254:4,7
debatable 123:11 291:14
debate 41:4 89:4 104:3 108:16 114:11 130:18 136:11 164:7 176:1 182:22 195:16 210:23 215:6 228:11 237:19 258:11 266:23 286:7
debating 216:6
decade 235:4 249:9
decades 195:21 247:17 249:21
decent 247:16
decide 171:23 178:21 225:22
decided 92:7 171:22 189:10 213:3 269:8
decides 178:19
deciding 261:21
decision 219:12 221:1,2 221:3,9 223:1 224:16 224:18,22 225:19
decisions 223:17 264:17 265:1
declare 293:13
declared 146:20
decomposition 17:23
decoration 172:6,11 178:8 178:10,14
decorations 171:11 175:4,5
decoupled 14:6
decrease 191:19
decreased 283:10
deenergize 283:6
default 181:1 264:15
defeat 68:18
defend 145:16
defense 144:7
defer 103:11 113:9 167:22 221:15,22 225:9 228:1 236:15 258:2
deficiency 276:6
define 178:19 209:9 273:4
defined 38:13 174:4 177:20 178:17 209:18,20 210:1 282:21
definitely 50:1 57:20 113:19 190:20
definition 62:11 63:18 64:9 65:20 67:3,9,14,15 75:20 76:8 77:3,7,10,15 80:17,20,21 80:22,23 86:15 88:22 90:4,14,21 118:1 119:22 189:8 204:8 256:3 263:6 263:18 274:17 283:1
definitions 64:12 86:21 88:23 287:13
definitive 47:16
degree 127:16 137:20 152:8 268:10
delayed 188:15 232:8 232:10 233:7 233:11
delete 124:12,20 154:11
deleted 129:19 140:7
deleting 180:22
deletion 70:21
deliberations 37:11 232:16
delineated 191:5 237:10
demand 203:10
demanding 247:7,12
demonstrated 128:6 226:16 274:18
densities 57:2
department 126:22 129:4 132:5 134:6 134:21 135:1 139:13 141:20,21 151:17 156:17 162:13 168:4 174:19 181:20 194:5 201:14 206:3 232:4
departments 201:13
depends 29:6
depleting 16:5
depression 248:21
derived 52:18
describe 276:5
described 23:10 250:7 276:10
description 271:9,16 273:8 273:21 274:2 274:8,20 277:8,23 279:4
deserves 155:6
design 5:2,7 6:6,20 7:2 8:15 10:17 11:10 11:18 12:1 12:21 13:22 14:3 15:10 15:17 16:9 18:8 19:16 20:5,8,22 21:4,6 23:11 23:14 26:5 31:7,11,13 32:20 33:2,6 33:21 38:3 42:13,23 43:12 44:4 44:20 45:1,2 46:3,23 52:21 53:7 53:18 54:14 54:18 55:15 55:16 100:10 127:22 130:6 156:6 238:2 238:5 240:5 240:12 241:23 242:5 248:12,13,13 250:6
designate 262:20
designated 31:4 179:14 181:4 202:12 218:4,8 231:6,21 261:3 262:8 263:15 265:5
designed 28:15 129:23 130:5
designers 130:3 154:4
desks 125:9
destruction 182:9
detailed 253:18
detect 162:21 168:16 209:8
detected 133:9
detection 133:9 198:10 198:12,13
detector 135:16 138:23 139:1,3 163:7 169:2 189:22
detectors 134:1,2,9,15 136:5 137:20 138:12,18,20 161:5,6
detention 173:23 193:5,8 193:10
determination 90:1 174:6
determine 6:16 11:22 31:15 54:14 96:7 172:18 274:12,13 277:9
determined 53:10 90:4 172:16 178:11 281:21 292:13
determining 11:18
develop 33:1 68:20 75:15 81:16 152:1
developed 6:16 9:19 10:13,18 15:6 101:2 229:12,15
developer 208:17
developers 208:12
developing 16:15
development 32:20 42:4 71:6 174:11 232:5
develops 148:12
device 96:10 188:16
devices 30:3 51:10 82:16 95:16 131:15 159:9
devoted 269:14
dhabi 289:6,12
diameter 31:19 46:7
diane 259:11
dick 254:19 273:2
didnt 17:18 48:15 75:16 107:4 107:10,11 108:21 196:3 219:17
difference 16:18,21 17:21 23:19,20 25:13 36:11 50:13 67:6 86:4 114:17 122:22 123:5 180:18 185:9 185:13,22
differences 17:11 20:1 255:21
different 6:6,10,11 7:9 7:10 8:22 17:6 21:2 38:14 54:17 63:17 72:14 73:12 85:13 91:19 95:2 117:9,10 145:22 146:6 171:9,10 173:14,14 180:4 194:17 194:18 211:11,16,17 213:4 228:15 256:12 273:11
differentiate 263:16
differently 7:7
difficult 56:2,3 175:1 264:9
difficulties 240:2 269:7 285:4
difficulty 91:8 241:5,13
diluted 282:3
diluting 283:8
dilution 268:22
dimensions 249:2
dinenno 14:20,21 18:3 23:18,21 39:2,2 59:7 59:7
dini 259:19 260:3 265:23 266:2 266:22 271:21,22 284:14,15 293:6,7
dioxide 23:7
direct 71:13
direction 57:21 79:6 147:8 242:17 249:16 253:22
directions 147:11
directive 278:18,21
directly 140:11 154:19 221:16 224:3 228:2 255:4 258:2 292:21
director 237:23 246:17
directs 233:3
disabilities 238:8 239:8,14 246:15,18,23 247:6,12,18 247:22 248:10,18 249:8,10
disability 243:13 247:10 248:3 250:1
disagree 26:22 234:14 289:18
disallow 128:3
disapprove 246:10
disapproved 246:5
discharge 22:6 53:10
discharged 154:19
discuss 89:19 158:2 268:3
discussed 10:3 29:16 53:14 85:9 86:9 168:8

183:5 257:16
discusses 111:6
discussing 114:17,18
discussion 4:14 64:8 83:1 87:20 88:13 100:6 104:11 109:2 110:3 117:4,8 131:5 132:15 139:5,21 160:5 166:6 167:1 169:15 169:21 170:8 171:5 177:12 180:2 186:22 188:5 201:19 203:1 211:19 215:11 216:5 216:10 217:21 218:18 223:14 227:15 228:18 229:21 230:14 237:14 243:2 245:14 250:10 255:20 256:6 256:17 257:14 260:23 261:11 267:12 273:1 275:5 278:9 279:8 280:8 280:20 287:5 288:1,22 290:8,21
discussions 201:6
disposal 183:10
disprove 91:12
disservice 199:15 201:3
distance 145:23 146:2 146:13
distinction 111:8
distinguishing 15:13
distribution 225:2 235:20
distributors 40:9
division 289:17
dms 196:20
dobson 116:11,12
docket 51:22
doctor 36:4,7 55:17 56:8 64:18 85:11,23 165:4 181:4 213:8 255:22
doctors 241:9
document 8:12 28:13 57:9 58:18 60:13 62:15 83:1,6 106:18 197:3 209:4 210:16 210:21 216:10 236:14 237:5 237:8,11,16 237:17 243:12 263:4 263:7 265:9 266:6 270:22 292:20
documentation 222:16 226:13 271:7,9 274:3,11
documented 27:19
documents 13:18 40:6 62:16 83:9 83:11,13 110:11,14 219:11 268:20
doe 264:6
doesnt 15:12 25:13 29:5 49:5 77:4,15 78:7 115:17 119:12 153:23 158:11 161:4 161:17 164:13 173:1 173:4 178:20 215:20 220:14 221:6 226:1,11 250:17 283:6
doing 44:5 58:23 73:16,17 74:15 76:7,8 180:23 197:18 199:15 201:15 227:4 228:15 289:13,21
dollars 68:10
dominant 6:2
dont 22:10 24:12 26:9 35:1 36:20 41:6 46:5,7,9 48:7,9 56:5 58:23 62:18 62:18 64:4 67:13 73:16 78:2,20 80:12 91:6 97:2,4 98:13 98:14 112:4 115:11 119:3 134:10 144:9 144:20 149:15 154:3 156:10 158:12 160:12 171:22 172:8 172:20 177:23 185:1 185:2 198:13 198:21 199:2 200:11 205:2 212:17 216:1 216:2 225:12 225:22 241:12 273:12 275:13 276:14,23 277:6 288:13 290:6,19
door 21:22 125:21 125:22 146:2 147:7,13 157:4 188:14 193:17 194:13,21 195:7 207:19 241:6
doorlocking 195:13
doors 26:15 90:19 101:7 125:7 126:2,12 147:2 193:4 194:9,23 195:8 199:8 201:16 240:6 240:23
dormitory 207:20
dorms 207:12
double 49:4 125:20 126:2 127:13 147:4,13 203:23 204:21
doubles 204:22
doublewide 125:13
doubling 239:22
doubt 12:17
dr 24:5 28:21 29:2 35:15 48:5,9,11 57:17 62:2,9 75:6 80:14 83:6,10 85:2 85:18,21 86:2,11,22 87:3,6,19 88:7,11,14 88:18 89:3 89:17 92:19 93:7 94:17 96:22 99:7 99:19 100:1 100:5 102:19 103:15 104:2 104:10 105:1 105:13,16 106:2 108:4 108:15 109:1 109:19 110:2 113:2,12 114:10,12 116:9 117:15 120:12,14 122:5,9,12 122:14,18,21 123:7,11 124:5,9 127:20 128:7 128:9 130:17 131:4 132:11 132:14 134:17 136:10,21 137:3,23 138:16 139:4 139:16,20 141:16 143:10 145:3 147:15 148:1 149:20 151:16 153:6 155:12 156:11,15 157:18,23 158:18,22 159:18,22 160:4,6 161:21 162:11 164:6 164:10 165:4 165:6,8 166:5,15,19 166:23 167:2 167:21 168:2 169:21 170:7 170:10,19,23 171:4,7 173:6 174:17 175:23 176:7 176:11 177:5 177:11,13,15 177:16 178:22 179:4 179:13,19 180:1,3 181:3,17 182:21 184:1 184:7 185:6 185:7,10,11 186:12,22 187:15,22 188:3 192:3 194:2 195:15 199:22 200:8 201:5,18 202:19,23 208:9,21 210:6,22 211:6,19 212:13,20,23 213:2,8,10 214:7 215:5 215:13 216:4 216:15 217:20 218:7 218:15,17 221:13 222:2 222:19,20 223:19 224:12 226:19 227:11,14,23 228:4,10,12 228:18 229:1 229:20,22 230:1,2,14 231:11 236:6 236:18 237:18 242:2 243:19 244:1 244:4 246:11 250:9 253:13 254:18,22 255:11,14,16 255:23 256:4 256:6,16,23 257:2,5,9,13 257:15 258:1 258:5,11,23 259:14 260:22 261:6 261:10 265:23 266:22 267:11,21 268:2,7 271:21 272:13,23 273:14 275:4 275:10 277:19 278:9 279:7,13 280:7,16,19 282:13 284:14 286:6 286:18 287:4 287:20 288:1 288:21 289:3 289:14 291:10,11,14 291:23 292:4 293:9
draconian 39:20
draft 209:4
drafts 245:15
dramatic 196:1
drawn 36:3
drill 199:8
drills 211:12
drinking 241:14
drop 9:11
dropping 15:11
drugs 207:3
dubai 289:6,12
duct 149:5 157:9,9
ducts 225:3
due 12:12 42:9 70:14,15 282:8 292:17
duluth 3:12
duly 261:3
dump 152:7
dupont 19:14
duration 111:22
dwelling 232:3 238:12 245:18,18 246:6
dwellings 238:23

E

e119 90:6 95:17 96:9
e1354 185:15
e2678 121:17
e5 121:15
e84 63:6 66:16 67:2 71:7 112:1,1 115:4,5,20 116:6,6 118:18 119:18 121:20
earlier 43:6 56:6 117:4 192:17 224:21 257:16
early 16:8 232:21
easier 273:8
easily 24:20 107:18 149:4,6,7,7 180:12
easy 49:13 209:5
echo 59:9
economically 208:18
edge 138:5
edition 4:19 14:15 38:2 188:12 189:8,20 194:12 196:17 197:5 201:10 231:22 243:9 257:20 270:7
editions 97:21 142:12 189:20
editorial 88:16
editorially 236:9
edp 36:18
educational 106:14 202:16 204:3,15 275:22
effect 10:1 18:10 56:14 95:23 99:1 110:15 156:4 160:19 181:23 195:4 228:14 231:15 252:9 267:8 272:20 273:9 275:15 282:8 286:15
effective 33:18 37:5 191:21 262:6
effectively 41:3 55:14 234:11
effectiveness 282:1
effects 166:4 287:10
effort 6:13 35:11 68:15 189:6 197:6 209:6
efforts 68:19 293:6
efma 202:17
efmas 203:3
egress 100:23 101:20 125:21 130:13 145:9 147:4,7,10 154:18,20 188:14,15 193:5 194:9 200:19 203:23 208:6 209:21
either 19:17 30:6 51:12 90:16 107:15 131:16 133:8 159:12 178:13 202:4 220:16 222:7 239:17 240:7 262:17
elaborate 205:14
eleanor 231:7
electric 32:5 225:8 260:15 287:17,18
electrical 2:18 33:14 40:19 41:9 42:16 47:17 53:8 56:7,14 59:21 149:3 149:8 177:3 221:4 223:3 259:17 260:5 260:11 261:18 264:20 265:6 267:3,5,8 268:9,13,18 268:23 272:16,17,20 273:3,16 277:2,12 278:8 279:1 280:22 281:5 281:10,14,19

282:2,23 283:5,19 284:23 286:2 286:10,12,15 287:1,14
electrically 45:14 59:19 281:6
electricians 276:13
electricity 277:13
electronic 30:2 35:21 36:18 51:9 82:16 131:10 131:14 159:8 159:9
elements 90:2,4,18,22
elevating 283:1
elevation 245:1
elevations 245:7
elevator 125:17
elevators 125:12 246:2
eleven 126:20
eliminate 54:10 65:6 72:18,20 74:8 163:10 169:6 249:1 257:22
eliminated 258:8
eliminating 72:15 73:23 145:1
elimination 268:23
elkridge 83:22
elvove 153:9,9
embers 206:12
embodied 17:8
embraced 248:11
emerged 247:11
emergencies 204:12 207:7
emergency 110:18 201:13 207:9 249:12
emission 160:10 168:23
emphasis 204:18
emphasize 85:12 97:7 98:22 196:18
employed 20:4 135:1 202:10
employee 104:16
employees 204:11 271:10 279:3 285:19 285:21 291:5 291:6
employer 262:18 265:5 265:12 266:8 274:15 291:3
employers 261:16 265:11 266:7
employment 247:8
empty 46:5
enable 47:14 96:5
enclosed 101:18 208:5
enclosure 21:21 26:15 102:15
encompassed 200:23 201:1
encountered 200:20 204:13
encourage 86:19 97:11 98:5 235:5 238:10 241:20
ended 198:12
ends 7:9 204:1
energized 13:10 33:13 40:19 41:9 42:15,20 47:17 53:8 268:23 280:22 281:5 281:9,14,18 282:2 283:5 283:19 284:23 286:1 287:14,16,17 287:18
energy 32:17 36:9,11 36:12,13,22 39:12 47:5 50:12 55:20 56:20 57:2 267:19 268:10 278:12 280:14 287:6
energyaugme... 55:18
enforce 40:5 56:3 175:2 264:9 264:14
enforceable 33:3
enforced 146:22 173:2
enforcement 32:7 112:6 261:14,20 262:8,10,14 263:3 264:12 265:13,17 266:9,16
enforcing 40:12 263:20
engage 207:5
engagement 131:12 270:3
engine 139:2
engineer 42:4 177:3 199:11 275:18,19
engineered 37:17 68:16,22 100:12
engineering 151:10 268:9
engineers 149:23
engines 139:1
enhance 238:3
enjoy 292:11
ensure 68:7 247:16 249:6
ensured 242:19
ensuring 70:13
enter 117:8
entered 101:22
entire 35:9 77:11 115:3,6 140:13,15 148:19,19,23 151:9 156:3 269:10
entirely 95:2 250:3
entities 261:17
entity 153:16 262:18 264:15 265:12,19 266:8,17
entrance 125:7 236:4 241:1 249:18
entrances 240:6
entry 270:15
enumerate 31:12
environment 207:8
environmental 219:19
environments 35:22
envision 49:13
equal 29:3 32:3 34:15 55:15 97:19,22 247:7,12
equals 47:10
equate 158:5
equated 97:22 99:4
equating 97:16
equipment 22:9 32:3,6 33:8 40:8 42:16,20 47:3,17,18 49:8,10,12 49:18 50:4 56:7,15 156:22,23 263:22 269:3 285:18
equivalencies 94:14
equivalency 94:2,6 95:15 96:8
equivalent 91:16 262:5
eradicate 128:5
eric 93:3,8 97:6 98:6 103:11 103:16 104:21
errata 136:15
erroneous 221:7
error 105:17
escape 152:8,16
especially 67:11 184:10 270:2 293:11
essentially 8:6 10:14 23:19 54:5 54:17 55:23 95:20 127:13 150:14 151:21 188:9 188:13,17 222:5 227:4 227:17 228:6 242:14
establish 203:3 247:3
established 35:20 194:18 195:12
establishing 35:8 262:5
estimates 239:21
etcetera 17:6 20:3 271:15 274:16 281:23
eugene 99:21 124:1
europe 40:11
evacuate 152:22 153:4
evacuating 152:13
evacuation 152:6 153:1 249:18
evaluate 274:21 275:1 286:2
evaluated 10:4
evaluating 102:1 146:7 174:13
evaluation 95:14,22 102:1
event 153:3
events 19:2,4
eventually 252:18
everitt 179:15 180:8 181:5 185:8 186:8
everitts 185:1
everybody 28:22 81:19 184:11
everyones 100:23
evidence 13:17 20:22 21:8 63:8 79:23 162:22 165:20 168:17
exact 70:20 86:8 212:16 228:14 256:2
exactly 14:5 121:18 251:21
exaggerated 17:14
exam 151:5
example 20:2 25:9 47:3 47:6 66:10 66:19 68:13 81:19 96:11 127:5 145:20 145:23 146:7 150:16 190:23 214:21 252:19 289:7
examples 219:20
exceed 115:10 182:10
exceeded 110:9 112:20
exceeding 54:13 144:20
excellence 238:4
excellent 43:10 57:7,7
exception 23:16 95:12,20 96:2 150:20 151:7 156:21 160:23 167:4 171:13 174:1 174:8 186:10 213:11 245:10 269:1
exceptions 150:8,9 244:21 245:6,11,19
excluded 70:21
exclusion 161:7 248:19
excuse 87:3,4 122:14 185:11 196:12 227:22 229:1
executive 246:17
exempted 163:5 168:23
exemption 163:20 169:16 250:23
exercise 261:17 262:11
exhibit 175:7
exhibition 1:5
exist 31:10,16 92:5 154:5 173:5 264:10
existing 38:1 67:16 71:1 118:19 125:1 142:8 142:9 161:9 163:4 168:22 188:11 189:21 190:4 190:8 191:10 191:11,12,16 191:23 198:4 198:16,17,21 199:19,21 203:5 230:3 282:7
exists 27:21 101:12 140:21 154:21 283:23 285:23
exit 125:22 126:18 146:15 150:15 154:15,16,17 155:2,4 205:3 211:12
exiting 152:16
exits 100:21 101:22 145:23
expand 163:20 169:15 175:3 182:2 238:3 239:14
expanded 116:21 164:2
expanding 199:16
expect 18:9 50:5 59:15 273:11
expectation 92:4
expected 56:20 249:20
expedite 85:15
expeditious 88:5
expeditiously 83:14 85:4
expended 269:14
expending 68:9
expense 100:12
expensive 240:8
experience 20:16,18 32:11 201:1 205:16 207:11 238:4
experienced 234:1
experiment 207:3
expertise 162:6
experts 20:14 44:10 126:23
expires 294:15
explain 45:10 52:14 93:6
explained 226:15
explains 172:22
explanation 111:9 112:5 282:12 283:13
exposed 101:1 130:14 224:5,7 228:8 229:11 230:9 281:16 284:23
exposes 101:10
exposing 101:9 184:19
expressed 90:12
extend 119:19 142:13
extended 63:6 71:7 74:22 115:5
extensive 37:2 195:2
extensively 270:19
extent 25:13
exterior 152:17
external 55:19
externally 39:12
extinguish 12:15 13:15 17:4,7,12,16 17:19 20:18 26:20 33:14 36:10
extinguished

5:3 19:5 28:10 53:4
extinguishing 2:2 3:9,21 4:4 5:16 8:14 9:19,23 10:22 11:12 11:22 12:3 14:1,4 15:9 17:7,11 19:19 32:16 39:9,11 52:22
extinguishment 12:4,13 19:2 38:10 42:15 43:8 59:18
extinguishm... 12:12 13:19 23:16 26:5 27:11,19 33:13
extra 22:1 275:15
extract 219:7
extracted 64:12 186:7 218:21
extraneous 269:4
extraordina... 94:23
extrapolate 222:8,10
extreme 83:6
extremely 288:11

F

face 248:18 290:12
faced 190:11
facilities 33:8 43:22 47:21 56:22 135:17 138:9 148:20 161:12 166:2 188:11 190:8 190:17 191:12,12,16 191:23 198:16 200:16 202:16 203:5 203:10,19 204:10,23 205:4,6,12 205:19 231:21 247:22 248:14 283:4 288:17
facility 36:19 151:22 165:11 170:1 177:8 184:12 191:10 199:4 199:4 203:12 204:7 208:15 275:7,8 289:16
fact 12:8 16:8 20:5 21:19 32:12 38:9 55:18 55:20 64:19 66:2 77:9 88:23 90:13 91:12,12,18 96:8,12 97:9 97:15,16 98:1 99:5 141:9 158:8 160:15 161:15 164:14,20 197:21 276:1 289:19
facto 95:12,20 96:2
factor 8:13,19,22 9:2 9:7,13,17 10:1,7,12 13:16 16:10 39:8 42:14 49:6 52:22 53:5 54:6,19
factors 15:23 21:19,19 28:8 203:9
factory 111:17 115:2 118:21,23 119:2 120:4 121:3
factoryapplied 117:3 119:9
fail 98:18,19
failed 20:20 49:11 92:12
failing 49:18 50:4
fails 30:13 104:15 123:22 131:23 159:16 166:13 170:17 179:11 187:6 201:22 211:23 216:9 227:1 230:21 255:7 267:15 280:11 291:20 292:18
failure 9:11 17:12,15 20:18 22:5,7 98:17 144:8 144:14
failures 12:12,12,14 13:15 33:14 38:11 144:10
fair 232:5 238:7 247:19 249:5
fairly 11:1 29:13 125:17 235:15
fairness 70:14,16
faith 46:22
fall 3:14,23 55:2
falls 140:23 241:4
false 42:16,20 43:3 137:10 207:12
familiar 101:23 237:15
familiarity 203:17 204:6
family 232:3 239:8 241:8 254:6
fantastic 259:7
far 46:2 49:16 65:3 73:21 97:10 114:3 120:1 158:6 265:9 288:20
farreaching 284:12 285:4
fashion 87:13
fast 34:6
fatalities 207:21
favor 12:19 29:22 30:6 33:20 46:19 51:6 51:12 55:8 57:12,23 59:8 60:10 70:10 77:9 82:6,12,18 88:1 89:8 96:21 99:11 104:14 109:9 123:13,20 131:8,17 137:7 138:15 139:8 153:11 159:2,6,13 165:6,12 166:11 170:2 170:12,16 177:9 179:6 179:10 187:4 200:3 201:21 211:22 216:8 226:23 230:20 242:5 246:16 247:3 252:15 255:1 255:6 256:20 258:15 266:11 267:14 272:6 273:3 278:12 280:10 287:21,22 288:4 289:2 291:15,19
fe25 28:15
fear 264:23 265:3
feature 193:3
features 92:22 93:4,9 103:13,17 104:22 232:2 240:18
february 35:18 232:13
fed 34:21
federal 153:16 167:7 238:7 247:19 249:5 262:10 264:7 275:8
feel 19:7 137:9 203:9 269:9
feeling 254:12
feelings 253:21
feels 129:23
feet 63:9 119:21 144:21 146:1 146:17 207:18 219:21,22 287:12,15
fellow 268:11,11
felt 94:3 103:22 114:2 142:18 182:16
fide 128:4
fiduciary 204:16
field 20:12,16,17 21:8 22:3 23:13 26:5 32:7,10 53:4 95:21 118:17 118:19 119:1 120:18 278:20
fifteen 18:10
figure 49:19 172:3 239:22
fike 4:18 25:22 28:7 45:8 52:4
filled 17:22 31:21 140:14 207:22 208:7
final 22:15,17 60:4 82:15 83:8 83:13 93:17 99:7 232:16 233:3,8 243:12
finally 21:1 25:4
find 28:17 37:4 40:1 50:21 167:9 191:1 209:12 211:10 215:14 245:11 283:6 291:8
fine 22:21 165:8 210:17 220:20
finish 111:23
finished 119:9
finishes 111:4 113:14 113:21
finishing 128:9
finnegan 253:14,15
fire 2:2 3:9,21 4:4 5:9 6:9,17 7:16 11:6,7 11:11,14 12:11,22 13:11 14:3 16:23 18:3 18:18 19:2,4 19:18,23 20:2,6,19 22:6 23:21 24:13 28:16 29:6 30:18 30:19 32:14 32:19,21 33:12 34:18 35:6,11 37:19,22 40:8 41:9,15 41:15 42:4 42:22 43:2,6 48:18 49:5 53:2 56:9,14 61:12,13 62:13 64:1 65:20 66:8 66:10,14 68:1,4,11,16 68:22 69:19 71:13,14,15 73:6 74:20 75:1,21 76:1 76:22,22 77:13 81:2 90:1,3,8,10 90:14,21,23 91:10,19 92:5,22 93:4 93:9 95:18 96:8,15 98:10 99:5 101:2,20 102:1 103:12 103:17 104:22 110:16 111:18 114:19,20 115:14,16,17 116:12,16,20 117:3,7,21 118:1,3,7 119:5,9,22 121:5,7,7,22 121:23 122:8 122:13,22 123:1,6 132:9 134:6 137:11 139:1 139:2 144:14 144:20 145:12,18 148:12 149:5 150:13 154:12,22,23 162:21 164:11 168:16 172:15,18 174:2,3,7,11 175:8,9,12 175:14,18 178:17 180:9 180:14 186:20 206:3 206:5,11 207:18 208:6 210:8 215:15 219:2,6 220:9 222:12 222:16 224:4 224:7 226:5 228:7 229:13 236:20 254:1 257:17
fireproof 176:18,21
fireretardant 66:21 68:13
fires 5:12 8:16 10:13 12:15 13:15 17:4,4 19:5 20:2 23:12 24:21 24:22 26:16 26:18 28:10 28:22 29:3,4 29:5 35:12 40:19 45:11 45:14,22 49:20 50:22 53:3 55:18 55:19 144:17 162:23 165:21 168:18 206:22 207:6 207:20
firestop 89:14 145:19
firetect 70:8 80:7 256:10
first 4:15 13:13 15:22 18:10 19:21 25:23 52:9 55:12 80:17 85:8 97:5 104:5 126:17 138:14 143:18 149:18 152:19 156:19 173:17 183:4 190:20 192:9 195:21 197:23 198:1 199:6 203:11 209:3 213:12 224:15 227:7 235:19 245:4 248:7 250:15 255:10 270:13 293:5
firsttime 125:3
fit 40:1 48:19 190:21 241:1
five 30:12 31:9 32:3,5 51:19 82:22 131:21 150:8,9 159:15 187:8 187:10,11 192:2
fix 25:2 196:15 251:2
fixed 105:22 107:18 251:1 287:16 287:16
flame 36:9 63:7,8 70:8 77:10 77:21 79:21 88:8 119:17 119:20 122:8 122:13,23,23 123:6 171:12 171:15,19 172:1,4,13 173:1,4,13 174:2 175:4 175:10 177:20,21 178:3,6,7,15 185:19,19 229:11,14
flameproof 176:19,20,22
flameretardant 176:12,16
flames 184:21 206:13
flammability 48:18
flammable 5:8
flash 269:2 281:16 281:21 282:16 284:21,22 286:1
flexibility 262:19 263:15
flipped 290:14
flood 245:1,7,20 250:19,22
flooding 24:17
floor 4:21 10:20 15:17 21:23 23:11 30:8 31:2 51:15 52:11,12,16 60:7 62:6 65:16 67:18 67:23 81:21 82:1,20 85:22 88:1 88:12 89:7 89:16,18 99:10 100:2 100:4,15

101:1,2,21 101:22 102:14 104:13 106:1 109:6,20 110:1 116:13 123:17 124:6 124:8 125:15 125:16,23 126:1,11,16 126:17 130:15 131:3 131:19 132:11,13 135:8 139:7 139:17,19 140:8,14,16 140:18,18,20 141:4,8,8,9 141:11,11,12 141:13 142:22 143:23 145:11,12,18 148:10,12,14 148:17,19,20 148:21 149:1 149:2,14,15 150:16 151:6 151:7,10,11 151:22 152:2 152:7,11,14 152:14,22 153:16 154:13,18,22 156:23 158:5 158:11,17,21 159:5,23 160:3 163:10 163:19 166:9 166:20,22 169:6,15 170:9 171:1 171:3 179:2 179:3,8,20 179:23 187:1 187:23 188:2 195:4 199:7 200:4 201:19 201:20 202:20,22 205:2 211:21 213:7 215:6 218:16 226:21 227:13 230:17 231:10,11 233:19 234:12 254:21 255:5 255:15 257:10,12 258:14 261:9 267:9,13,22 268:1 272:21 280:9,16,18 286:16 291:13,21 292:1

floors 101:10,17 127:14,16 140:6,6,10 140:12 149:10 153:4 155:3 158:10

flow 224:5,8 229:11 230:9

fluid 241:14

fluoride 18:1

flux 32:17 36:12,13 36:22 43:9 43:15,18,21 44:3,8,13,16 47:5 49:6,22 50:5 55:20 56:10,20

fluxes 49:14

flyer 28:14 274:1

fm 11:19 26:6 180:7,19 182:12,15 184:18 185:20

focus 36:18

focused 36:18

folks 291:1,2

follow 8:11 45:17 53:13 124:11

followed 70:13

following 13:9 24:9 39:4 42:10 44:5 85:4 150:7 219:20 247:5 269:6,11 279:22

follows 11:18 106:8 261:14 263:5

followup 47:12 48:1 51:23 52:15 53:20 54:2 54:22 60:2 210:13

font 119:20

food 205:5

foot 125:4 146:12

forbidden 250:17

force 143:17 240:7 287:9

forced 66:13 147:7 153:20 154:3 264:17

forefront 291:8

foregoing 292:23 294:5

foreign 273:10

forget 171:9

forgetting 78:14

forgot 138:15 165:7 199:12

form 29:21 30:9,21 51:4,16 53:22 90:16 105:5,10,21 109:7,16,21 123:17 157:7 178:13,14 179:17,21 187:2 230:18 263:10 270:7

formal 235:9,22

formally 231:6

formed 67:6

former 116:20

formulaic 203:21 204:20

forth 46:20 57:9

forthcoming 173:15

forward 37:9 56:23 68:22 85:5 138:20 254:11

forwarded 27:12 292:20 293:3

found 3:13,22 4:8 49:21 55:1 60:21 61:7 61:17 84:1 84:10,20 184:18 205:22 206:10,17 216:20 217:6 217:15 259:21 260:6 260:17

foundation 32:15 35:7,12 39:11 41:16 43:7 45:13 48:15

four 26:12 31:18 32:1 46:11 127:5 219:20

frame 212:7

fraser 259:8

frequent 207:12

friends 239:9 292:13

front 125:20,22 132:18 273:4 292:9

frtw 67:3 117:8 230:4,8,12 257:21

fses 101:23

fssa 12:8 18:22 31:5 32:15 32:23 33:5

ftc 104:6 130:23 148:4 155:16

fuel 11:13 12:4 25:14 158:6

fuels 12:2 13:23 16:23 39:12

full 17:16 116:6 248:9 294:6

fulltime 204:11

fully 32:20 166:2 198:6 269:16

fumes 101:21

fun 29:10

function 239:16 241:18

functionality 239:11

functioning 240:3

fund 37:5

fundamental 20:1 25:5 101:15 127:15

fundamentally 102:5

funded 32:15 43:6

funding 35:9 240:19

furnishing 110:22

furnishings 110:12,14 111:5 113:10 119:14,15 166:2

furniture 160:8,9,16,18 160:19,20 161:2,3,16 162:4 163:3 163:21,23 164:12,15 168:9 213:23 214:3,5,18 214:22,23 215:1,16,18 215:19,21

further 10:2 43:5 82:23 87:20 104:11 109:1 136:4 139:4 156:14 166:5 169:21 170:7 177:11 186:22 201:5 201:18 211:19 215:12 216:4 216:9 228:18 229:20 230:14 250:9 254:16 256:17 275:4 278:9 279:7 280:7 287:4 288:1,21 290:20

furthermore 163:19 204:19

future 67:16

G

g4s 289:17 291:2

gained 270:16

gallon 26:12,12

gallons 182:6,10

game 151:4

gas 5:17 7:11 14:9 17:16 26:21 37:19

gaseous 2:2 3:9,21

gasoline 26:13

gasses 5:14 7:7,10 15:14 16:5 21:6,11 26:21,21 40:11,16

gbh 62:3 75:6 80:14 85:19 88:7 114:12 120:14 159:19 164:10 166:15 167:2 170:20 171:8 177:16 179:14 185:7 212:14 215:13 222:20 228:12 229:22 255:12,23 256:23 257:6 291:11

ge 288:3

gear 287:13

gee 17:18

gel 106:9 107:8

gels 107:2

general 153:10,13 154:8 283:3

generally 46:5 203:21 208:13 234:3 234:6 249:13 263:10

generate 134:8 205:17

generated 43:13 206:9

generating 43:2

generation 35:23 36:20 49:11 241:22

generic 114:3

genesis 15:16

gentleman 34:6 65:1

gentlemen 3:20 61:5 84:8 108:15 178:22 217:4 260:4

georgia 3:12

getting 74:17 102:8 154:13 271:5

gibbs 237:22,23

gift 125:11,18

give 5:10 8:2,8 56:18 68:13 68:15 123:3 135:20 156:11 172:10,14 183:15 184:15 212:20 257:5 259:13 273:11 278:2

given 23:22 32:18 53:2,3 57:11 111:22 143:16 190:6 221:7 243:23 274:7

gives 244:21

giving 161:13

gladly 74:14

glass 98:20 99:2

glasses 132:2

glazing 90:18 92:23

glenn 202:9

global 60:19

go 22:18 25:1 28:17 34:18 39:7 40:15 47:23 50:15 51:8 55:21 57:15 58:19 59:2 62:20 67:9 73:18 76:18,20 78:23 81:5 82:9 107:12 107:23 117:23 123:12,15 124:9 131:10 131:20 138:20 152:6 152:14 158:23 159:4 159:8,17 170:11,14,17 182:22 186:9 186:23 196:3 196:5 199:10 199:13,17 201:3 210:23 217:22 223:2 226:2,21 241:9 245:6 245:9 255:1 256:17,21 257:3 259:15 279:19 281:3

goal 70:20 83:14 248:9 271:3

goals 236:2

god 207:17 290:13

goes 34:10 96:12 111:7 114:22 119:16 154:9 155:1 197:8 239:5 250:20

going 8:18 9:13 15:1 18:20 30:2 46:6 48:13 49:15 51:2,8 54:10 56:22 58:19,20,21 63:13 64:8 64:13,19,20 73:18 74:4 75:15 91:1 93:2 96:3 97:14 98:19 104:21 107:21 110:10 115:9 117:2 118:6 118:12,17,21 118:22,23 119:1 132:21 133:2,4 143:15 155:18 157:10,20 158:2,16,16 164:14 166:13,13 178:2 181:12 184:15,16 185:4 187:7 197:22 198:2 198:21 199:3 199:11 201:11,12,15 212:23 214:10 215:19,22,23 218:2,20 223:10 225:5 226:10 228:21 236:15 246:9 251:7 256:2 273:23 275:12,14,16 277:16,17 280:6 283:8

287:13,17,18 289:5,11,20 290:9
goldenrod 136:15,17 231:19
goldsmith 288:3,3
golinveaux 259:9
good 25:17,18 32:21 46:21 47:15 47:15 52:17 56:16 57:10 57:22 66:1 69:5 70:7 85:16 108:19 108:20 125:14 158:13 184:19 209:6 211:9 222:3 228:5 246:13 253:14 256:9 276:16 282:15 288:14
govern 106:17
governing 244:15 262:22
government 167:7 247:9
governmental 262:15
grab 7:17
granting 261:23
gray 261:4
great 6:13 25:6 172:2 236:4 247:20
greater 53:9 204:6 248:1
greatest 102:4
greatly 241:17
greg 24:5 28:21 35:15 48:5 57:17 259:7
gregory 137:5,5 165:10 165:10 169:23,23 177:7,7
grodsky 11:4,5 30:16 30:17 31:4,6
ground 125:19 269:1 289:7
grounds 41:18
group 3:12 8:2 9:16 36:16 47:13 48:2 50:19 55:6,9 57:7 116:15 159:22 161:23 166:19 170:23 196:15,19,22 213:3 215:7 216:6 255:16 259:7 285:8 285:13,14 287:2
groups 35:20 36:2
growing 100:8
growth 20:2
gsa 153:13
guarantee 144:1
guardian 46:17 55:4
guess 48:11 85:23 97:3 98:1,18 113:3 153:22 154:10,14 224:15 227:6
guest 203:20 206:18
guidance 58:14
guidelines 232:6
gun 20:21

H

half 26:12,16,19 119:21 287:15
hall 207:13
halls 204:2,19 205:10,15,18 206:19 208:5 208:11
halocarbon 14:8 17:16 37:18
halocarbonb... 21:5
halocarbons 21:10
halon 9:1 16:1,11 39:17
halons 23:6
halt 68:21
hamer 267:18,19 268:2,4,8 278:11,11 280:13,13,21 282:15 285:7 287:6,6,22 292:3
hampshire 202:11
hand 82:13 88:2 89:9 99:11 106:9 107:2 107:8 109:10 116:3 123:14 123:21 131:9 139:9 159:7 166:12 170:12 179:6 179:11 187:5 204:2 251:6 251:7 253:4 291:18
handed 208:15
handles 156:22
handling 56:13 225:4
handout 231:19
handrail 125:14
handrubs 108:13
hands 29:23 51:7 60:11 82:7 104:15 159:3 170:17 201:21 211:22 216:9 227:1 230:20 255:2,7 256:20 258:16 267:14 280:10 291:15,19
hanging 293:12
happen 22:12 133:6 199:14 208:7 244:18
happened 17:22 72:12 95:10 106:9 106:16
happening 133:20 183:14
happens 24:11,14 74:14 154:2 185:18
happy 6:18
hard 7:17 39:23 205:17
hardware 17:6 40:10 193:17
harm 165:21
harrington 3:11,12,18,19 4:13 7:23 8:1 22:15,16 22:19 29:9 29:10 34:3,5 37:8 50:17 50:18 54:3,4 60:3,5,13 259:8
hartford 60:19
hasnt 72:12
havent 58:15 73:21 107:20
hazard 8:19 17:10 31:10 35:21 53:8,11,18 54:12 130:6 149:19 174:10 214:19 269:4 270:4,7
hazardous 133:10 183:13 183:17 209:16 241:7
hazards 9:3 11:11 12:22 31:8 32:14,21 36:17,19 38:4,11 47:1 47:20 52:21 211:17 239:2 241:3 281:8 286:3,4
head 28:11 100:8
headaches 226:9
headlines 207:22
health 100:14 104:7 106:11,12,13 107:7 108:18 108:22 124:14,17 126:4,6,9,20 126:22 127:10 128:2 128:4 129:1 129:5,10,19 130:7 131:1 132:7,22 133:1,3,5,7 134:11,23 135:5 137:6 137:7,8 138:4,19 140:6,10,11 140:15 141:8 141:12 142:19,23 144:4,16 145:16,21 146:4,17 147:1,3,18 147:20 148:10,10,13 148:16,19 149:19 150:12,13,17 150:22 151:1 151:8,18 153:16,22 154:2,6,14 155:6,7 156:20,23 160:11 162:9 162:14,19,23 163:23 164:3 165:10,11,14 165:19,22 168:1,5,10 168:15,18 169:17,23 170:1,4 171:21 173:19 174:15,20 177:7,8 181:1,14,21 183:3,4 188:9,14 190:6,23 193:23 194:6 194:7 196:21 198:4 200:2 200:3,5 231:5 235:23 240:1 241:3 248:20,22 249:22 250:6 252:5 278:20
hear 64:8,13 73:2 74:4,9,12 85:22 171:4 231:12 264:19
heard 20:17 29:15,16 40:22 50:19 50:20 72:10 72:22 74:13 75:8 78:13 83:12 85:6 88:12 89:18 117:4 123:12 149:7,11 155:10,17 160:4 166:23 192:12 198:1 223:14 244:5 252:4 254:23
hearing 64:20,20 100:5 155:7 216:11 251:22
hearings 251:13
heat 36:22 43:9,15 43:18,21 44:3,8,12,16 49:1,6,10,14 49:21 50:5 56:10 57:2 160:14,15 163:6,16 164:18,23 165:1 169:1 169:11 184:19 185:16 215:17
heated 39:12
heatgenerating 206:15
heating 59:19,21
heery 108:17 147:17 183:2
heights 270:16
held 3:2 35:17 191:17 244:11 251:22,22 294:8
hello 4:17
help 57:8 107:7 249:15,18 259:13 292:13
helped 216:13
helpful 27:21
helping 136:23
helps 46:1
heptane 10:23 11:13 14:4 16:2 25:5
heres 48:13
herring 74:5 78:21
hes 78:16 129:22
hfc227ea 6:3
hfcs 25:9
hi 24:5 80:6
hickman 273:15,16 277:21,21 278:14 286:19,19
high 26:12 34:19 137:10,20 270:23 283:2
higher 14:8 19:19 23:17 24:16 43:10,16 49:22 50:5
highest 269:8
highlight 94:12 203:9
highlighted 94:8
highway 76:10
hipaa 184:10,11
hirschler 62:2,3,9 64:19 75:6,6 80:14 80:14 85:11 85:18,19,23 86:2 87:3 88:7,7,14 114:12,12 120:14,14 159:18,19 160:6 164:10 164:10 165:5 165:6 166:15 166:15 167:2 167:2 170:19 170:20 171:7 171:8 177:13 177:16,16 179:13,14 180:3 181:4 185:7,7,11 212:13,14,23 213:8,10 215:13,13 222:20,20 228:12,12 229:22,22 230:2 255:11 255:12,22,23 255:23 256:23,23 257:5,6,15 291:11,11
historic 208:4
historical 16:10
historically 9:2 200:10
history 5:10 15:1 34:9 34:19 68:3 195:20 200:12 222:6 251:12
hit 40:12 102:5
hoffman 18:15,16
hold 52:7 105:13 122:14 199:9 212:20 236:13
hole 238:15
holland 72:4,4,9 75:8 75:18 78:11 78:11 87:1,1 87:8,8 109:14,14 110:6,6 113:16 117:16,16 218:12,12,19 221:16 224:13,13 227:3,3,16 227:17 228:20 229:2 229:2
hollands 105:14
home 137:21 138:22 235:2,6,13 237:1,15 239:16 240:8 240:12,16,20 240:22 241:10 243:21 249:6 249:16 251:4 252:12,17 254:10
homelike 137:16
homes 127:22 137:16 138:6 163:5 163:22 164:3 166:1 168:23 169:17 198:2 234:23 240:5 240:10 241:9 241:23 249:7 253:22
hoover 69:17 72:4

78:11 87:1,8 109:14 110:6 117:16 218:12 224:13 227:3 229:3
hope 153:2 160:7 161:19 201:9 229:18
hopefully 142:23 153:3 197:13 290:20
horizons 241:21
horizontal 150:14,19 152:3 154:15 154:16,17 155:2,4
horizontally 152:16
hospital 125:4 150:17 167:12 183:11 197:11 240:13
hospitality 204:18
hospitals 127:22 161:18 167:18 183:9 198:4
hot 289:21
hotel 206:18,18 211:13
hotels 203:13,14 204:17
hours 269:13
housing 208:13 232:4,5 238:7,20 239:14 247:4 247:8,15,19 248:1 249:5 251:10,20
hud 232:5
huey 104:5,6 130:22 130:23 148:3 148:4 155:15 155:15
huge 144:11 186:17 199:20
hughes 14:21 21:17 39:3 59:7 65:10 218:3
human 110:15 288:7
humancentered 238:1 240:12 248:13
hundred 74:7 91:6 98:12,13
hundreds 69:23
hurricane 249:10
hydrocarbon... 25:12
hydrogen 18:1

I

ibc 95:3 251:18 252:2
ibew 277:22 286:20
icc 231:21 232:12 233:11 235:17 236:8 244:8
id 8:8 17:9 25:23 26:8 27:3,9 28:3 55:9 85:4,10,14 89:14 105:4 132:9 138:23 150:2 156:11 158:19 172:10 174:12 183:4 183:18 192:6 193:21 209:3 210:20 211:5 211:7 224:17 245:13 250:12 258:21 259:3 267:20 278:13,19 280:14
idea 21:9 66:1 108:19,20 114:5 153:21
ideal 152:4
identical 86:3 88:14 242:14
identifiable 101:11 193:15
identified 93:14 117:11 174:9 192:22
identify 122:9,15 127:3
ieee 268:11
ignite 184:22
ignition 160:13 163:5 206:15
ignore 15:22
ii 243:8
iii 208:4 220:1,3
ill 22:20 27:16 30:5 34:7 37:12 45:9 50:22 52:9 54:1 59:8 64:18 80:19 132:1 199:10 215:3 224:1 228:1 268:4
illegally 167:10,13,18 215:23
illinois 259:20
im 4:17 6:18 8:18 11:4,5,7 13:3,3,5 15:1,3 18:16 18:17 19:13 21:16 22:3 22:23,23 24:5,7,7 26:3,3 27:7 28:2,6 29:2 30:1 34:6,7 37:8,17,20 42:3,5,6 45:16 48:11 48:12 50:15 50:16 57:23 58:4,7 63:10 63:21 65:11 65:15 69:6 69:17 70:8,9 70:10 74:20 77:9 78:17 79:18,18 83:12 93:8 99:13 103:16 104:5,6,20 105:8,8 110:10 115:9 116:12 118:6 118:12,21,21 118:23 119:1 129:5 132:7 132:18 139:23 142:4 144:11 148:3 153:9,10 155:6 165:7 169:22 172:3 175:6 176:5 177:3,15,18 179:14 181:12 183:19,20 187:19 198:11 200:10 201:2 202:10,12 209:19,22 211:3,3 218:2,4 223:10 225:6 227:7 228:21 228:21 229:1 229:2,8 230:23 231:2 231:6 234:14 236:6,15 237:22,23 242:7,10 246:17,19 250:12 253:15,23 254:9 255:8 259:9 261:2 261:3,4 268:19 273:17 275:7 275:8,12,13 276:2 277:2 277:3,5 287:22,23 289:17 290:13 293:7
imagine 48:21 107:22
immediately 82:9
imminently 75:12
impact 110:14 190:15 198:22 269:9 269:17
impacts 150:3
impairment 240:16 250:2
impairments 239:17
implanted 254:10
implementation 264:17 265:1
implemented 190:19 219:1
import 167:18 215:23
importance 239:5
important 71:1,17 81:3 91:4,17 102:6 207:10 233:21 238:10 248:6 250:5
importantly 190:16 239:10
imported 167:11,13,14
impracticab... 244:23
impractical 38:15
impregnated 67:4 71:11,19 76:18
impregnation 69:21
improve 208:1
improvement 57:21 263:17
improvements 41:1
improving 247:21 248:5 282:7
inability 241:13
inadequate 20:9 208:6 273:21
inappropriate 120:1
inappropria... 130:4
incapacitation 207:4
incense 206:13
incentive 208:17
inches 31:18 32:1 46:11
incidence 7:16
incidental 199:2
incidentally 236:2
incidents 199:3
include 36:20 45:18 70:18 71:1 71:19,23 80:18 130:12 220:9 245:7 274:18 279:2 279:5
included 50:3 59:16 93:21 138:10 210:12 232:18 234:20 240:18 272:3
includes 31:9 38:12 43:7 175:9 249:4
including 182:7 204:20 219:6 225:2 248:21 249:6 250:1 259:7 271:13 278:3
incompletely 283:11
inconsistency 155:5 229:9
inconsistent 130:1
incorporate 90:9,22 189:9 211:13
incorporated 3:12 46:18 83:22 90:15 254:16
incorporation 263:12
incorrect 55:20 79:4 142:4
increase 10:7 20:14 39:21 49:6 50:10 54:18 175:14 196:1 206:22,23 207:6 269:2 281:18
increased 8:15 15:13 20:22 43:19 54:19 172:15 241:4,7 248:21 281:7
increasing 57:5 58:8 205:8 229:16 241:1 249:23 250:1
increasingly 205:11 248:6 249:11
incur 100:11
independence 239:11
independent 6:23 44:15 231:1 247:11
independently 45:3 64:13 247:13
index 63:7 79:22 86:5,8 88:16
indicate 13:14 89:9 91:15 109:10 123:21 139:9 159:7 162:22 166:12 168:17 173:12 179:10 187:5 255:6 263:9 266:13,20 272:11 285:16
indicated 47:12 59:10 93:11 142:21 143:2 210:16 224:21 272:2
indicates 32:16
indicating 156:2 174:3 242:17,19
indication 180:8 264:12
indisputable 20:21
individual 14:17 32:2 96:6 205:4 263:20 265:4 265:6
individually 96:7
individuals 262:11
industrial 213:14,15 214:11,18
industries 44:11
industry 11:5 19:23 30:17 35:10 35:10 37:4 40:23 68:2 68:13 70:20 71:11 72:12 92:23 138:22 155:7 160:8 161:15
inert 7:10 14:9 21:6 21:11 26:21 37:19
infant 190:9 191:1 200:21
infeasibility 281:8
infections 241:16
infirmaries 196:9
influenced 98:2
information 27:20 28:18 40:17,17 108:9 220:18 221:8 225:7 246:3 253:11 254:14 269:4 274:21
informational 262:7
informed 201:23 202:2
inhabited 204:8
inherent 10:1
inherently 15:23
inhibit 94:14
initial 52:19,20 53:6 53:12 234:16 234:19
initially 124:18,21 136:1 142:2
injury 241:7 285:21 285:23
inquiries 240:11
insert 11:9
inserted 137:15 142:16
inside 125:9 246:6
inspection 193:17
inspectors 278:22
install 47:19 140:5
installation 38:16 263:22 276:13 277:4
installations 13:20 198:18
installed 12:6,9 19:1 33:11 46:4 96:12 133:15 140:10 141:7 163:7 169:2
installer 12:9
installers 40:9 58:13
installing 40:9 134:2
instance 103:10 192:21 200:20 273:18
instances 23:17 79:2
institute 24:6 238:1
institution 240:12
institution... 240:10
institutions 204:3,15
instruction 258:4

integration 248:9
integrity 38:21
intellectual 271:18
intend 93:10
intended 73:8,9 95:11 95:19 101:5 102:18 204:4 261:15 269:6 278:4
intends 142:8
intent 47:12 88:20 102:9 103:18 108:9,13 130:1 135:9 135:14 143:19 189:5 284:3
intentional 285:17,20
interact 24:12
interest 85:3 93:2 97:3 104:20 105:4 135:4 181:12 204:17 293:13
interesting 205:1
interface 121:9
interim 33:2 190:18
interior 111:4,23 113:14,19,20 205:2 240:6 245:18
intermingled 191:2
intermingling 146:23
internal 262:20 269:23 270:10
international 9:14 16:17 37:21 62:3 75:7 80:15 85:19 88:8 89:14 95:5 108:18 114:13 120:15 121:8 121:13 147:18 159:19 164:11 166:16 167:3 170:20 171:8 177:17 179:14 183:3 185:8 212:14 215:14 222:21 228:13 229:23 238:8 251:13 255:12 256:1 257:1,6 268:21 270:2 270:10 291:12
internation... 252:10 270:23
interpretation 261:21 273:7
interpretat... 38:14 191:7
interpreted 142:12 271:14
interpreting 40:12
intimate 203:17
intoxicated 207:4
introduce 83:6
introduced 15:5 206:16
introduces 231:17
introducing 68:11
introduction 16:4 214:17 269:3
introductory 268:5
intuitively 205:3
invasion 253:22
invested 71:5
investigations 184:5
invoking 262:18
involve 175:12
involved 196:3
involves 11:21 188:8
involving 40:20 42:15
irrelevant 186:19 250:20
isnt 7:14,16,16 25:18 112:19 160:19 251:6 277:23
iso 9:15 16:21 17:3 23:21 40:6
isolation 241:11 248:19 248:20 249:2
issue 5:1 10:11 15:8 17:14 35:4 41:2 44:23 55:7 64:5 65:10 76:4 79:14,19 81:1 90:11 94:7 97:13 98:8 121:5 135:16 142:22 144:2 144:12,13 151:19 154:7 171:9,10 173:11,16 187:20 191:8 192:8,23 193:19 195:13 212:16,18 215:17 236:4 236:7 250:19 251:2 252:21 253:3,6,10 279:16,20 280:4 290:5 290:20
issued 279:21
issuer 280:2,3
issues 35:19 53:15 66:4 93:5 94:11 98:15 104:23 112:7 112:12 113:9 115:12 129:1 144:22 162:9 168:7 181:15 194:1 196:2 210:18 213:19 223:12 233:6 234:16 235:18 253:5 254:3,6 271:18 272:9 290:18
item 51:21 86:18 92:10 103:14 128:21 135:22 142:1 142:6,8,9 174:9,9 175:17 183:5 183:20 257:16,17 266:21
items 57:1 85:12 113:7 158:3 174:9
iv 220:1,3
ive 26:20 58:7 59:17 72:11 74:10 106:5 121:17 127:5 149:11 151:18 174:9 199:10,13 200:20 203:2 226:15 253:17 268:16,18 269:7 275:17 275:18

J

jaeger 138:3,3,3,17
jake 230:23 236:11 237:5 250:11
james 83:7 179:15 181:5 216:19
january 35:16 232:21 244:11
jeff 288:3
jeffrey 3:11
jelinske 149:22,22
jesse 65:9 218:3
jim 97:1 104:19 105:3 108:17 108:19 113:9 113:13 115:11 136:13 143:12 147:17 157:19 180:8 181:9 183:2 184:3 185:1 185:8 186:8 186:13 195:18 201:8 211:2 259:10
job 116:1 269:21 289:10
joe 69:6 72:4 75:8 75:18 78:11 79:12 87:1,8 105:14 109:14 110:6 113:16 117:16 218:12 221:22 222:3 224:13 227:3 228:2,5 229:2 258:2
john 242:4 267:2 272:15 286:9
join 44:21 275:2 286:22,23 287:1
joint 125:5 127:2 196:20
josh 153:9
journey 8:3
judgment 175:10
july 225:19
jump 282:11
jumped 28:11
june 1:11 3:3 294:9
juris 226:12
jurisdiction 71:4 90:12 95:22 96:4,6 96:17 116:19 117:13 172:17 174:6 175:1,7 189:1 223:10 224:20 225:2 261:17,19 262:3,9,11
justification 7:15 19:21 32:10 38:5 48:21 49:16 53:1 98:3 286:5
justifications 143:16
justify 43:19 158:8

K

kamalasanan 81:6,13,16 122:7,11,13 122:17,19,22 176:5,8,12 279:10,15 280:1 288:23 289:4
katherine 37:17
kathleen 70:8 80:6 256:9
kathy 237:23
katrina 249:10
keep 7:21 67:13 124:19 158:3 161:21 223:10
keeping 215:10
kelly 259:11
kept 222:18
key 36:14 115:13 197:11,13 199:7 201:17 203:9 213:18 243:1
keying 188:19
keylocked 199:5
keys 188:19 193:15 197:9 199:1 199:5,12,13
kicking 23:2
kidney 241:15
kilowatt 36:23 43:23 56:6,13
kilowatts 32:4 43:20 47:4,6
kind 57:14 91:7,22 91:22 143:17 183:13 226:12,13 276:21
kinds 204:23
kineticist 25:7
kitchen 133:2,12,19 134:3,15 138:10,12,18 138:21 139:3 209:16
kitchens 137:14 205:5
klein 128:22 129:3,4 130:17 134:23 136:9 162:8,11,12 162:13 164:7 167:23 168:2 168:3,4 173:18 174:14,17,18 174:19 181:13,17,19 181:20 182:21 192:7 193:21 194:2 194:4,5 195:16
knew 65:3 234:5
know 15:15 40:14 41:8,11 43:1 43:12 46:5,7 48:7,9 54:16 58:13 66:17 73:17 74:21 78:2 97:20 112:4,11,17 115:11 117:2 119:3 134:7 144:10 151:6 153:22 154:4 156:10 158:15 172:4 172:5,8 177:23 185:1 185:2 196:8 209:22 225:12 226:1 251:12 254:6 254:7 273:5 273:22 274:6 276:14,18 277:8 278:5 290:4,15
knowledge 57:11 234:8 274:14,19 276:7
known 19:23 202:17 230:7
knows 28:22 95:7 171:23
koffel 83:21,22 84:6 84:7 85:2 86:11,13 88:18,20 89:3 92:19 92:21 102:20 102:22 104:16,17,18 105:3 113:2 113:6,13 128:10,11 134:17,19 136:10,13 141:16,18 143:12 156:11,14 157:19 162:1 162:3 164:6 167:21,22 173:6,8 181:6,8,10 184:3 186:13 192:4,6 195:15,18 201:8 208:21 208:23 211:2 211:14 214:7 214:9 216:12 216:14 223:20,20,20
koffler 97:1
kovacik 267:1,2 272:14 272:15 286:8 286:9
kraus 254:19,19 273:2,2
kris 67:22
kristin 259:8
kutti 81:6 122:19 176:8 279:10 288:23
kv 287:12

L

labeled 69:13 77:5,7 77:14 79:14 79:20 81:3 115:7 116:4 121:3 175:19 177:22 182:11
labeling 80:1,2 182:14
labor 291:6
laboratories 44:7 259:20 267:2 272:15 286:9
laboratory 20:12,20 21:9 42:19 115:8
labs 71:9 182:15
lack 145:1 292:17
lacks 13:14 38:4
ladies 3:19 61:5 84:8 217:3 260:3
laid 203:8
lamb 14:18
landscape 144:3,15,17 158:6
language

14:14 33:22 38:1 54:23 55:14 73:19 102:9 108:12 193:13 245:15,16
languages 273:12
large 11:1 15:23 25:12 100:15 101:10 125:8 125:17 181:2 184:11 185:14 186:1 206:16 269:18 276:6 282:8
largely 85:8 235:13
larger 182:5
largest 232:7 235:23 291:3
larrimer 132:4,5,16,17 134:21 139:12,13,23 156:16,17
larry 11:5 30:17
lastly 7:14,20 14:7
late 6:22 82:14 195:23 235:19 293:12
latest 32:12
lathrop 97:1,1 104:19 105:3,3,14 106:3,5 108:19 109:5 113:9,12,13 113:13 115:11 136:13,13 137:1 143:12 143:12 157:19,19 158:1 181:9 184:3,3,8 186:13,13 195:18,18 201:8,8 211:2,2,7 258:20 259:1 259:14
laughter 29:11 83:16 293:8
law 263:2,11,14 264:6
laws 262:20
layers 66:19,20,22 67:1
layout 203:22
lead 125:20 241:15 241:21
leadership 35:7 270:4
leading 68:4 83:12 125:14 138:5 203:23
leaning 49:3
learned 277:8
learning 205:7
lease 153:15,18 155:20,22 208:13,16
leasing 149:16 154:1
leave 37:12 50:22 71:17 222:11 227:19
leaves 228:7 273:6,6
leaving 240:13
leavitt 1:23
led 8:3
left 268:14
legal 261:17
legally 167:14
legitimate 144:23
legitimately 264:14
lesser 156:9
letter 4:5 61:14 66:3 84:17 92:13 217:12 260:12
level 7:10 34:19 57:11 125:19 134:14 140:8 142:19 146:8 146:9,14 165:17 191:19 275:22 283:2 283:9
levels 39:13 50:5 268:21 282:10
licensed 276:12
licensure 276:12,17
lid 180:13
lies 162:6
lieu 174:2
life 2:5 32:7 83:19 84:8,14,16 89:23 97:21 99:21 102:2 102:5 110:15 112:7 116:12 124:1 125:5 128:23 129:6 134:22 145:5 161:14 162:8 163:2 167:23 168:20 181:13 193:22 194:8 210:3 223:4 239:2 247:1 247:16 248:23 249:14 250:6 254:1
lift 241:13
lifts 246:2
light 48:22 49:3,15 128:1
lights 48:23
lightweight 68:23
likelihood 137:10 206:22 206:23
liken 273:22
likeness 217:23
likewise 56:12
limit 13:22 56:7,7 70:22 71:2 71:13
limited 127:11 174:10 182:15 230:7 230:12 262:9 281:15 282:19 284:21 286:1
limiting 110:14 256:12 256:13
linda 259:11 294:14
line 36:6 63:10 282:14
linen 182:3
lines 144:7
link 5:12
linteris 24:5,5 28:21 28:21 29:2 35:15 36:8 48:5,5,9,11 55:17 56:8 57:17,17
linteriss 36:4
liquid 5:8 11:12 26:21 178:13
liquified 7:8
list 205:17
listed 63:7 69:13 71:9 77:4,6 77:10,14 79:14,19,21 81:2 115:6 116:4 121:3 175:19 177:22 180:7 182:12 201:16
listened 29:14
listening 129:21 172:7
listing 74:22 77:8,9 79:23 80:2 81:1 182:14
lists 150:7 277:15
literal 248:7
literature 48:16
little 5:10 15:2 17:20 36:11 45:9 47:22 49:1,1 58:5 77:7 85:3,16 98:14,16 107:13 114:6 141:13 195:20 199:8 240:19 242:15 254:15 275:15 288:19
live 165:23 239:12 240:7 247:13 283:19
living 205:7 247:11
load 158:6 228:21
loaded 203:23
lobby 100:15 125:8 125:17,20,21 125:22 126:1 126:3
local 6:8 206:3 262:10,20
locally 24:15 252:9
located 103:21 238:2
locations 91:21 136:2,5 209:16 262:12
lock 188:14 193:3 197:10,13,14
locking 188:8 189:11 189:18,23 191:17 194:8 194:14,19,19 194:22 195:1 195:7 200:17 200:21
locks 188:19,19 189:23 201:17
loco 204:15
log 45:20 52:6 55:1 60:8
long 19:23 70:19 76:15 194:8 199:1 215:15 234:21 235:1 272:2
longer 17:20 63:16 100:18,22 214:11
longerterm 204:4
look 5:18 16:18 17:23 20:16 39:10 45:20 55:12 65:17 81:19 97:11 97:12 98:5 151:20 173:22 177:4 201:16 236:23 237:8 245:10 269:21 273:12 287:9
looked 5:13 48:16 49:17 59:17 149:7 219:14 242:13 287:2
looking 10:6,8 15:15 27:21 40:23 40:23 47:5 58:7 73:15 172:7,8 277:7 278:2
looks 11:2 30:15 106:6 166:13
lose 21:18 69:12 101:13
loskey 243:20,20 244:3,5
loss 158:7 184:5 293:2
lot 16:15 34:8 45:12 46:8 53:1,3 106:5 117:9,9 133:1 144:22 158:13 183:9 185:5 196:23 245:14 275:15 285:2 289:22
lots 29:4,4
love 164:19
low 16:4 20:13 21:10 59:14 144:11 180:14 282:9
lower 27:18 44:3,8 44:16 117:6 146:8,9,14 150:16 283:9
ludicrous 167:19
lumber 121:12
lumped 203:12

M

magnitude 38:6 43:23
mail 274:1
main 7:6 58:8 125:7 263:7
mainstreaming 234:20
maintain 14:14 127:18 149:17 155:21 186:20 271:4
maintained 68:8 112:12 137:21
maintaining 262:6
maintains 270:23
maintenance 112:9,12,18 275:17,21,23 276:14 277:2 277:3,11
major 36:8 98:9 238:15 240:11,22 252:19
majority 93:15 97:10 150:22 239:15
maker 128:19 135:11 135:15 141:19 142:7 201:23 202:2
making 46:2 62:13 63:3 67:14 76:10 78:4 99:23 105:14 129:22 130:10 132:23 207:9 226:9 261:21
makuta 145:5
manage 275:21,22
management 100:12 202:16 282:4 286:4
manager 37:18 205:23 275:8 283:4
managing 275:17
mandates 112:17
mandating 146:5,21 271:18
mandatory 261:16 263:8 263:10
manned 161:12
manner 130:1 145:13
manual 278:20
manufacture 62:13 65:23 68:8,12 72:16,19 73:3,10 74:12 75:16 75:17 78:14 80:19,19,20 80:21,23 87:14
manufactured 115:2 116:5
manufacturer 6:5 13:6 42:7 65:2 66:18 112:14,18 123:2
manufacturers 6:3,19 63:3,13 63:22 70:2 90:14 214:4
manufacturing 63:16,17 64:2 70:9 80:10
marcelo 62:3 75:6 80:14 85:19 88:7 114:12 120:14 159:19 164:10 166:15 167:2 170:19 171:8 177:16 179:13 185:7 212:13 215:13 222:20 223:23 228:12 229:22 255:12,23 256:5,23 257:6 258:7 291:11
marcelos 184:23,23 186:15
margin 11:1 14:8 16:8
mark 19:13 47:2,7 149:22
market 76:5,14
marketing 18:17
marketplace 67:12
marshal 116:20

marshals 6:9
marvin 104:6 130:23 148:3 155:15
maryland 83:23
massachusetts 1:9 126:22 246:19
massive 185:22 215:15
material 42:12 49:4 66:20 111:10 111:19 112:8 112:9,11 120:4 122:1 122:23 123:4 175:13,20 176:13,16,18 176:21,22 177:3 229:10 230:4,6,9,10
materials 2:4 9:3 11:22 12:3 48:18 60:16 61:7 61:13 71:16 73:5 95:17 111:11,14 180:14 185:21 223:2 263:22 271:15 274:16
maternity 188:23 190:10 192:13
mates 207:13
matter 17:18 80:9 107:16 153:23 161:4 178:20 290:21 294:8
matthews 259:11
mattresses 167:5,6,9,18 168:8,21 214:1,1,5 215:23 216:1
mature 254:15
maximally 248:15
maximum 32:1 182:5
mcgovern 259:10
mckay 259:11
mclaughlin 200:1,1 275:6 275:7,12 289:15,16
mdc 10:17
mdcs 20:13 21:10
mean 29:5 77:12 107:1 119:1 173:1 178:12 183:7 226:12 291:2
meaning 187:8 271:14
meaningful 13:14
meaningless 171:16
means 62:13 65:23 68:7 70:21 71:2,12,17 71:23 72:16 72:18,23,23 73:1,2,7,10 74:11 78:1 78:13 80:18 87:13 90:10 100:17 101:19 130:12 154:18 172:13,15 176:13 188:13,14,17 188:20
meant 273:4 278:6
measures 189:14,16 194:10,15 289:19
mec 10:19,22 27:11 54:15
mechanical 151:6,7,10 156:21,22 158:5,9,11 158:17
mechanisms 25:8
medical 107:7 183:10
meet 66:15 67:2,3 71:20 75:23 76:16,17 78:7 100:10 115:4 118:6 119:4 121:11 121:11,14 122:1,3 146:12 147:13 160:21 180:19,20 185:15 214:23 215:2 215:20 216:1 216:2 230:8 230:10 244:22 246:1 263:4,13
meeting 1:3 3:1 36:5 61:9 92:12 93:12,15 104:8 182:12 183:15 187:13 200:5 237:7 244:11 251:8 267:6 272:18 283:21 292:18 293:11,14,15
meetings 235:10 237:13 290:3
meets 75:20 76:15 121:6 215:21 229:13,18 284:3
melting 176:14,23
member 15:3 23:1 30:5 46:18 48:6 51:11 57:18 65:11 69:7 70:10 79:13 82:18 83:7 113:10,14 129:11 131:13 132:7 132:8 135:4 159:10 183:19 199:7 211:3 214:12 223:10 231:2 234:14 268:12 270:3
members 4:7 12:9 14:23 18:23 21:13 30:3 32:23 55:5 61:16 104:9 128:12 142:17 162:20 168:15 178:7 178:9 210:10 232:13 233:16 234:6 235:2 241:8 260:14,16 267:5,8 272:18,20 285:13 286:13,15,23 292:5
membership 14:13 44:21 59:1 87:10 114:8 117:19 131:1 147:21 165:14 183:6 292:7
mental 248:22
mention 9:18 165:7
mentioned 36:13 94:22 113:22 163:14 168:6 169:16 177:2
mercantile 107:11
mere 249:4
merely 142:2 258:9 265:15
message 161:13,19
met 38:17 137:8 147:20 182:7 183:5 189:5 193:12 267:5 272:17 286:12
meter 36:23 43:20,23 47:6
method 11:17,21 15:18 16:14,14,19 16:20,23 121:19 173:3 185:3,4 209:18 281:23 282:17 286:2
methods 15:6 70:19 72:19 93:21 93:22 97:17 172:21 261:23 262:4
metric 187:9
michael 202:13 246:14
michigan 202:14
microphone 4:16 11:3 12:23 14:16 14:17 18:13 19:11 21:14 22:22 25:20 27:2 28:19 30:15 37:14 38:23 41:22 45:5 46:15 48:3 52:2 55:3 57:16 58:1 59:5 61:23 65:7 67:19 69:2 69:14 70:5 72:2 75:4 77:17 78:8 79:9 80:4 85:16 86:22 87:6,19 88:5 89:11 94:18 96:22 99:14 99:20 104:4 105:2 108:16 109:12 110:4 114:11 116:9 117:15 120:12 122:5 122:15 123:8 123:22 130:21 132:3 136:12 137:4 137:23 139:10 143:11 145:3 147:15 148:1 149:20 153:6 155:12 156:15 157:18 158:18 159:17 164:8 165:8 166:14 169:22 170:8 170:18 176:4 177:5,12 178:23 182:23 184:1 185:6 186:12 187:16 195:17 199:22 200:8 201:7 202:8 210:23 214:13 217:22 218:10 222:19 223:19 224:12 227:2 228:11,19 229:21 230:22 237:21 242:2 242:3 243:19 246:12 250:10 253:13 254:18 256:7 261:1 266:23 267:16 272:13 273:1 273:14 275:5 278:10 279:9 280:12 286:7 286:18 287:5 288:2,22 289:14 291:10
microphones 57:15
midday 187:8
middle 207:16
migrate 148:15 149:9
migrated 16:11
migrating 148:23
migration 142:23
mike 89:5 99:9 116:11 187:19 202:7 215:12 226:20 256:7 258:12
mikes 51:2 215:11
milke 83:7,10 85:2 85:21 86:11 86:22 87:6 87:19 88:11 88:18 89:3 89:17 92:19 93:7 94:17 96:22 99:7 99:19 100:1 100:5 102:19 103:15 104:2 104:10 105:1 105:13,16 106:2 108:4 108:15 109:1 109:19 110:2 113:2,12 114:10 116:9 117:15 120:12 122:5 122:9,12,14 122:18,21 123:7,11 124:5,9 127:20 128:7 128:9 130:17 131:4 132:11 132:14 134:17 136:10,21 137:3,23 138:16 139:4 139:16,20 141:16 143:10 145:3 147:15 148:1 149:20 151:16 153:6 155:12 156:11,15 157:18,23 158:18,22 159:22 160:4 161:21 162:11 164:6 165:4,8 166:5,19,23 167:21 168:2 169:21 170:7 170:10,23 171:4 173:6 174:17 175:23 176:7 176:11 177:5 177:11,15 178:22 179:4 179:19 180:1 181:3,17 182:21 184:1 184:7 185:6 185:10 186:12,22 187:15,22 188:3 192:3 194:2 195:15 199:22 200:8 201:5,18 202:19,23 208:9,21 210:6,22 211:6,19 212:20 213:2 213:8 214:7 215:5 216:4 216:15 217:20 218:7 218:15,17 221:13 222:2 222:19 223:19 224:12 226:19 227:11,14,23 228:4,10,18 229:1,20 230:1,14 231:11 236:6 236:18 237:18 242:2 243:19 244:1 244:4 246:11 250:9 253:13 254:18,22 255:14,16 256:4,6,16 257:2,9,13 258:1,5,11 258:23 259:14 260:22 261:6 261:10 265:23 266:22 267:11,21 268:2,7 271:21 272:13,23 273:14 275:4 275:10 277:19 278:9 279:7,13 280:7,16,19 282:13 284:14 286:6 286:18 287:4 287:20 288:1 288:21 289:3 289:14 291:10,14,23 292:4 293:9
miller 77:20,21
million 239:20,22 240:1 249:19
mills 261:2,2,12
mind 57:6 88:5 111:16 126:16 161:22 194:9 212:17
miniatrium 100:11
minimal 174:11 232:2 238:22 241:22
minimum 5:6 8:14,14 9:19,23 10:17,22 11:10,12 13:23 23:11 33:21 39:8 39:14 47:10 52:20 53:7 55:15 195:11 208:19 248:15 288:15,20
minor 17:10 251:2
minors 204:8,14
minute 26:16,16 105:13 136:22 156:12 212:21 258:22 280:2
minutes 26:14,19 36:5 63:6 86:9 112:4 119:19 120:4,6 121:20 123:3 187:8,9,11
misapplication 89:22,22 92:17
misleading 253:7
misled 253:1
missed 47:2,7
missing 149:13
mission

239:1,3
246:21 250:4
missions
204:4
mistake
5:9 105:11
223:7
misuse
206:6
mitigation
286:3,3
mix
24:12 204:21
mixed
24:18 111:18
142:14
mobility
239:8,13,17
240:16 250:1
modano
294:14
mode
88:5
model
235:5 252:11
moderator
89:20
modest
41:19
modification
124:19 243:18
modifications
133:1 240:13
240:20,23
290:1
modified
65:17 124:4,6
131:8,20
modifies
284:7
modify
240:15
moments
205:13
monday
121:15
monetary
190:15
money
71:6 77:8
month
35:17 210:14
monthly
193:16
months
22:12 58:18
199:3 232:17
232:21
233:13
moot
160:16 164:19
165:2 223:15
morning
83:15 147:21
200:6 267:6
272:18
286:13
motel
211:13
motels
203:14
mother
200:21
motion
2:2 4:15,18
7:20 11:8
12:20 14:22
18:12,21
19:7,9,15
21:13,17
23:5 24:9
26:4 27:6,8
28:5,7 29:19
29:22 30:6,7
30:8,13,14
33:20 34:12
34:13 38:1
38:19 39:4
41:9,20 45:9
45:16,18,19
46:19 47:12
48:1 51:3,6
51:13,13,15
51:20 52:4
52:15 53:20
54:2 55:9,10
55:11,13
57:13 59:8
59:10 60:2,7
60:10,12
61:3,23 64:4
64:15 65:16
67:18,23
68:7 69:1,9
69:10 72:9
74:10 77:22
78:12 79:19
80:15 81:11
81:14 82:5,7
82:8,10,12
82:18,19,20
82:23 84:6
85:12,21
86:6,7,20
87:9,20,23
88:2,3,4,11
88:13,23
89:4,7,7,9
89:10,10,17
92:16 94:20
99:10,12,13
99:16,17,20
99:23 100:1
100:6 102:16
103:6 104:3
104:9,11,13
104:15,15,18
105:2,15,20
106:4 108:8
108:16,23
109:2,4,6,9
109:11,12,15
109:19 110:4
110:7 112:23
113:4 114:11
116:8,13
117:21
120:11,15
123:11,13,15
123:16,16,20
123:21,22
124:5 128:3
128:14,19,19
130:15,18,20
131:2,5,7,17
131:18,19,23
132:3,10,11
132:16
134:13,20,20
135:8,9,11
136:11,11
137:7,9
138:15 139:5
139:7,8,10
139:10,14,16
139:22 140:4
141:14,19
142:8 147:14
147:19,22
150:1 153:11
158:22 159:4
159:5,6,13
159:14,16,16
159:23 160:5
161:20,23
163:10,19
164:7 165:5
165:7,12,15
166:6,9,11
166:20 167:1
167:20 169:5
169:5,15
170:2,14,15
170:16 171:1
171:6 174:13
176:1,3,6
177:9,12,17
179:4,8,10
179:11,12,20
180:2 181:6
181:22
182:22 183:6
183:7,23
185:12
186:14,23
187:1,4,6,16
187:22 188:5
188:6 191:6
191:10 192:2
193:1 195:4
195:17,20
200:4,6,10
201:6,20,22
202:1,1,3,6
202:7,20
203:1 208:20
209:2 210:23
211:20,21
212:2,4,5,7
212:9,10,11
212:12,22
213:4 215:6
215:6,7
216:6,8,9
217:2,19,21
217:22 218:1
218:6,10,13
218:18
219:10
222:22
223:18,22
224:1,6,14
225:23
226:18,21,23
227:1,7,8,16
228:11,13,17
229:3,19
230:2,15,17
230:21,21
231:7,11,15
233:19
234:12 235:7
235:11
237:19,21,23
242:6 244:3
246:10,16
247:3 250:4
250:10,12
253:16
254:23 255:2
255:5,6,7
256:10,15,21
257:9,22
258:14,16
260:2 261:1
261:6,11
264:21
265:22
266:23 267:4
267:7,9,13
267:15,21
268:6 269:10
271:5,6
272:19,21
273:3,19
275:3 277:22
278:13 280:8
280:11,11,14
280:16,22
281:2 285:6
285:15 286:7
286:11,14,16
286:21
287:23 288:5
289:2,17
291:18,18,20
motions
3:15,16,18
4:12 51:23
60:23 61:1
61:21 84:3,4
85:1,7 103:7
171:14
173:14 202:4
215:9 216:22
216:23
255:17
259:23,23
260:21,23
269:6,11
271:2 293:1
motivation
271:3
mounting
17:6
move
30:20 47:13,15
62:4 68:22
83:2,10 85:5
85:20 87:22
88:4,9 89:5
89:10,14
99:9 104:12
105:1,5
109:2,12,15
123:22 124:3
131:6 132:2
139:6,10
151:23
159:16,20
166:8,16
170:21 179:8
179:16
187:16,21
201:19 202:1
202:17
211:20
212:11,15,17
216:5,11
217:20 218:9
218:13 227:8
230:15,21
235:19 240:8
249:15
254:11 255:4
255:13 257:7
258:13 261:4
267:12,16,20
277:10 279:8
280:8,11
291:16,17
moved
65:21
movement
110:18 152:3
219:18 247:5
247:7,11
movie
205:10
moving
53:20 60:6
99:13,20
163:12,16
169:7,11
179:11 212:1
227:1 249:4
256:7
msl
200:2
muddies
91:23
muddle
91:18
muehe
246:13,14
multifamily
238:19 247:23
multiple
44:6 70:1
94:15 137:17
142:14 153:4
203:22
209:11 237:9
myriad
116:22

N

nafra
62:4 75:7
80:15 85:20
114:13
120:15
159:19
166:16 167:3
170:20 171:8
212:14
215:14
222:21
228:13
229:23
255:12 256:1
257:1,7
nahb
235:15
nailed
290:6
name
13:3 18:15
27:7 28:4
37:17 42:3
58:3 67:22
70:7 77:20
81:6 89:13
116:11
122:18,19
130:19 132:5
145:5 162:13
176:2,7,8
178:4 179:13
187:19 202:9
230:23
237:20,23
242:4 246:13
250:11
253:14
267:19
271:10
273:15 275:6
279:10
288:23
289:12,18
names
139:13 289:15
narrow
36:18 240:6
national
24:6 41:15
116:14 132:9
221:4 223:3
225:8 235:13
238:13,15
239:23
243:21
254:16
260:15
268:21
nationallyr...
115:7
natural
128:1
nature
277:6 288:7
near
202:7
nearby
206:10
nebraska
202:15
nec
224:23 225:6,7
necessarily
46:9 67:4 77:6
209:5 210:1
264:2
necessary
53:11 92:12
94:3 96:5
101:18
133:20
208:20
247:14
263:15 269:9
274:21 291:5
need
20:22 22:1,11
34:5 44:2
46:11,13
49:5,7 50:6
50:11 52:9
57:1 67:9
79:3 91:1
98:13 111:21
116:23 121:1
136:15
142:18
149:13
151:11
165:18 166:3
186:2 189:5
189:9,13
190:22 191:5
191:15,17
196:6 201:11
213:5 241:15
254:4,9
270:22
274:15,15
276:9 287:9
287:13,17,18
needed
35:4 37:3
49:19 54:20
87:14 112:19
120:8 156:3
186:3 211:15
240:22 245:6
265:1
needs
40:2 115:4
117:14 122:1
122:3 148:7
188:16 189:2
189:12,16,17
189:19
190:10
192:14 194:9
194:14,17,17
194:19,20,21
195:2,6,6
196:12
200:13,17
249:11
250:14 254:8
272:3 277:10
negative
97:12,15 136:8
283:13
284:10
negatives
98:6,7 236:22
236:23
negotiate
241:11
negotiating
241:6
neighborhoods
249:3
neighbors
249:7
neither
110:22 265:21
never
99:4,5 106:20
120:21,22
133:10
143:18,19,19
200:20 251:9
253:5
nevertheless
213:5
new
9:6,6 11:15
42:13,22,23
43:12 48:15
58:20,22
99:22 113:17
115:21,22
116:21 119:6
119:7 120:7
120:23 124:2
124:23
129:10
160:17,20
161:9 167:9
189:20 190:3
190:6,16
191:16
197:16,17
202:11 203:4
203:4 206:1
209:4 214:5
215:18 246:6
249:6 251:20
261:14
282:18
newborn
188:22
newer
67:11 205:12
208:8

newman 70:7,8 80:6,6 256:9,10
nfpa 1:3 3:1 4:3 5:11 12:15 12:18 13:4 17:8 19:4,14 21:12 23:1 23:21 28:17 32:14 33:1,4 38:2 42:5 44:12,18 45:12 46:18 46:21 48:14 55:5,13 57:8 61:11 64:21 69:7,8 70:23 71:4,14,21 79:13 81:18 83:2 84:16 90:5 97:17 110:11 145:8 147:2 171:12 171:20 180:21 183:19,21 185:14 186:2 186:6,7,11 203:4 212:5 212:8 216:11 217:11 220:7 220:8,20 221:20 223:3 223:4,5 224:3,3,4,6 224:10,10 225:15 228:16 231:2 231:18 232:19,20 233:22 234:3 234:9,22 235:17 238:10,17,18 241:20 242:7 242:16,22 245:10 251:5 251:9 252:1 252:8,16,20 254:2 258:9 259:3,12 260:10 262:22 263:19 264:2 264:3 265:12 265:16 266:9 266:15 267:3 270:6 272:16 277:10 286:10 292:6 292:8,15
nfpas 62:15 239:1 243:16 250:4
nice 125:8,11
night 48:22,22 49:3 49:15 206:9 207:16,18
nist 24:6 25:6 28:21 43:5 43:13 44:14 48:5,17 57:17
nitmam 5:6 7:5 8:5 13:8,12 14:14 42:9 44:22 47:14 47:23 52:17 70:10 72:1 75:3 77:4 80:7 81:4 87:17,18 186:8
nominal 14:7 40:21 41:19
nominally 16:22,23 40:10 40:10 49:10
noncombustible 230:11
noncompliance 190:11
noncompliant 126:19 128:6
nonconforming 226:8
nondebatable 82:3,6 158:22 170:11 179:5 254:22,23
nonhealth 140:5 146:9 151:3,5
nonprofit 238:2
nonsmolder 167:19
nonsprinklered 144:17 163:4 168:22 198:8
norm 205:6
normal 11:13 115:20 137:12
normally 62:18 115:20 200:23 221:15
north 88:8 178:6
northbrook 259:20
note 93:6 124:23 192:9 198:7 233:21 235:10 258:7 262:7
noted 23:18,21 141:18 292:14
notes 176:15 294:7
notice 183:9
noticed 3:5
notwithstan... 292:23
nowadays 107:12
nuclear 261:3
nuisance 132:20 134:10 137:10,11 138:13
number 4:16 8:17 11:3 11:17 12:5 12:23 14:16 14:18 18:13 19:11 21:14 22:22 24:3 25:3,16,21 27:15 28:1 28:20 30:15 31:17,20,23 32:1,5 37:15 39:1,13 41:22 45:6 46:15 48:4 52:2 55:3 57:16 58:2 59:5 62:1 65:7 67:19 68:10 69:2 69:14 70:5 72:2 75:4 77:17 78:8 79:9 80:4,12 81:5 84:6 85:16 86:22 87:6,19 88:5 96:23 99:14 99:20 104:4 105:2 115:14 116:10 117:15 118:14 120:13,16 121:5,17 122:6,15 123:8,23 136:12 137:4 137:23 147:15 148:2 148:16 149:11,21 150:20 151:16,19 153:6 155:13 156:15 157:18 158:18 159:17 164:8 165:9 166:14 169:22 170:8 170:18 177:6 182:23 184:1 189:12,15 199:22 217:2 219:16 220:5 220:19 236:8 236:10 260:2 262:1 269:18 277:19 282:8
numbered 113:3 278:21
numbers 3:18 25:6 61:3
numerous 13:18 82:2 210:18
nursing 127:22 137:16 137:21 138:6 138:22 163:4 163:22 164:3 166:1 168:22 169:17 198:2 240:10

O

objected 161:11
objections 85:10,14
objectives 262:5
observation 16:13 129:21
observations 268:17
observed 269:7
obstructive 268:17
obtain 286:4
obvious 205:3
obviously 98:14 112:7 151:4 190:15 197:12
occasion 206:4
occupancies 91:21 107:6 108:14 129:1 129:6,10,19 130:8 133:3 133:5 134:23 135:5 140:11 146:19,21 150:12 160:11 162:9 162:20 163:1 164:1,3,21 165:22 168:1 168:15,19 169:18 173:23 174:16 181:14 188:9 190:6 193:6 193:11,23 194:7 209:12 210:4 213:4 213:14,16,16 213:20,21 214:11 236:17
occupancy 103:22 106:20 106:21,23 107:4,10,15 107:16,20 108:1,10,11 124:15 126:4 128:2,22 140:12,15 142:14,20 143:1 144:5 144:16 145:16,21,22 146:1,5,20 146:22 147:1 148:11 150:13,19,23 151:1,3,8 154:14 162:5 165:19 181:1 188:15 193:2 193:8 203:6 204:5,7 208:2 209:7 209:9,14 213:13,13,14 214:18,19 215:16,18 234:13
occupancys 157:12
occupant 147:10
occupants 101:19,22 130:13 146:14 188:18 205:14
occupied 208:14
occur 9:12 192:19 205:18 206:8 209:2
occurred 237:8 279:5
occurrence 128:6
odd 113:3
offer 34:3 86:12 92:20 103:8 113:5 134:18 141:17 173:7 192:7 208:22 208:23 214:13,21 221:14 266:1 268:16
offered 261:13 265:8
offering 203:7
office 107:7 125:10 144:3,15 158:6 263:19 265:4
officer 4:11 54:1 61:20 83:8 84:23 217:18 260:20 292:13
offices 101:6,6 151:11
officially 293:9,14
officials 236:1
oh 75:1 118:20 199:9,12 220:23 226:14 227:6
okay 8:1 11:2 22:19 22:21 27:1 29:8,11 45:5 50:18 52:13 53:17 60:6 80:23 82:4 99:19 102:19 104:2,10 105:7,13,16 106:23 118:21 127:4 131:4 155:7 159:16 175:23 177:5 179:19 199:7 202:19 213:2 220:12 227:14 228:10 237:18 292:11
old 9:1 11:19 18:8 23:17 48:22 50:9 164:16 196:4 257:20
older 160:20 208:3 239:21 240:2
oldest 235:23
olicon 242:5
once 33:10 73:2 74:9,12 82:5 136:22 139:11 147:12 154:20 257:3
onebyone 254:5
onehour 157:8
onerous 197:22 198:14 198:16 282:6 288:7,8,10 288:12 289:19 291:8
ones 18:7 255:18
ongoing 68:3
open 21:22 89:4 100:15,23 104:3 108:16 114:6,10 125:8,13,16 126:3,3,17 126:19 130:18 133:5 133:7,13 135:17 136:11 138:10 144:3 144:4,14,17 156:23 158:6 164:7 176:1 182:22 195:16 206:13 210:23 215:5 228:11 237:19 258:11 266:23 273:7 286:6 289:23
opened 126:15 133:11 157:4
opening 100:10,18,20 101:1,4,8,10 101:14,16 102:4,10,11 102:14,17 124:14 125:21 126:10,14 127:4,8,13 127:23 130:14
openings 100:16 101:21 102:7 125:2 127:9 128:4 128:8,21 129:10,15,18 129:23 130:6 130:11,12
openness 127:23
operate 208:13 270:19
operated 169:3 197:14
operating 49:10 156:5 281:15
operation 95:15
operational 190:17
operations 134:8 270:21 275:17,21
operator 112:10,16
opinion 7:12 93:10 103:8,18 142:7 223:8 277:18
opponents 207:20
opportunities 238:3
opportunity 68:20,21 247:2 247:13 250:8 253:17
oppose 82:19 116:8 131:2 183:7 199:16 228:16
opposed 29:23 30:7 51:8,13 58:8 58:9 60:11 72:19 82:8 82:13 88:2 89:10 99:12 104:15 109:10 123:14,21 131:9,18 139:9 159:3 159:7,13 166:12 170:13,17 179:7,11 187:5,8 201:22 211:22 216:9 227:1 230:21 235:2,11 255:2,7 256:21 258:16 267:15 280:11 291:16,19
opposing 235:12
opposition

14:22 39:3 58:4 143:14 143:15 183:22 222:21 223:21 233:15 264:21 267:7 272:19 273:19 286:13 289:17
option 73:13 130:6 152:15 153:2 191:12,21
options 71:3,13 73:13 79:7 171:23 172:15,16 182:2,18 239:15
order 3:17 31:10 43:22 47:14 49:14 54:14 61:2 72:20 74:15 79:3 84:5 87:4 92:16 102:17 133:6 147:13 167:9 193:10 217:1 260:2 272:3 274:12 274:13 282:11 292:3 292:4
ordinary 87:13
organization 16:17 77:8 178:5 235:23 238:2 263:19 265:4
organizations 197:6
organized 292:10
original 52:5 53:22 54:23 60:8 113:23 114:14 123:16 133:14 135:23 138:8 142:5 202:15 203:8 234:7 261:13 264:11 266:2 271:23 278:15 281:4 284:15
originally 5:11 90:11 92:11 93:11 93:12 101:4 102:18 138:8 138:17 156:2 285:8
origination 270:4
orlando 35:18
osb 68:16
osha 272:4,7,10 274:17 276:8 276:10,11 278:3,16,18 278:20,21,23 279:3
outbreak 96:16
outcome 95:2
outlined 147:22
outside 110:21 113:16 152:16 154:19 241:10 245:18 251:7 270:22
outsourced 208:12
overall 207:10 209:5
overly 198:14,16
overnight 203:15
override 95:20
oversight 107:14
overturn 223:16
overturned 7:4 244:12 284:12
overview 274:9
overwhelmingly 72:17 73:14,23 79:6
owen 67:21,22
owner 112:10,14,16
ozone 16:4,5,5

P

padlock 197:11
padlocks 197:12
page 55:1 65:18 93:20 114:1 140:1,2 188:7 271:6 271:6 280:23 283:14 285:12 287:3
pages 4:8,10 61:17 61:19 84:20 84:21 217:15 217:17 260:17,18 294:5
paint 74:18 120:23
painted 76:20,21
paints 114:23
palmer 273:16 277:21 285:7 286:19
panel 114:21 115:18 115:23 116:5 121:2 122:2 289:23 290:4 290:8,10
panels 111:11,12 114:2,23
paper 5:8 43:5 66:19 276:5
papers 43:2,3
paperwork 218:5 288:12
paragraph 38:2
paragraphs 42:12
parallel 247:10
parameters 102:3 282:17
parentis 204:16
park 99:22 124:2
part 9:16 10:16 32:15 34:9 35:1 65:6 80:1,10 95:4 110:7 111:13 118:9,12 138:7 149:6 207:10 209:6 233:3 239:3 243:1 269:21 271:19 287:16 293:13
partial 4:3 61:11 84:15 217:10 251:16 260:10
partially 198:8
participate 241:10
participation 293:12
particular 9:21 22:10 39:20 55:7 62:20 95:19 112:3 128:17 154:1 187:20 192:10 266:21 272:12 273:18 280:22 281:13 284:11 285:9
particularly 25:18 41:6 268:22
particulates 137:12
partitions 113:18 119:8
parts 10:16 218:21 246:7 264:9 281:6,16 283:7,20 285:1,17 287:16
pass 62:21,22 66:7 78:2 118:17 180:15
passage 247:18
passed 15:22 94:16 136:7 159:3 173:4 185:20 221:11 232:17 255:3 293:1
passes 51:20 60:12 78:5 82:23 86:6 88:3 89:10 98:1 99:12 109:11 116:5 123:14 139:10 179:7 256:21 258:16 291:16
passing 55:10 252:13
passive 90:10,22 92:4
path 100:23 245:17 245:17
patient 145:10 163:3 168:21 182:9 188:17 189:4 190:13 197:10 200:13
patientowned 163:21,22
patients 145:13 161:1 163:7 164:12 164:14 169:2 189:13,14,15 190:18 191:4 194:10,11,14 195:2,5,6,22 196:1,2
paul 13:3 42:3 58:3 59:11 151:17 200:9 267:19 273:6 278:11 280:13 287:6
pauls 230:23,23 231:13,14 250:11,12 278:5
pediatric 188:22 190:9 191:1 192:13 196:10
peer 20:11
pellet 178:13
penalize 16:4
penetration 145:18
penetrations 143:23 149:2,5 149:8 152:11
people 5:22 6:1,9 47:19 49:17 49:21 50:2,2 62:19 76:14 98:23 106:11 110:18 161:22 167:17 193:3 193:4 196:11 197:1,1 215:11 216:13 225:12 238:4 239:7,11,13 239:21 240:1 240:7,13 241:5,8,12 241:14 246:23 247:6 247:12,21 248:10,17 249:10 252:4 253:3,7 259:7 269:14 269:16 273:11 276:9 276:12 277:13 291:1
perceived 142:17
percent 14:8 16:22 17:5 28:16 31:21 98:13 98:13,15,15 98:16,16 138:6 150:17 150:18 151:1 198:5 270:21
percentages 144:10
perfect 59:13,20
perfectly 116:2
performance 19:22 44:2,7 44:16 62:16 62:17,21 91:2,16 94:2 172:15,18 174:2,3,7 175:8,9,12 178:17 180:9 180:14
performance... 70:18
performed 16:20 281:9,10
performing 285:22
performs 63:2
period 22:9 128:15 201:17 208:13 232:18
permanently 239:18
permission 115:21,22 128:21 163:11 169:6 261:23 262:2
permit 130:12 182:4 194:13 195:5 224:11 268:23 279:18,21 280:5,23 281:11,15,19 282:2,23 283:5 284:1 286:2 287:14 287:17,19
permits 204:6 279:17 282:9 288:12 288:15,18 289:20 291:1 291:1,6
permitted 106:18 119:8 128:20 133:2 133:5 137:19 163:9 169:4 194:8,22 195:7 224:9 230:4 262:3
permitting 219:2
perpendicular 140:19
person 202:6 214:9 240:16 241:18 250:13 251:15 276:17
personal 103:8 247:14 254:6 258:21 269:3
personally 259:12
persons 246:15,18 274:18
perspective 64:17 135:6 173:9 190:17 200:12
pertinent 219:11
pete 132:5 156:17
peter 60:18 134:21 139:13 142:4 142:21 143:2 147:22 157:21 158:2
peterkin 108:17,17 147:17,17 183:2,2
peterson 202:9,10 203:2 208:10
pg 2:1,2
phase 266:13
phil 14:21 39:2 59:7
philosophy 133:7 248:11
phrase 68:7 79:21 171:19
physical 240:2
pick 35:1 107:4,10 107:11
picture 31:13 185:18
piece 27:20 32:3 49:11 56:14
piercing 126:10
place 75:14 76:5 145:16 149:18 164:19 183:16
placed 167:12 281:6
places 56:21 171:13
plain 250:19
plan 44:14 100:15 207:10
plane 83:15
planning 249:13
plans 44:5 45:15 151:19 176:19 205:2
plastic 5:8 26:18 121:10,10,12
please 4:22 18:14 19:9 25:21 30:11 31:5 31:13 37:6,7 37:15 41:23 45:6 46:16 51:6,18 52:2 52:8,14 57:16 62:7 64:4,15 67:20 69:3 77:18 80:5 81:4,20 82:7 82:12,21 85:17 87:5 88:2,6,13 89:9 99:11 99:14,18 100:5 104:14 106:3 109:9 109:13 110:3 116:8,10 122:9,12,14 122:15 123:2 123:20 124:10 128:10 130:19,21 131:9,10,20 132:15 139:9 139:21 142:4 149:18 158:12 159:6 159:14,17 160:4 166:11

166:23 167:17,20 170:16 171:5 176:1 179:10 180:1 187:4 187:11,16 188:4 202:7 202:23 211:22 212:20 213:9 215:11 216:2 218:18 227:15 228:16 231:12 237:19 244:2 246:12 255:6 256:20 257:6 257:14 258:23 261:11 265:22 267:14 268:2 270:1 275:2 275:11 278:7 279:14 280:19 286:22 292:6 292:9
pleasure 83:6
plenty 125:10
plenum 219:3 222:17 224:5 230:5 230:6,10,11
plenums 220:10 222:7 223:2 224:8 224:21 225:4 228:9 229:5 257:18,21
plumbing 149:3,8
plus 7:22 141:9
point 20:9 36:15 37:8 50:16 59:12 63:12 64:7 66:1 69:19 75:8 75:14 77:2 77:16,22 80:16 87:3 97:5 114:7 114:16 126:19 127:1 130:9 143:22 144:6 150:2 154:9 156:18 156:19 157:5 164:8,21 172:23 183:18 197:7 207:4 215:7 223:15 228:21 229:4 243:22 245:13 258:12 276:16 292:3
pointed 56:8 97:6 109:6 162:19 168:14 175:16 177:14 195:3 222:23
points 19:20 115:13 129:22 194:16 221:17
pole 141:5
policies 234:17 235:5 235:16
policy 235:7 243:16 272:8
pools 203:20
poor 180:10
population 240:4
populations 189:5 190:14 190:21
portion 29:20 30:9,20 51:3,16 105:5,9,20 109:7,16,20 123:17 154:13 179:16,20 187:1 227:9 230:18 292:20 293:10
pose 194:11
posed 189:14 193:12
position 34:4 39:6 40:1 86:12 87:17 88:19 92:20 103:14 113:5 128:10,18 129:12,14 134:18 141:17 173:7 208:22 221:14 222:18 233:18 234:17 265:16 266:1 266:13,14
positions 235:16 264:14
positive 209:22
possesses 274:14
possibility 128:5
possible 93:23 102:5 126:12 153:15 208:18 240:15 252:3
possibly 148:14
posted 131:22
potent 251:4 252:9
potential 41:1 89:22 92:17 93:1 98:16 104:20 135:3 140:15 140:20 148:19 153:18,19 154:7,12 181:11 188:10 191:9 192:18,23 193:18 209:1 269:9 285:4 285:23
potentially 66:5,8 94:8 103:20 144:23 148:23 154:23
powder 178:13
power 31:18 32:2,5 35:23 36:20 47:4 59:15
powered 53:9 163:8,11 169:7
powerful 252:7,13
ppe 288:10
practical 150:3 285:18
practice 270:11,13
practiced 16:19
practices 261:18,22 270:16 282:7
pragmatic 95:7
precedence 13:21
precursor 252:10
predicted 32:17
prediction 9:12
preeminent 25:7
preface 13:9
prefer 255:9
preparedness 249:13
presence 162:17 165:16 168:12 206:14
present 3:10 11:17 14:15 56:22 57:10 83:20 93:10 103:13 103:18 113:11 128:12 162:23 168:18 210:5 214:11 216:18 259:18 292:15
presentation 253:18
presentations 271:15
presented 3:18,21 38:8 38:10 61:3,7 73:12 79:7 84:6 108:9 200:14 217:2 253:7 254:4 254:14 260:2 260:5
presenters 45:11
presenting 84:9 135:6 217:5
presently 140:9 148:9
president 11:6 30:17
presiding 4:11 54:1 61:20 83:8 84:23 217:18 260:20 292:12
pressure 63:4,13,14 64:2 66:13 69:20 74:6
pressuretre... 65:4 66:12 71:10 77:1
pretending 73:6 115:16
pretty 10:5 34:19 49:13 184:19 211:9
prevail 225:22
prevent 89:22 101:20 120:3 142:23 184:20
prevention 184:5
prevents 184:19
previous 59:9 72:10,22 74:9 78:16 86:19 87:11 88:15 117:18 117:20 150:5 169:14 189:20 191:14,20 228:14 257:20 265:16 266:14
previously 36:13 69:11 141:18 168:8 190:9 195:12 198:17,19 199:18,21 233:14 244:5 288:16
primarily 203:16 204:7 237:14
primary 15:9 110:13 204:18 225:1
principal 13:4 19:14 42:5
principle 93:13 114:15 127:15 129:8 243:5 284:17
printed 231:19 232:12 232:17,23
prior 126:23 188:12 234:16 258:8 258:10 293:2
private 167:15 208:12 208:17 240:19
privilege 258:21
privy 225:6
proactive 207:23
probability 9:12
probably 15:12 28:22 36:23 37:3,4 56:3 59:14 121:17 143:23 157:6 199:20 264:21 283:10 288:14,16
problem 5:22 6:1,8 15:16 17:14 19:8 37:2 58:23 67:8 101:8 103:9 103:11 106:19 110:8 111:13 118:9 119:11 126:23 127:1 130:2,3 133:17 151:23 152:4 152:8 158:10 162:23 168:18 177:23 178:1 184:6,9 190:2,6 199:20 222:17 226:14 250:22 253:2 279:22 280:6 290:23 293:8
problematic 152:15
problems 112:6,9 117:13 152:12 192:18 196:9 211:17 243:22 244:19 248:22
procedural 291:22
procedure 263:23 279:11 279:16,19,21 280:4,6
procedures 112:15,18 261:22
proceed 4:11,14,23 29:19 31:5 61:2,20,23 62:8 84:5,23 85:15 88:13 100:6 106:3 110:3 124:10 132:15 139:21 160:5 167:1 171:5 180:2 188:4 202:23 217:1 217:18 218:18 227:15 231:13 257:14 260:1 260:20,22 261:11 280:19
proceeding 51:2
process 23:9 34:17 59:2 63:5,14 63:16,18 64:2,3 69:21 69:21 70:1,2 70:3,14,15 70:20,22 77:1,23 78:7 80:10 85:5 85:15 233:11 252:2 288:4
processed 293:2
processes 70:17 256:13
processing 35:21 36:19 56:15,21 57:3
produce 20:21 86:15
produced 73:7
producing 110:17
product 37:18 62:20 63:2,22 66:9 66:17 67:1,1 67:4,6 68:14 69:13 74:10 74:15,21 75:1,11,12 75:22 76:17 76:18,21,21 77:11 78:6 96:9,15 112:3 115:1 115:3,6 116:4 117:5 120:16 121:2 271:1
production 32:2
products 17:23 37:22 63:4,15,23 65:2 66:5,18 67:7,12,16 67:16 68:6 68:23 69:17 72:5 75:23 76:1,3,4 78:12 87:2,9 109:15 110:7 117:10,17 133:16 134:9 178:9,11,12 218:13 227:4 248:14
professional 275:18,19 294:14
progress 76:9
progressing 63:9
prohibit 107:21 108:13 124:13 245:21 262:16
prohibited 107:1,19 108:1 124:17 205:21 206:6 206:7 282:21
project 35:8 48:19 146:8 224:23 225:8
projects 244:15 262:23
promote 246:22
promoting 6:4
proof 91:11,14 177:1
propensities 205:14
propensity 206:12
proper 44:16 212:6 218:8 236:9
properly 102:6 144:1
properties 68:14
property 110:16 155:22 208:14 271:18
proponent 63:18 91:15 129:9,22 130:10 142:5 142:5 143:17 162:21 163:15 168:16 195:3 199:17 209:4 209:6,23 211:18 237:1 237:14
proponents 162:16 168:6 168:12 174:22
proposal 8:6,9,11,12 10:4,15

14:14 19:7 19:16 29:21 30:9,21 38:3 38:12 40:14 42:18 44:18 44:22 47:13 51:4,16 53:12 58:5 65:1,3,18 66:3,7 68:18 69:18 70:4 89:21 97:16 99:23 100:2 100:7 102:8 103:3,19 104:3,4,14 105:6,10,21 109:7 110:8 118:14 124:3 124:6,12,18 124:21 128:15 129:7 129:12 131:8 131:20 133:14 135:12 138:11,19 140:2 142:3 142:6 145:6 148:6,7 151:15,18 160:17 163:15 169:10 179:17,21 181:23 182:1 187:2 188:7 202:15 203:3 203:8 210:11 210:20 227:9 230:19 231:16,17 232:11 233:2 234:7 244:13 244:20 245:4 249:15 250:8 251:16,16 261:13 264:11 266:2 266:4,11 271:23 272:12 278:16 281:1 281:3,13 283:14,16 284:10,11,16 291:9

proposals 3:22 4:9 20:7 61:8,18 72:14 84:10 84:21 109:16 109:21 123:18 138:9 192:20 209:12 214:15 217:6 217:16 260:7 260:18 269:19 285:9

propose 85:4,11

proposed 11:9 31:7 38:16 44:14 45:22 55:22 56:18 57:22 62:10,12 77:3 80:17 93:13 110:20 142:15 171:21 174:23 193:7 193:13 195:11 211:9 245:4 269:12 269:17 271:1 282:18

proposing 39:19

proprietary 62:11 65:5 67:15 69:22 70:3 74:5

proprietor 231:1

propriety 64:5

protect 102:6,17 190:13,18

protected 33:7 100:21 101:18 102:11

protecting 98:19

protection 32:14 35:6,11 37:22 41:15 42:4 43:7 60:19 67:22 90:10,16 92:22 93:4,9 101:14 103:13,17 104:22 110:15 141:6 145:2 165:17 166:4 189:22 198:1 209:18 210:8 254:1 284:22,22 285:16 288:11,13

protective 189:16 194:15 269:3

protocol 6:15 26:7,9,10 28:9 38:17 38:20

proven 97:18 191:20

provide 44:15 58:22 91:16 95:14 112:14 127:16 130:19 141:6 141:12 147:7 162:22 168:17 176:1 237:19 238:6 263:15 274:8 274:10,20 276:21 288:13

provided 13:17 14:12 28:9 92:2 93:19 102:15 110:11 154:18 163:6 169:1 182:6 182:17 235:13 246:3 279:4 285:11

provides 19:19 37:21 85:11 141:13 162:4 165:17 191:20 232:1 242:16,18 274:23

providing 20:21 145:17 203:15 249:16 288:11

provision 90:8,20 91:7 91:23 95:4 95:19 96:3,5 106:19 118:7 129:9 142:11 145:15,17 146:2,4,10 146:16,17,21 146:23 156:6 157:2 163:12 163:16 169:8 169:12 175:2 189:2,19 191:5,13 218:23 219:2 220:12 225:17 242:23 243:6 262:14 263:4

provisions 33:16 91:2,3 92:8 95:9 99:2 103:23 106:10,15 108:3 116:7 129:14,17 145:21 146:20 149:16 154:3 154:5 157:14 182:6,16 188:9 189:11 190:1 191:14 191:18,20 193:9 194:13 194:18 195:5 196:13,16,19 220:15 222:11 225:11,15 226:1 242:21 243:14 263:8

prudent 23:23

psychiatric 195:22 196:2,7 199:4

public 64:23 92:10 128:13 161:13 192:16 231:4 235:4,7,16 235:23 238:18 240:19 247:8 247:22,22,23 248:20 249:22 250:5 252:5 262:12

publication 58:18 95:13 232:8,10 233:7

publish 44:8

published 4:2 5:11 35:16 36:8 40:17 43:13 61:10 84:15 210:21 217:10 233:19 234:17 244:9 244:10 252:16 260:9

pulling 289:8

purpose 89:21

pursue 257:1

pursuing 202:1,4 212:2

push 276:3

pushed 282:9

pushing 75:1

put 10:20 17:20,21 24:16,22 26:12,15,16 28:16 29:4,5 40:16,18 41:7,10 46:20,22 49:5,19 57:9 64:10 66:12 66:22 106:17 118:18,21,23 119:1 132:1 147:13 151:5 186:8 198:17 199:18 215:18,22 246:2 259:6

puts 257:21

putting 58:9,10 59:12

Q

qualified 264:23 265:6 274:18 275:1 276:7,18

qualify 192:13

quality 239:2 247:16 248:23 250:6

quantities 174:10 206:16

question 81:21,22 82:6 98:9 123:10 123:13 158:20 159:1 159:2 170:9 170:10,12 179:2,4,6 185:22,23 254:20 255:2 291:12,15,22

questioning 189:4

questions 106:6

quick 8:8 34:19 195:20

quickest 28:12

quickly 8:18 229:23 277:23

quite 22:3 57:3 156:5,6 157:10

quiter 216:20 217:2,3 221:13,15 227:23 228:1 236:10,11 256:4,5 258:1,2,17

quorum 292:2,5,14,16 292:17 293:2

quote 42:14,19 231:23 233:2 233:3,5,8 265:9,15 274:18,19 278:1,2

quoting 175:6 231:23 239:1

R

radiant 43:9,15

raise 8:13 21:4 88:2 99:11 104:14 123:13 131:9 159:3 170:12 170:16 179:6 201:21 211:22 216:8 226:23 230:20 255:2 256:20 258:15 267:14 280:10 291:15,19

raised 90:11 213:19 253:5,10

raising 29:22 51:7 82:13 89:9 109:10 123:21 139:9 159:7 166:12 179:10 187:5 253:4 255:7

ramifications 191:22

ramp 245:21 246:1

ramping 240:23

ramps 254:8

ran 120:16

range 16:1 25:12 36:23 37:21 43:20 44:1 204:12 262:7 275:23

rapid 188:18

rare 207:21

rarely 103:4 206:17

rarer 207:21

rasing 82:7

rate 43:15 163:6,15 168:23 169:11

rated 96:9 98:10 99:5 141:4,5 141:9 157:8 157:9

rates 43:9,18,21 44:3,8,13,16 248:21 250:1

rating 90:15,21 91:10 92:5 95:18

ratings 90:1,3,9,23 91:19

ratio 7:9 39:17

rationale 14:10 15:17 16:6 42:18 43:2,9,15 93:19,20 203:7

reach 147:12 249:20

react 162:21 168:16 290:16

reacting 25:9

read 27:13 52:6 110:10 118:12 148:6 220:19 224:15,16 225:10 266:5 271:8

readily 46:23 47:18 194:22 195:8

reading 63:11 105:8

reads 118:16

ready 57:15 75:12 117:1 226:20 289:23

reaffirmed 266:12

real 13:15 18:3,5 32:7 43:21 44:20 58:11 59:3 117:12 158:10 172:23 184:9 187:10 199:14 220:5 248:5,20 265:21

realistic 59:18

realize 248:9 269:17

realized 66:3 248:6,17 249:11 285:3

really 7:6,10,14,17 22:11 37:1 46:9 47:4 56:5 57:22 72:21 73:16 86:17 91:1 91:14 97:6 106:7 110:8 132:19 153:23 160:12 161:13,19 197:21 198:15,21 201:11 211:15 229:16 249:1 253:23 269:21 276:3 276:14 281:17 287:9

realm 119:13

reason 6:1 8:19 9:1 15:7,21 19:6 25:15 45:16 95:6 106:8 115:19 128:19 132:18,19 151:13 161:8 204:10 207:23 219:9 221:19,21 232:7 233:1 240:22 244:12 246:4 275:13 276:2 281:12

reasonable 12:1 14:10 56:19 101:19 182:17

reasoning 264:22

reasons 8:17 13:9 15:8 24:10 25:5 71:21 96:20 144:23 145:2 147:22 155:9 158:13 281:7

rebut 157:22

rebuttal 250:13

rebutted 250:14

receive 280:3

received 64:23 222:15 276:20

receiver 279:17 280:3,5

receiving 90:13 285:6
receptacles 180:5,7,10,11 180:19,20 181:2 182:3 182:18
reception 125:9
recessed 187:13
recognition 20:4 203:10 243:15
recognize 74:15
recognized 35:3 36:21 37:1,4 158:9
recognizes 27:15
recognizing 41:1 196:14
recommend 135:20 151:14
recommendation 163:13 169:9 169:13 218:20 292:19,21
recommended 74:2 113:8 163:17 262:14 263:12 285:12
recommending 231:15
recommends 285:14
reconvened 187:14
record 41:16 51:18 82:21 127:3 135:10 142:10 181:4 218:8 235:9
records 182:9 183:10 271:14,19 279:2
recouples 14:3
recreation 205:10
recycling 182:8
red 30:4 51:11 74:5 78:21 82:17 131:13 159:10
reduce 132:20 134:13 241:15
reduced 9:23 248:23
reducing 10:1 239:2
redundant 77:22
refer 222:8 223:5 278:17 284:9
reference 79:20 108:12 135:20 173:13 209:21 243:17 253:1 258:9 263:10
referenced 23:13 43:6 236:8 237:11 283:16
references 224:3 252:21
referred 9:9 43:8 112:21 208:14 248:12
referring 142:3 146:17
reflect 236:9
refuge 151:21 152:19
regard 81:1 135:8 143:8 173:13 186:5 192:12 209:1,7,11
regarding 145:8 200:17 243:3 265:1 265:6
regardless 95:23 96:1 220:2 252:8
regards 54:23
regime 50:6
registered 275:19 294:14
regulate 203:4
regulated 223:2
regulation 165:18
regulations 162:17 168:13 244:15 262:22 264:7
regulatory 262:15,21
rehabilitation 240:14
reinforces 265:16 266:14
reinstate 71:22
reinstated 129:14
reiterate 18:22 29:12
reject 30:7 50:14 51:14 55:13 70:4 82:19 93:18 103:4 131:18 132:10,12 136:12 139:5 139:8 143:7 159:14 165:15 210:11 223:18 233:4 236:21 266:3 291:9
rejected 30:13 135:12 135:13 148:7 164:4 169:19 175:21 227:21
rejecting 55:10,12 233:1 287:3
rejection 93:19 285:15
rejections 234:20
related 7:16 29:21 30:10,21 34:12 51:5 51:17 53:21 105:7,11,21 109:8,17,21 123:18 146:10 168:8 175:10,13 179:17,21 181:8,22 187:3 192:10 227:10 230:19 237:9 237:10 255:19 270:2
relates 52:15
relation 43:11 89:23
relative 18:3 40:3 135:17
relatively 9:22 40:19
relaxation 142:18
release 160:14,15 163:6,16 164:18,23 165:2 169:1 169:11 185:16 198:12,13 215:17 232:12
released 278:20
relevance 52:14
relevant 45:2 234:1 250:23
reliable 188:20
relied 204:9
rely 98:12 193:4
relying 174:5
remain 21:6 80:23 130:7 142:8
remained 189:19
remaining 92:7
remains 53:9 80:20,21 80:22
remarks 39:5 278:13
remedy 50:9
remember 48:22 115:14 160:18 197:16,21 207:11
remind 30:5 51:12 131:16 159:12
reminder 130:18
remodel 226:2
remote 188:18 189:22 198:12,13
removal 71:12 188:18
remove 33:22 44:23 148:18 163:15 169:10 274:10
removed 87:15 129:9 171:16 212:10
renovations 240:17
reoccupancy 206:2
reorganize 285:7
repeat 80:19 268:5
repeated 234:20
replace 45:2 134:14
replaced 171:18
repoll 266:19
report 2:2,4,5,14,18 3:7,10,13,16 3:20,22,23 4:3,5,9,10 12:9 22:11 29:20 30:9 30:20 35:13 35:15,16 36:4,7 41:16 51:4,16 55:2 60:14,17,21 61:1,5,8,8 61:11,14,18 61:19 83:17 83:20 84:1,4 84:9,10,11 84:15,17,21 84:22 91:9 91:22 103:2 105:5,9,20 109:7,16,20 123:3,17 143:6 148:5 148:5 179:17 179:20 187:2 216:15,18,20 216:23 217:5 217:6,6,10 217:12,16,17 227:6,9 230:18 232:19 250:8 258:19,21 259:15,18,21 259:23 260:4 260:6,7,10 260:12,18,19 269:10 285:12,12 287:3 292:19 292:20 293:1 293:6
reported 12:15 19:1 22:10 33:12 38:11 240:2
reporter 294:14
reporting 1:23
reports 12:11,14 90:13 95:14,22
represent 59:18 67:22 138:4 141:22 174:14 178:5 178:9 214:10 273:16
representative 31:4 59:21 179:15 181:5 202:13 218:4 218:9 231:4 261:4 272:7 272:10 276:10
representat... 196:20
represented 210:19 283:12
representing 11:7 30:18 37:20 69:6 79:12 89:13 92:23 99:22 108:18 124:2 147:18 148:4 153:12 176:9 183:3 185:1 185:2 246:7 253:15
represents 59:14 138:5 214:19
request 292:1
requested 264:12
requests 18:23
require 38:15 50:21 55:18 56:10 102:9 136:1 136:4 164:13 189:16 194:10,14 197:23 214:20,22 216:2 235:5 262:15,21 282:4 288:18 289:20 290:2
required 19:2 20:15 32:13 36:12 45:14 62:17 62:21 74:23 78:6 93:22 99:5 121:11 125:21 140:9 140:23 141:10 145:19 147:3 150:10 157:14 160:9 160:11 162:5 165:16 167:6 175:15 188:17 189:13 190:7 197:9 200:18 214:1 235:3 242:17,20 245:16 276:7 284:19,20 292:14
requirement 11:10,16 14:2 70:23 79:23 81:9 100:11 101:16 103:21 112:13,17 121:7 123:4 140:5 141:3 141:11 143:3 143:19 146:13 147:13 148:18 156:9 160:15 171:15,20 175:4,5 176:17 181:1 182:7 183:16 185:16 189:18 193:14 213:23 215:20 229:18 230:3 231:17 262:19,23 263:5,14,21 265:13 269:1 274:10 278:17 281:18 282:18 283:2 284:12
requirements 12:18,20 33:21 40:4,13 63:5 63:6 66:16 76:15,16 78:2 92:5 115:5 119:5 130:10 135:18 140:17 146:18 160:21 162:4 163:6,16 164:18 165:2 169:1,11 180:20 182:12 186:10 188:11 189:21 190:1 190:3,11,12 190:16,19 191:9,16,23 195:1 197:17 208:19 229:14 230:8 230:10 234:21 238:11,12,16 238:23 242:18 246:6 247:3 263:9 263:16 265:18 266:10,16 272:4 274:13 288:6,15,20 291:7
requires 36:9 38:6 68:17 81:2 115:19 141:1 244:15 251:20 284:1
requiring 48:21 50:10 69:12 161:16 278:16
requisite 96:17
research 28:12 32:12,15 35:7,12 39:10 41:15 43:1,7 45:13 48:14,15,17 53:2 68:4 71:6 254:13
reserved 124:20
residence 204:19 205:15 206:19 208:5 208:11
residences 239:12 243:8
resident 203:5 205:18
residential 210:4,9 211:4 234:13 235:10 236:17,20 244:7 246:4 246:9
residents 165:23 204:2
resin 66:20
resistance 90:1,3,9,15,21 90:23 91:10 91:19 92:5 95:18 96:9 98:10 99:5
resistant 160:9 161:17 161:18 164:15 167:8 167:10,19
resounded 124:21
respect 142:11 172:2 242:15
respectful

287:8
respond 64:18 133:19 193:4 206:1
responded 18:23 206:4
respondent 240:21
response 156:13 193:14 207:9 285:5
responsibil... 102:23 204:16
responsibility 110:13 112:21 112:22 206:1 242:9 261:20 265:19 266:17
responsible 37:18 70:12 200:19 203:16 204:9 232:19 234:2 235:21 263:20 265:4 265:13 266:9
rest 40:11 143:7
restate 22:16 109:4
restaurants 203:20
restore 96:4
restoring 96:16
restraint 114:4
restrict 68:20
restricted 114:3 282:20
restriction 47:3 54:12
restrictions 54:8,11
result 16:21 20:3,13 55:9 88:23 94:1 132:21 132:21 188:7 285:21
resulted 17:11 29:13 37:11
resulting 54:7 191:22 206:5 241:14
results 4:8 16:19 17:3 18:4 20:20 36:2 42:14 61:17 84:20 131:22 144:17 191:19 217:15 260:17
retain 12:20 33:20 161:2 218:23
retardant 61:13 68:2,11 70:8 71:15 111:18 117:7 119:9 122:23 123:1 171:12 171:15 172:1 172:4,13 173:1,4,13 174:2 175:5 175:11,19 177:20,21 178:3,6,15
retardantco... 75:21 117:3
retardants 88:9 178:7
retardanttr... 61:12 62:14 64:1 65:20 66:8,11,15 69:20 71:15 73:6 74:20 75:2 76:2,22 76:23 77:13 81:2 114:19 114:21 115:15,17,18 117:22 118:1 118:4,7 119:5,23 121:6,7,23 121:23 219:3 219:6 220:10 222:12,16 224:4,7 226:5 228:8 229:13 257:17
retested 9:22 111:21
retirement 249:20
retroactive 188:11 190:12 190:19 191:9 191:23 226:3
retrofit 248:16
retrospect 47:2
return 4:19 10:9 29:20 30:8 30:20 51:3 51:16 55:14 105:5,9,20 109:6,15,20 123:17 179:16,20 187:1 215:3 227:5,6,8 230:18 269:10 293:1
returned 8:7,7
returning 180:22 218:13
reverse 281:2
reversed 128:18 129:13
revert 69:11 228:6
review 8:8 96:6,18 108:10,11 111:2 192:18 219:11 232:23 234:7 237:12 243:11 244:17 246:8 252:22
reviewed 10:11 20:11 45:3 103:19 113:7 219:4
reviewing 6:9 214:15
revised 136:4 142:16 175:17 283:23
revision 3:23 4:3 60:22 61:9,11 84:2 84:12,15 216:21 217:7 217:10 260:8 260:10 261:13 283:12
revisions 271:1
revisit 15:1
rewording 65:19
rewrite 189:8
rewrote 66:6
rickard 242:4,4
right 6:16,22 7:12 27:15 45:19 57:21 58:7 66:10 74:16 83:11 108:22 118:13 123:12,15 131:22 144:4 144:15 146:7 158:23 159:4 170:11,14 183:12 185:4 187:15 199:10 221:19 247:7 255:1 256:18 258:13 291:16,17
rightfully 17:1
rightly 221:17
rights 247:5,10 248:4
ring 134:4
rise 13:8 42:9 242:5
risk 34:18 191:4,22 202:5 269:4 270:4,8
risks 241:4
risky 207:6
river 261:3 264:5
rivers 13:2,3 42:2,3 58:3,3 59:11
rob 123:9
robert 259:6
robin 19:12,13
roc 3:14 11:9 19:16 21:1,4 31:7,9 32:18 33:23 37:12 47:8,13 52:5 56:1 60:22 84:2 86:14 93:20 133:22 140:1 216:21 234:11 237:3 237:10 243:10,14 244:6,6 253:8 259:22 269:20 271:5 280:23 283:18,22
rocs 196:4
roetzell 94:19
role 270:4
roles 233:22
roll 41:5 139:1,2
rolled 270:12
rolling 137:19
ron 259:7
room 17:16,22 28:16 31:14 46:5 56:13 102:12 151:5 163:8 169:2 200:22 206:21
rooms 33:8 101:9 163:4,21,23 168:22 169:16,17 204:22 205:5
rop 3:14 8:12 60:22 84:2 140:3 188:8 216:21 234:11 236:12 243:6 253:8 259:22 269:19 271:6 281:1
rops 196:4
rosenbaum 93:3,7,8,8 94:17 99:7,8 103:12,15,16 103:16 104:21 108:4 108:7
roughly 28:9
round 49:1
roundrobin 37:2
roundtheclock 204:11
routes 205:3
rules 52:9 70:13 118:22 131:12 212:8 261:21 262:1
ruling 292:1
ruma 149:22
run 62:20 121:20 204:3

S

safe 68:5 191:21 261:18 270:11,13,16 281:6 282:7 289:4
safeguarding 285:18
safeguards 137:17
safely 239:16
safer 291:7
safety 2:5,18 7:11 8:13,19,22 9:2,7,13,17 10:1,7,12 13:16 14:8 15:23 16:9 21:19,19 28:8 39:8 42:14 52:22 53:5 54:6,19 68:17,22 71:13 83:19 84:8,14,16 89:23 97:21 99:21 101:19 102:1,2,3,5 112:7 116:12 124:1 125:5 128:23 129:6 134:14,22 137:20 145:5 161:14 162:8 163:2 164:11 167:23 168:20 181:13 189:17,17 190:1 191:13 191:20 193:22 194:8 194:15 207:10 208:2 210:3 217:11 223:4 231:2 234:21 236:2 236:4 238:17 238:19 239:11 241:3 241:22 249:14 254:1 259:17 260:5 260:11 262:6 262:11 263:17 265:7 268:13,18 271:4 277:2 277:12 278:20 283:10 289:18
satisfy 78:1 271:2
saudi 81:7,7 122:20 122:20 176:9 176:9,10 279:11,11 289:1,1,6
savannah 261:2 264:4
save 269:12
saw 8:21 9:5 56:1 113:8
saying 13:10 34:14 45:16 47:23 59:12 73:17 74:10 75:1 76:8 78:20 97:18,22 146:16 172:23 227:5 227:19 233:11 245:19 278:1
says 46:10,13 55:14 107:9 110:12 111:11 112:7 113:17 117:21 119:6 121:1 136:17 145:9 147:2 160:17 164:12 171:11,17 172:8,13 173:3 177:20 178:1,16 199:12 219:17 220:6 220:11,19 221:4 224:19 225:8,10,14 226:13,16 245:23 248:13 279:2
scale 20:20 41:12
scenario 142:14 152:5 152:18 154:21
scenarios 13:11 17:1 37:3 41:10 59:16,19,22
schlosser 9:9
school 208:15
science 32:22 68:4,21
scientific 38:7,20
scope 36:17 110:9,10 110:21 113:17,20 115:10 119:14 163:20 164:2 169:16 219:15 220:19 225:10
scoped 232:11 251:20
scoping 231:18 234:3 235:21 238:11 242:16,20,21 247:3 250:16 250:17,18,21 251:14,16,17 251:19,23 252:3,6
score 215:10
screen 3:17 8:5 61:1 84:4 87:4 109:3 162:1 217:1 260:1
screw 259:9
sealed 144:1
search 19:8
seated 292:11
second 4:20,21,22 10:21 13:21 15:21 20:7 27:14 31:1,2 31:3 52:7,11 52:12 62:5,6 62:7 80:1 81:23 82:1 85:22 88:12 89:16,19 100:3,4,5 105:22 106:1 106:3 109:22 109:23 110:1 110:3 118:12 123:12 124:7 124:8 125:15 125:16,23 126:1,16 132:12,13,15 139:18,19,21 157:5 158:21 158:23 160:2 160:3,4 166:21,22,23 171:2,3,4 179:3,5,22 179:23 180:1 188:1,2,4 193:15 199:9 202:21,22 206:8 213:5 213:7 218:15 218:16,17 220:22 227:12,13,15 231:10,12 245:13 248:17 254:21,23

255:14,15 257:6,11,12 257:13 261:7 261:8,9,10 267:23 268:1 280:17,18 291:3,13
secondly 140:22
seconds 18:2 30:12 51:19 52:10 52:14 82:2 82:22 127:20 131:21 159:15 192:2 208:9
section 4:19 42:11 73:7,9,23 74:16,23 77:12 94:6 100:9 101:16 104:7 108:18 108:20,22 112:8 117:10 118:13,16 119:7 120:10 122:3 124:13 124:14,19,20 131:1 132:22 133:1 137:7 137:8 145:11 145:11 147:18,20 165:12,14,16 170:2,4 171:22 177:9 180:6 182:3 182:4 183:3 183:5 200:3 200:5 219:15 222:6 229:9 231:18,22 232:1 236:7 236:9 244:23 245:2 257:19 261:14 263:5 264:20 267:3 267:5,9 272:16,17,21 273:3 278:8 278:23 285:10 286:10,12,16 287:1 292:14 292:22
sections 94:5 120:8 189:11
secure 95:17 190:9 191:13
secured 189:1
security 189:14,14 194:10,11
see 3:17 8:5 16:21 18:4 22:3 23:19 29:10 33:5 62:21 65:17,18 86:14 101:8 103:10 107:21 123:22 125:8 127:1 132:1 136:8 143:6 183:11 185:17 196:5 197:4 201:11 211:15 224:18 233:4 237:2 238:14 246:8 253:17 254:13,13 256:7 275:14 283:13 290:19
seeing 51:1 83:1 87:21 89:5 99:8 100:15 104:11 109:2 131:5 139:6 166:8 201:19 211:20 216:5 226:19 230:15 256:17 258:12 267:12
seeking 209:23
seen 24:22 27:18 107:12 127:6 144:16 185:18 204:15 248:5
sees 184:11
segments 35:10
select 73:14
selected 81:9 176:16
self 143:13
selfcontained 203:14
send 44:22
senior 19:13
sense 21:1 101:9 155:2 216:3 226:11 252:6
sensor 188:15
sent 111:1
sentence 271:8
separate 6:14 87:12 102:13 126:5 128:2 146:19 189:11 203:5 203:10
separated 100:21,22 102:11 145:12,17 146:20 150:12 209:14
separating 6:22 126:2
separation 99:3 140:7 141:9 146:18 150:19 152:9 209:13
sequence 29:19 30:14 61:23 82:10 217:2 260:2
serious 127:7
seriously 128:6 268:20
serve 219:19
served 203:22
service 11:11 116:15 205:5
services 37:22 46:18 55:5 60:19 95:14,22 153:10,13 154:8 247:9 247:14 275:7 289:16
serving 231:3
session 1:13 3:1 36:16 97:8 292:16
set 40:21 46:22 68:18 83:11 134:11 199:13 207:14,18 244:23 245:1
sets 45:21
setting 15:17 23:11 191:1
seven 269:11
sevenstory 146:8
severe 59:15
shane 83:10
shape 157:7
share 173:19 253:19
shared 180:8,16,17
sheet 136:16,17
sheets 276:5
shock 281:20
shop 125:11,18
short 22:9 85:11,23 86:2 187:7
shorted 290:14
shortterm 203:15
shouldnt 53:14 77:23 149:12 197:18
show 79:1 180:17
showed 9:11 54:6
showing 165:21 180:18
shown 73:19 185:14 249:23
shows 25:8 34:13 38:10 45:13 79:22 117:17
shut 26:15
shutdown 22:8
side 5:15 74:18 125:11 185:17,17,18 185:18 235:12
sides 29:15 74:19 143:1
siemens 11:5 18:16 30:17
sight 21:18 193:16
sign 29:23 48:12 60:12 82:8 109:11 289:22
signed 212:6
significance 87:11 282:1
significant 63:8 68:21 114:16 175:14 180:18 185:9 190:5 191:21 253:19
significantly 9:7 248:22 281:22 282:7
signify 29:22 51:7 60:11 82:7 82:12
similar 17:4,10,13 34:12 44:17 91:16 94:4 94:15 95:4 110:17 150:4 154:16 191:3 213:11 255:17 263:18 264:13
similarly 151:6 202:2 212:3
simple 40:19 53:16 160:7 248:7
simpler 251:19
simply 147:3 152:14 185:20 206:9 222:8 223:5 248:8 251:4 277:23
simulate 49:18 50:4
single 20:18 40:20 92:1,13 133:14,23 139:2 151:5 163:11 254:10
singlefamily 249:7,16
singleoccupant 204:22
singlestation 133:17 134:16 163:8 169:3 169:7
sir 23:6 28:2 52:1 53:23 122:15 267:11 280:2 291:23
sister 243:17
sit 92:21 220:22
site 114:22 244:22 264:5 282:4
sitting 144:4,15
situation 17:17 25:2,17 40:15 49:14 50:9 101:15 134:11 241:7 251:23
situations 24:15,21 50:11 240:9
six 5:14 26:14 49:22 211:10
sixstory 125:4
size 127:14 241:1
skills 274:14,19
skip 34:23 137:5 165:10 169:23 177:7
slab 143:23 154:18
sleep 207:15
sleeping 163:4,7,21,23 168:22 169:2 169:16,17 203:17 207:17
slight 86:3
slightly 17:5,19 21:22
small 23:20 40:20 41:11 125:10 125:18 137:14 185:19 240:6 284:18
smelling 172:7
smith 231:7
smoke 100:12 101:2 101:20 127:13,14 133:9,18 134:1,1,2,8 134:9,16 135:15,15 136:1,2,4,5 137:11,20 138:12,18,20 138:23 139:1 139:3 140:5 140:9,14,18 141:10,12 142:13,19,22 142:23 143:1 143:3 144:6 145:9,12 146:2,3,11 147:2,6,12 148:8,9,14 148:16,21,23 149:9,17 150:4,6,9,20 151:8,9,11 151:20 152:20,21,22 153:20 154:12 155:17 156:3 157:15 161:5 161:6 163:7 163:8,12 169:1,3,7 189:22 198:10,11,13 229:12,15
smoking 20:21 133:15 206:14
smolder 161:17,17 164:15 167:7 167:10 168:23
smoldering 160:10,13,21 162:23 163:5 165:21 168:18 171:10 213:23 215:20
social 248:18
society 248:10
socs 127:1
soiled 182:3
sold 167:15 215:21
sole 231:1
solely 182:8
solomon 259:6
solution 19:8 57:22
solutions 15:15 40:23 261:3
somebody 120:3 198:19 289:23
somethings 172:1
sontag 123:9,9
soon 180:12
sorry 26:3 27:3,7 28:2,6 64:14 76:19 79:18 99:13 105:8 105:15 128:7 158:17 159:8 165:7 166:17 169:22 177:15,18 184:8 213:15 227:7 229:1 229:2 233:16 257:5 259:9 287:23
sort 39:4,13 48:7 92:1 125:9 221:5 229:6
sos 276:22
sought 129:8 162:16 168:11 174:22
sound 68:4
sounded 66:1
source 279:3
sources 206:16
southern 28:13
space 101:1 124:15 124:16 126:6 126:8,20 133:12 134:3 140:22 149:16 153:16,18,21 154:1,14 156:22,22 157:6 201:2 205:1,9 270:15 289:5
spaced 31:23
spaces 33:7,14 53:8 219:21 220:6 225:4
spacing 289:8
spare 192:2
speak 21:17 34:6 55:8 69:8 78:4 119:12 122:7 138:14 143:15,17

149:23 151:18 157:20 173:18 183:22 192:7 192:21 193:19 231:9 242:5,10 246:15 247:2 250:12 273:19 275:12
speaker 72:22 78:16 117:20
speakers 50:3 59:9 74:9 75:10,11
speaking 9:22 13:5 14:21 18:19 19:14 24:8 39:3 42:6 46:19 48:6 57:18 59:8 62:3 65:10 65:11,13,15 69:18 78:12 79:15,19 85:19 87:9 88:8 94:20 104:5,7 114:13 116:13 117:20 118:4 120:15 130:20,22,23 136:14 137:6 143:13,13 145:6 147:19 148:3 155:15 165:11,12 166:16 170:1 170:2 176:3 177:8,9,17 183:8,20 184:7,8 185:10,11 186:14 187:20 195:19,19 200:2,3,10 211:3,4 223:21 224:14 229:3 237:20,22 243:20 244:1 244:3 253:16 254:19 267:2 267:3 272:15 273:2,18 275:10,13 277:22 278:12 279:23 286:9 286:10,20 287:20,22 288:4 289:1
special 54:14 189:15 194:14,16,19 195:2,6 261:23 262:2
specialized 99:6 189:13,16 194:10,15
specific 42:22 43:7 70:17 96:15 103:21 110:23 193:23 210:15 269:12
specifically 33:5 108:3 210:13
specifics 96:1
specified 31:11 238:12
spending 205:13
spiral 101:5
spite 161:15 164:13 172:9
spoken 14:23 55:17 101:6
sponsored 32:14 202:16
spray 24:11
spread 15:19 63:7 77:10 79:22 82:14 101:20 119:18 131:10 142:22 171:19 174:11 229:11,14
sprinkler 92:7 96:14 98:17 144:8 144:10,11,13 145:2 189:22 198:1
sprinklered 91:20 98:11 160:12 164:21,22 165:1 166:3 190:7 198:3 198:6,9 213:17,20,21
sprinklerpr... 140:23 141:2
sprinklers 92:2 94:1 98:12,18,19 99:2,6 141:5 141:7 157:13 160:12,14 162:17 165:16 168:13 208:5 235:2,6 252:17
square 36:23 47:6 49:23 144:20 146:12
squared 43:20 44:1
stabilized 29:6
staff 133:8,18 137:18 162:20 165:19 168:15 188:19,21 193:4,15 194:22 195:7 197:9 199:1 199:7 200:18 207:9 236:7 259:4,10 292:6,8
staffed 204:11
staffing 208:6
staffs 204:18
stage 129:7,13 133:22 234:11,11 236:12 243:6 243:11 244:6 253:9
stair 101:5,5 125:13 126:3,13,20 154:21
stairs 208:6
stairway 152:6 234:21
stairways 235:6 252:18
stairwells 204:1
stand 210:20 223:16 292:5
standard 4:4 5:13,18 7:2 9:15 11:19,20 18:11 19:3 33:9,17 34:13 38:14 38:22 39:20 42:8 45:1,19 45:23 47:15 50:9 53:17 55:13 58:10 58:14,19 59:3 61:12 63:1 64:6 67:9 68:8 71:14 91:11 91:13 116:23 117:7 121:16 121:19 122:11 123:5 172:12 173:3 180:7,9,12 182:13 215:1 215:3 219:15 219:17,23 220:8,12,19 225:14 226:16 231:20,23 232:1,8,11 232:12,16,17 232:23 233:11,12,19 235:20 238:9 244:8 245:15 245:23 246:7 250:20 252:22 253:4 254:17 260:11 261:15,20 262:19 263:1 263:6,11,13 263:19,21 264:1,9,14 264:18 265:2 265:10,14,17 265:18 266:6 266:10,15,17 270:11,14 283:18,22 284:1
standardized 19:17 32:20 33:2
standards 12:18 13:7 16:17 20:3 24:6 33:17 58:21 62:16 70:12,18 71:20 76:13 83:7 89:23 90:5,7 91:5 95:7,8 121:16 195:11 199:18 219:12 220:7 220:20 221:1 221:2,3,8 223:1,6,16 224:16 225:11,15,18 231:16 233:13 234:22 238:13 239:3 243:17 244:16 248:8 249:6 251:1 269:23
standing 132:18 292:7 292:12
stands 107:23
star 275:7 289:16
start 142:3
started 16:7 196:11 206:10 255:18
starting 206:22 217:22 260:23
state 70:17 87:7 123:9 206:1 247:19 249:5 281:4
stated 38:1 129:17 174:22 192:17 214:16 258:7 263:5 264:22 276:8
statement 10:21 26:22 27:9,16 42:16,17,21 47:16 102:20 108:5 125:5 162:2 181:7 192:4,15 239:1 250:4 266:5 284:2
states 16:20 69:23 74:21 124:12 138:6 140:13 162:5 167:6 167:11 214:2 215:21 275:20
station 133:15 134:1 139:3 163:12
statistical 162:22 165:20 168:17
statistics 240:1 249:22
stay 19:10 27:2 187:10 239:16
stays 106:12,13,13 106:14,22
stenographic 294:7
step 57:7,21 93:2 104:21 181:12 238:11,21 249:17 250:5
stepfree 236:4
stepped 97:3
stepping 58:4
steps 240:5 241:5,6 241:12
steve 158:19
stewart 275:6 289:15
stilwell 4:17,17 5:1 25:22,22 26:3 27:4,10 27:13 28:2,6 28:6 45:7,8 46:20 47:11 52:1,3,3,17 53:23 55:22 56:18
stilwells 55:8,10 57:13
stood 195:11
stop 122:15 180:13
storage 213:13,14,16 215:15,18
store 107:13
stored 215:2,16
stories 203:22 220:2,4
story 125:3
stoves 133:2,12 134:3 134:15
straight 125:12 131:23
street 1:7
stressed 241:17
strictly 13:11 127:10
strides 247:21
stringent 197:1,2
stripped 65:22
strong 10:6 29:13 56:5 235:20 243:16
strongly 57:12 97:11 192:1 234:14
structure 31:15
structures 2:4 60:16 61:6 219:19
struggle 241:5 247:11
student 203:5 205:15 205:16 208:13
students 204:17 206:9 206:20 207:2 208:14
studied 36:14
studies 49:17 50:2
study 32:12 35:14 45:13 48:14 279:20
stuff 74:17 76:15 78:21 198:9 199:14 201:15 277:7 277:16
style 48:22
sub 175:17
subdivide 144:19
subdivided 157:6 158:17
subdividing 158:9
subdivision 146:11
subject 13:12 41:16 56:9 81:17 81:17 128:21 207:12 225:3
subjected 55:19
subjects 157:21
submission 60:8
submissions 92:1
submit 17:9 30:11 44:18 72:14 81:18 101:12 127:9 279:16
submitted 4:5 28:8 45:1 61:14 65:1 72:13 84:17 94:15 104:16 104:19 134:20 138:8 138:8 181:5 181:9 217:12 219:10 251:15,16 260:12
submitter 8:21 9:5,10 99:16 104:1 211:15 212:2 212:3 231:7 255:8 284:4
submitters 202:15 272:1
submitting 212:4
subsequent 86:7 89:1 103:7 135:19 206:5
substantiate 23:14
substantiation 13:13 56:6 143:8 210:19 222:14 272:1 278:15 283:11
substituted 99:3
success 22:5,7 248:5
successful 12:11 13:18 17:11 23:15 26:5 33:12 35:8 38:10 45:16,17 68:5
successfully 19:5 270:12
suddenly 63:15 151:2 178:10 186:1
sufficient 94:13 214:19 271:17 274:3
suggested 63:21 105:17 156:8
suggestions 268:17
suitable 33:6 261:15 263:2,10 265:10 266:6
suitably 101:17
suite 152:20 201:1
suites 204:21
summarize 37:6 241:20

summary 235:18 285:22
summer 1:7
sun 122:2
supdet 35:18 36:5,17
supervised 133:8
supervision 282:10 283:9
suppled 32:5
supplement 92:6
supplements 270:11
supplied 6:2 217:23
supplies 112:18
supply 53:8
support 13:8 14:13 18:21 19:6,9 19:14 21:9 21:13,20 24:1 37:23 41:20 42:9 44:22 45:8 47:23 59:9 64:4,15 67:17,23 68:6 69:1 72:1 74:14 75:3,7 77:21 79:5 80:15 80:22 81:3,4 81:13 86:19 87:16,17 92:15,16 94:20 104:9 108:23 112:23 116:13,14 120:10 122:7 122:17 130:20 137:9 139:2 141:14 145:6 147:14 147:19,22 161:20 167:20 170:5 170:5 176:3 176:5 183:6 192:1 200:6 200:10 201:2 203:3 204:3 208:20 215:14 224:14 226:17 229:19 231:9 233:9 234:12 235:20 237:21 239:10 240:16 243:16 247:14 256:5 259:4,10 265:22 267:9 272:21 275:3 276:12 278:7 280:1 286:16 293:13
supported 32:9
supporting 7:5 13:14 14:11 20:12 38:18 72:6 74:10 76:3 134:13 222:15 233:2 274:11
supportive 235:7
supports 32:20
supposed 155:3 183:12
suppressant 24:11
suppression 11:6,7,14 18:18 30:18 30:19 32:19 37:19 48:18 90:17 95:16 96:10 209:19
sure 34:6 50:15 108:7 134:7 135:10 137:1 155:18 161:1 165:4 184:21 209:19 216:1 251:8 253:23 254:9
surface 8:16 10:13,17 12:21 36:14 111:6 119:12
surfaces 113:18,19 119:7
surprising 202:6 269:18
survey 12:8,11 18:23
surveys 127:2
susan 200:1
suspect 51:8
suspend 3:5
swapped 136:19
switch 287:12
switching 289:9,11
symbol 251:4 252:7,14 252:16
synopsis 8:2
system 24:17 28:15 32:16 49:12 90:16,17 91:15 100:13 102:1 134:1 134:2,14 151:4 171:13
systems 2:2 3:9,21 4:4 6:2,4,10,19 11:6,7,14,20 12:6,10,14 18:18 19:1,3 30:18,19 32:19 33:11 37:17,19 46:4 47:19 65:5 219:18 225:2 234:2 234:10 242:8 242:13 243:2 243:4,13 244:7,13

T

table 5:14,14,15,19 31:7 42:23 42:23 43:12 45:18 46:12 53:13 54:6 55:23 209:15 282:22
tables 269:5 270:5,6 270:8
tackle 37:2
take 17:13 49:6 56:1 57:8 66:19,22 97:23 121:20 133:19 136:21 187:7 192:19 200:12 201:12 214:8 226:11 238:10,21 241:21 245:5 273:23 275:14 279:18
taken 52:16 62:14 92:9 128:14 213:19 223:8 234:15,16 235:15 249:12 269:12 284:4 284:7 294:7
takes 26:16 102:4 187:11 202:5 257:19
talk 22:4 72:23 75:8 77:4,10 290:13
talking 8:4 10:9 49:9 49:11 54:22 72:21 78:17 110:19,20 118:5 119:13 145:15 172:5 186:15 198:7 211:18 277:2 277:3,5
talks 75:18,19 111:11
task 36:2 55:6 196:15,19 285:8,13,14 287:2,9
tasked 83:12
tasks 192:17 282:5
tc 74:1 124:6 131:8,20 227:22 234:2 234:10,14,14 234:15,16 235:2,10 270:3
tcc 2:5,14 86:15 93:6 193:19 218:20 219:4 220:17 221:7 222:12 227:21,22 232:22 233:3 233:7,9 236:12 244:10,12
tccs 231:3
tcds 196:5
tcrs 196:4
tcs 231:2 232:19 234:19
team 100:10 127:22
technical 1:3 3:1,8,20 4:2,6 7:15 7:17 8:21 9:5,15 12:16 14:23 15:3,4 19:13,21 20:14 21:1 23:1 24:2 27:17 32:10 33:1 35:4 41:18,18 44:19 46:10 46:19,21 48:20 49:16 55:5 56:5 57:8 60:15 60:18 61:6 61:10,15 70:11 74:1 79:13 83:18 83:21 84:8 84:13,13,18 84:19 88:21 92:11,22 93:4,5 94:13 97:13 98:8 103:1,12 104:22 111:2 113:10 115:12 124:4 128:23 129:5 132:8 134:22 135:6,7 138:18 141:23 148:5 156:20 162:8 162:14 165:13 167:23 168:5 168:10 170:3 173:8 174:15 174:20 177:10,14 181:14,15,21 182:1 186:6 193:22 194:6 210:4,18 214:10 216:16,19 217:4,8,8,13 217:14 219:5 221:12,18,23 224:22 228:2 233:22 234:5 236:16 238:6 238:12 242:8 242:12,18,23 243:2,4,13 243:22 244:16 258:3 259:16 260:4 260:9,13,14 268:12,14 272:9 273:17 276:20 285:14 287:8 292:18 293:10
technically 33:23 47:4 57:10 197:18
technologies 18:17 71:19 288:4
technology 24:7 267:19 268:10 278:12 280:14 287:7
ted 202:14
telecom 36:19
telecommuni... 35:22 47:21
telecommuni... 33:8 43:22 44:11 56:22
tell 7:18 62:18 78:20 79:2 120:2 142:6 225:19 277:16 290:16
telling 78:17 161:14
tells 77:13 119:16
temperature 176:14,23
temporarily 239:17
ten 7:22 18:10 32:1 119:21 120:4,6 187:9
tenant 112:11
tend 191:3 203:21
tendency 100:8
tens 12:5 33:10
tentative 33:1
term 113:22 117:5 174:4,4,7 178:3 274:8 274:23
terminate 154:17
terminated 292:17
termination 282:17
terminology 71:18 117:9
terms 80:22 116:22 252:1,1,6 253:6
terrain 245:7
test 6:15,23 15:5 15:18 16:14 16:14,19,20 16:21,22 18:4 19:18 19:18,19 23:20 24:10 24:10,19 25:18 26:6,9 26:9,22 32:10 38:7 38:17,20 41:12 54:14 62:20 63:10 66:7,16 67:2 71:7 74:22 76:17 78:1,2 78:6 80:1 90:5,7,13 91:5,9 93:21 95:7 97:17 112:1,1,2 118:18 119:17 120:4 120:6,17 121:7,11,11 121:19 122:4 123:3 173:3 180:9,13,15 180:19 184:18,20 185:3,3,15 185:20 186:3 186:15,15,19 215:1 244:23 274:16
tested 91:13 95:17 96:9 112:4
testifying 233:14
testimony 72:5,10 192:12 243:23
testing 11:21 20:6 37:2 38:15 53:11 68:4 90:8 115:7 182:14 214:20
testings 44:7
tests 18:4 19:22 26:20 42:15 42:20 50:3 71:8 78:4 271:15
texas 104:6 130:23 148:4 155:16
text 69:11 79:21 129:15 142:15 163:2 164:12 168:20 222:8 222:11 233:13,17 237:2 243:10 253:7 257:20 263:7,13 281:4
thank 4:13 7:22,23 11:2,4 12:22 12:23 13:2 14:15,16,20 18:11,13,15 19:9,10,12 21:13,14 22:12,14 24:2,3 25:19 25:20 26:23 27:1,23 28:1 28:19 29:6,8 29:18,23 30:16,23 31:6 34:1,2 37:14,16 38:23 41:21 41:22 42:2 45:3,5 46:14 46:15 48:2,3 50:16 51:1,7 52:8 54:21 57:13,14 58:1 59:4,5 60:2,3,11,13 61:4,22 62:2 62:9 64:6,15 64:16 65:7,9 67:18,19,21 69:1,2,14,16 70:4,5 72:1 72:2 75:4 77:16,17,20 78:7,8 79:8 79:9 80:3,4 80:10 81:4 81:15,20 82:7,13 83:2 83:4,10 84:7 85:2,18 86:10,11,13 87:18 88:17 88:18 89:3 89:12,17,20 92:18,19 93:7 94:17 96:21,22 99:19 100:1 103:15 104:2 104:10 106:2 108:3,4,15 108:23 109:1 109:11,19 110:2 113:1 113:2,12 114:10 116:8 116:8,9 120:12 122:4 122:5,21 123:7 124:5

124:9 127:21 128:9,11 129:3 130:16 130:17 131:4 132:2,4,14 132:17 134:16,17,19 136:9,10,21 137:4,5,21 137:23 138:16 139:4 139:12,16,20 139:23 141:15,16 143:10 145:3 145:4 147:14 147:15,23 148:1 149:20 151:15 153:4 153:6 155:11 155:12 156:16 157:16 159:15,18,22 160:6 161:20 161:21 162:3 162:12 164:5 164:6 165:2 165:8 166:4 166:5,19 167:20,21 168:3 169:20 170:6,7,23 171:7 173:5 173:6 174:18 175:22,23 176:11 177:5 177:10,11,13 178:21,22 179:19 180:3 181:2,3,19 182:20,21 184:1 185:6 186:11,12 187:18,22 188:3 192:2 192:3 194:4 195:14,15 199:22 200:7 200:8 201:5 201:18 202:19,23 207:17 208:20,21 210:7,22 213:8,10 214:6,7 215:5 216:3 216:4,12,14 217:20 218:7 218:17 221:12,13 222:19 223:17,18,19 224:11 226:18,19 227:11,14,23 228:10,17 229:20 230:13 236:5 236:19 237:18 241:23 242:2 243:18 244:4 246:11 250:7 250:9,11 253:11,13 254:17,18 256:3,4,15 256:16 257:2 257:9,13,23 258:1,6,10 258:11,16 259:3,12,14 260:3 261:6 261:10 265:23 266:22 267:1 267:10,11,16 267:18,21 268:2,4 271:20,21,22 272:13,14,22 272:23 273:13,14,15 275:3,4 277:21 278:8 279:7 280:7 280:19,21 282:15 284:13,14 286:6,8,17 286:18,19 287:3,4,19 288:21 289:3 289:14 290:13 291:10 292:4 293:5,11

thats
9:19 21:23 22:21 23:13 25:16 26:11 27:23 29:17 47:6 48:12 49:12 53:3 56:16 57:3 59:16 63:19 67:6 69:22 72:21 73:3 73:10,19,20 74:3,17,23 76:17 77:7 77:15 78:15 78:18 79:3 82:3 112:1 115:10 118:8 118:9,10 119:10 126:8 128:21 130:2 133:13 134:8 142:15 144:11 148:23 152:17 155:3 161:23 162:6 164:15,20 169:5 171:18 177:23 178:5 179:5 183:13 185:20 197:2 198:14,22 201:16 209:17,19,23 214:5,23 215:1,21 219:6 220:12 220:20 222:5 222:17 225:16 231:19 240:3 251:2,21 252:5,12 254:22,23 255:11 262:12 274:9 275:14,16 276:16 277:16,18 283:14,18,22 291:14

theoretical
41:11

theres
5:13 9:14 12:17 13:21 19:21 20:11 20:13 21:8 25:6 33:17 34:8 50:1 76:5 79:23 89:17 100:1 101:11 105:6 105:10 107:13 109:19 111:9 111:10 112:4 114:16 115:22 120:2 123:5 124:5 132:11 136:15 139:16 143:2 144:22 152:11,21 157:2,10 158:13,23 159:22 165:20 166:19 171:17 179:5 179:19 180:18 186:1 187:22 190:15,20 193:2,16 196:8 202:19 209:21 219:20 220:11,15,20 225:12,14,17 226:14 229:9 231:11 240:19 250:13,22 253:2 257:9 261:10 262:23 267:21 276:6 277:14 278:17 280:5 280:16 290:1 290:8,23

thermal
17:23

thermals
208:7

theyll
183:9 198:20

theyre
49:2 56:3,3 64:12 72:5 73:16,17 74:19,23 78:13,20 97:18,18,18 97:22 98:14 110:19,20 133:4 144:1 161:2,4 164:22,22 167:14,14,15 178:14 183:12 184:12 190:7 197:17 203:12 207:5 212:16 245:12 251:6 251:11 288:8 289:8,13

theyve
16:11 117:23 251:8 277:8

thing
6:22 7:4,12 21:18 23:11 23:23 24:16 25:23 26:8 26:10,18 28:2 50:15 53:16 58:9 58:16 64:7 64:14 86:8 88:15 91:17 98:21 107:13 111:12,16 134:7 183:18 197:8 198:10 199:6 211:5 211:7 220:22 224:15 227:5 227:17 245:13 254:15 256:11 273:6 290:15

things
22:9 23:22 26:10,12 49:1 57:6 74:3 80:16 92:1 103:7 121:21 172:22 184:22 196:23 197:2 197:7,15,20 198:23 206:13,20 211:10 218:19 221:5 229:6 248:6 252:18 254:1 273:11 277:6 288:8 289:9 290:17

think
8:1 15:1 17:1 20:9 21:18 23:10,22 24:10,11,19 24:20 26:20 27:20,22 35:1 39:15 40:6 41:17 47:2,14 49:8 50:8,18 54:11 57:20 57:22 58:16 67:8 69:22 76:4 97:2,6 98:9 107:11 108:2 115:11 116:1,23 117:12 121:16 129:22 134:7 136:14,19 144:22 145:2 149:19 154:4 154:7 155:9 158:13,15 161:12 173:17 184:18 192:14 195:23 198:14,21 199:15 201:3 205:13 211:11 214:16 220:8 251:11 254:4 255:21 256:17 273:12 275:15 276:23 277:14 278:6 282:13 288:18,19 290:6,8

thinking
98:23 276:16

third
141:3 193:16 249:9

thirdly
235:22

thirds
92:13 95:1 97:10 98:1,4

thomas
27:8 46:17 55:4

thornberry
217:23 218:4,9

thorough
234:7

thoroughly
287:10

thought
51:20 103:20 160:7 172:9

thousands
12:6 13:19 33:10 68:9 248:3 269:13

threat
189:15 194:11

three
6:3 13:9 19:20 26:19 31:23 35:20 36:8 39:6 64:10 64:14 83:8 83:13,13 87:12 97:17 125:9,12,19 125:20,23 127:1,2,6 128:13 148:15 188:13 193:11 220:2 220:3 248:6 272:6 285:11 287:2,15

threefloor
126:8

threestory
124:16

tia
58:17 251:1

tie
5:6 25:15

tight
127:18

tile
21:23,23 111:17,20 120:5,5

tim
77:20

time
3:5 6:4,18 15:11 20:1 22:9 30:11 35:1,9 38:7 51:18,22 54:2 57:11 63:10 71:5 78:23 82:3,9 82:15,21 83:2 86:18 93:2 104:20 107:20 128:7 132:2 146:15 146:19 156:6 156:20 173:21 181:12 185:12 193:14 201:9 212:6,15 213:1 223:6 232:15 233:8 238:21 255:19 264:6 264:8 275:15 277:14,15,17 282:13 289:20,23

times
10:18 16:2 27:11 39:14 39:18 52:22 53:5 54:15 64:14 94:22 98:22 145:9 151:19 188:20,21 194:23 195:8 199:1 252:17

today
7:21 16:18 18:19 20:4 29:14,16 35:16 37:20 68:15,18 71:22 103:7 132:18 148:9 171:14 199:13 202:12 232:8 233:15,18,21 234:12 235:8 235:11,18 244:20

todays
204:19

told
63:1 75:19 158:2 198:5 198:22 220:23 236:7 251:19 255:8

tom
22:23 57:19 94:19 99:15 138:3 283:13

tomorrow
83:15

tons
186:18

tony
89:13

tools
172:10

top
30:5 51:11 82:18 126:12 131:14 159:10 241:6

topic
234:6 251:14 252:19 258:12

topographical
245:21

total
24:17 144:3

totally
24:18 97:16 144:3 145:22 146:6 158:7 203:11 253:3

touch
8:18 34:19 193:16

townhouses
232:3

tracy
259:8,9

trade
114:4

traditionally
200:15

tragedy
207:22

trained
204:12 274:22 278:1,3 279:3

training
207:9 238:1 271:7,10,11 271:12,13,14 271:16 272:3 274:3,6,7,9 274:12,16 276:4,9,20 276:22 277:1 277:6,9,14 278:23 279:3 279:4,5

transcription
294:6

transfer
145:10

transferred
145:14

transit
247:23

transportation
247:8,15

trash
180:5,7,10,11 181:2 182:3 186:1,11

travel
145:23 146:2 146:13

trays
31:20,23 46:6 53:15

treat
66:20 213:3

treated
67:5 69:17,20 72:4 78:11

87:1,8 109:14 110:6 117:16 177:21 218:12 224:13 227:3 229:3
treaters 69:23
treating 74:6
treatment 21:2 68:5
treatments 70:2 71:20 175:18
treats 7:6
tree 80:9
tremendous 248:18 259:3 259:13
tremendously 50:12
trend 205:7 208:10
tried 46:22 49:18
trouble 101:9
troubleshoo... 277:5
trucks 137:19
true 78:22 90:8 294:6
truly 56:1 270:22
try 31:13 34:7 36:20 37:6,7 39:23 50:4 67:13 91:18 114:6 122:2 132:20 158:8 186:20 187:10 215:19 228:22
trying 24:16 25:1,2 31:15 34:17 37:8 50:8,10 58:7 74:8,20 85:3 117:17 118:10,11,20 172:3 229:8 244:20
tsang 25:7
tucked 100:18
turn 65:5 271:19
turning 234:13
twelve 187:11 260:15
twice 50:6 293:8
two 5:20 6:7 7:6 9:3 10:16 12:5 15:21 31:20 39:13 42:10 43:3 48:17 49:6 52:9,13 59:9 91:23 92:12 94:23 97:10 98:1,4 100:21 101:6 101:9 115:13 121:5 127:14 129:22 136:2 148:15 156:18 161:8 189:11,15 192:7 199:3 212:17 213:4 215:22 220:1 221:9 232:2 232:18 233:22 236:22 237:15 245:11 247:17 249:20 252:4 266:12 270:18 272:13 282:5
twofamily 238:23 241:23
twohour 126:5,11 140:7 141:4,5,9 143:22 145:17 154:18
twostory 100:9,18 102:10
twothirds 93:16 240:3
tyco 37:20 38:18
type 25:14 31:14 47:1 66:20 100:15 102:14 161:5 161:5 203:6 203:12 206:17 208:4 208:4,18 220:1,3 238:11,14 239:4,7,14 239:15 243:7 245:2,3,8,10 246:6 247:4
types 21:2 96:13 208:2
typical 190:23 203:19 209:17
typically 203:15 204:13
typo 105:6

U

uhoh 125:13
ul 19:17 20:3 26:6 90:6 97:17
ultimately 10:4,13
unable 17:4,6 23:14 241:11
unanimous 129:20 164:4 169:20 221:11 243:15
unanimously 175:21 182:19 234:10
unavailability 236:13
unavailable 246:8
uncertainty 9:18
uncompartme... 150:23
undefined 174:7 273:6
underneath 144:4,15
underpins 42:22
understand 34:17 53:19 58:12 73:16 87:10 91:4 135:9 152:10 254:3 290:1 290:2
understands 284:6
understood 272:2
underwriters 259:19 267:2 272:15 286:9
undo 25:17
uneasy 254:12
unenforceable 33:23 56:4 171:17 282:19
unfortunate 87:10
unfortunately 64:11 108:21 143:16 237:13
unfounded 265:3
unintentional 285:21
unique 62:23
unit 56:13 245:22
united 16:20 69:23 74:21 138:6 167:6,11 214:2 215:21
units 192:13,13 196:10 232:3 238:12,14 239:4,5,7,14 239:15 245:3 245:8,10 246:7 247:4
universal 248:12 250:6
universities 210:12
university 202:10,11,13 202:14
unlock 194:22 195:8 199:8
unnecessarily 16:4 288:8
unnecessary 11:16 162:18 168:13
unpaid 231:3
unprotected 102:4
unquote 175:8 265:14
unsafely 240:7
unsprinklered 91:20
unsubstanti... 269:2 281:17
unsupported 34:1
untenable 32:8
untreated 74:19
unwarranted 11:16
upheld 34:13 70:14
upholstered 125:10 162:4 163:3,21,22 168:9 213:23 214:3,5,17 215:16
upper 36:21
ups 28:16
urban 121:8 232:4
urge 18:12 19:6,8 21:12 24:1 41:19 57:12 59:1 60:1 69:1 70:3 71:21 75:2 79:5 92:15 96:20 102:16 112:23 120:10 147:14 192:1 208:20 223:17 246:10 273:13
urging 235:22
urination 241:15
usability 236:3 238:17 238:19 247:21
usable 33:3 46:23 231:20 248:15 249:3
usb 68:12
use 6:19 7:2 8:13 30:3 31:10 31:12 44:13 46:3,11,14 46:14 53:18 54:15 70:1,1 75:16 91:1 94:10,14 96:9 100:9 108:13 113:22 124:13 128:20 129:18 130:7 146:6 163:11 169:6 172:21 174:1 196:13 200:11,16,17 206:20 219:2 224:9 225:16 225:16 231:1 239:9 241:13 257:17
useful 8:2 57:9
user 7:1 40:2 46:1 46:2 63:1
users 53:17
uses 26:6 42:17
usual 84:5 125:11
usually 5:3 171:18 178:13,14 283:5
utilized 95:21

V

vague 178:3
valid 43:16 56:7 63:16 155:17 258:7
validation 44:15
validity 44:12
valuable 288:11
value 13:23
values 5:19,19,20 9:20 42:13 45:2 55:23 58:10,20 59:3
varies 281:22
variety 172:14
various 15:5 103:1 173:10 192:19
vary 282:16
vast 150:22
vats 66:12
venues 205:11
verbage 55:21 69:12 174:10
version 16:16 39:20 47:9 150:5 233:9
versions 15:22
versteeg 69:5,6 79:12 79:12,18 221:23 222:2 222:3,4 228:2,4,5,6 258:3,5,6
versus 7:11 10:12 17:12 55:10
vertical 100:16,18,20 101:1,8,10 101:16,21 102:4,6,10 125:2 126:10 127:9,12,23 128:4 143:20 152:6 153:1
vertically 143:3 152:13
verticallya... 101:6
veterans 129:4 132:6 134:21 135:1 139:14 141:20,21 156:17 162:13 168:4 174:19 181:20 194:5
victim 207:1
video 180:16,18
videos 271:15,19
view 9:14 113:11 210:5 214:13 221:20 235:1
views 174:15
violates 101:15 127:15
violation 183:13 184:13
virtually 15:19 16:8 23:7 164:14
virtue 95:8,13
visibility 239:6 253:18 254:10,15
visit 125:3 239:8
visitable 239:5 249:7
visually 132:1
voltage 54:13
volts 32:6 53:9 54:13
volume 219:22 220:2
volunteer 35:9
vote 12:19 18:12 19:9 29:19 33:20 41:20 47:13 51:3,9 51:12 57:12 59:1 60:1 71:22 82:16 82:22 87:17 87:22,23 89:6 92:13 92:14,14 93:16 94:23 95:1 96:20 97:10,23 98:2,2,3 99:9 102:16 104:12 109:3 109:4 123:12 123:15 124:18 129:12,20 131:6,16,21 136:8 139:6 149:18 158:23 159:4 159:9,12,14 161:6 164:4 166:8 169:20 170:11,14 186:23 195:13 201:20 211:20 216:5 226:20,21 230:16 237:7 243:15 255:1 255:4 256:18 256:19 258:13 266:11,20 267:12 272:5 273:20 279:8 280:8 284:9 284:10 291:17 293:8
voted 52:18 104:9 108:23 129:11 131:2 136:1 137:9 143:6 147:21 165:15 170:4 183:5,6,21 200:6 234:10 236:21 243:5 267:6 272:18 286:13,23 287:1
voters 71:22
votes 30:11 51:18 97:12,15 275:2
voting 4:6 30:2,5 51:10,12 61:15 69:7

82:16 128:3 131:14,14 159:11 260:13,16 262:13 272:9 276:2 292:5

W

wagner 202:14
wait 22:20 27:14
waiting 208:7 228:21 258:18
walk 191:2
walked 125:7
walker 241:2
walking 290:7,19
wall 40:12 99:3,5 100:19 101:7 115:23
walls 90:19 113:18 114:23 119:7 149:3,18
walmart 291:3
wander 191:3
want 18:22 19:20 29:11 34:18 45:20 56:2 57:15 58:12 58:13,14,17 62:19 63:20 64:7 67:13 73:18 75:7 80:7,16 81:8 97:5,6 98:15 98:21 100:11 105:1 108:5 114:7,16 115:12,13 124:23 134:10 135:10 142:9 144:9,19 146:16 156:12,18,19 171:22,23 172:17,20 185:3 187:15 196:18 197:7 197:11,16 220:9 224:14 224:15 227:5 243:22 256:1 273:22 274:5 274:6 275:14 293:7,11
wanted 54:16 59:11 69:19 137:1 138:13 183:4 190:13 197:1 197:1 198:11 199:17 218:22 273:20
wanting 87:20 196:15
warehouse 214:18,22,23 215:2
warren 210:3,8 236:15 236:20
warrens 211:8
wasnt 78:19 118:4 143:15 157:20 158:2 237:11 246:3 252:23
waste 212:23 277:17
wasting 277:15
water 90:16 91:23 288:3
watt 56:9
watts 49:2,22
way 7:5,21 10:15 30:1 44:17 66:6 75:17 76:1,10,10 76:11,11,12 76:13,14,18 76:19 85:15 86:17 91:14 100:21 102:11 106:11 108:22 112:7 114:23 115:2 118:16 151:4 151:20 157:7 172:17 178:2 178:20 183:15 200:14 228:15 230:3 237:6 253:23 258:19 283:6 291:2
ways 118:2,8 120:1
wearing 288:10
wed 274:15
wednesday 1:11 3:3 294:9
week 22:4 106:6
welcome 3:4 102:19 113:3 247:2
welcoming 246:22 249:3
welldocumented 41:14
wellknown 207:2
went 6:13 9:22 34:21 79:6 98:6 106:20 151:2 164:23 199:6 207:15
western 116:16
wetting 96:15
weve 12:9 20:16,17 23:3,6,6,7 23:14 52:16 74:18 78:13 85:9,13 86:9 105:16 116:20 144:16 151:2 198:1,4 199:6 201:23 202:2 212:1 213:2,11 220:23 226:8 226:13 252:16 257:16 258:18 270:9 288:19
whats 45:22 48:13 54:17 98:18 106:9 156:10 164:21 223:13 227:19 252:11 278:6
whatsoever 99:1
wheelchair 241:2 246:2
wheres 112:13,17
whichever 19:18
white 3:13
whos 155:18 279:17
whove 14:22
wide 25:11 37:21 126:13 144:3 144:3,14 156:23 270:20 273:7
widely 233:12,20 237:6 253:11 282:16
widen 147:12
widening 240:23
widespread 15:19
wildland 121:8
william 83:21
willse 60:19 61:3,4 61:22 64:16 64:18 83:3,4
windows 209:22
wing 25:6 201:2
winning 14:18
wins 157:21
wise 23:11
wish 164:19 172:19
wished 266:20
wishes 10:9
wit 121:13
withdraw 99:17 218:6
withstand 176:13,22
wonder 128:13 153:14 271:17
wonderful 127:23
wont 75:23 197:12 226:6 251:5 268:5
wood 5:7 26:11 61:12 62:14 64:1 65:2,20 66:8,11,11 66:13,15 67:3,22 68:2 68:5,6,16,22 69:17,20 71:11,15 72:5 73:6 74:19,20 75:2,21 76:2 76:22,23 77:13 78:12 80:8 81:2 87:2,9 109:15 110:7 114:19,21 115:15,17,18 117:17,22 118:2,4,7 119:5,23 121:6,8,10 121:23,23 218:13 219:3 219:6 220:10 222:12,16 224:4,7,14 226:5 227:4 228:8 229:3 229:13 257:17
woods 74:6
word 30:4 51:11 71:2 78:7 82:17 86:5,7 88:16 114:2 131:13 159:10 171:15 174:1 237:6 258:18 263:8
worded 112:8 230:3
wording 178:16 228:7 258:8 261:12 262:12 281:13 283:23
words 62:12 65:22,22 71:22 72:15 72:18 80:18 150:6,8 203:3 251:17
work 6:13 24:6 25:6 25:10,13 29:12 36:16 44:14 68:11 68:19 83:14 132:5 149:5 154:6 196:16 211:15 251:7 259:4 261:18 261:22 262:12 268:23 269:13 270:11,13,16 276:1 277:13 279:12,15,17 279:18,20,22 280:3,4,22 281:7,9,10 281:14,19 282:2,7,23 283:5,5 285:22 286:2 287:14,17,18 288:12,15,18 289:5,11,13 289:21 291:7
worked 23:3,6,6,7 39:23 55:6 200:15
worker 263:17 271:3 274:13,14,21 283:10
workers 273:16 275:1 276:7 279:1
working 12:18 32:23 35:20 36:2 68:10 72:11 81:7 122:20 176:19 223:11 232:19 270:15 281:5 283:1,7 284:1,20 289:1,4
workplace 2:18 259:17 260:5,11 268:13
works 238:3
workshop 35:17 36:1
world 13:15 18:5 25:7 40:11 184:9 199:14 241:10 270:20 291:3
worlds 235:23
worldwide 270:13,17
worry 191:3,7
worse 17:17
worstcase 152:5,18
worth 205:13
wouldnt 78:19 199:20
wound 65:12 67:14
wrap 37:7 258:20
write 76:12,13 155:23 219:17
writing 172:12
written 7:6 43:5 69:12 71:23 150:4 210:17 263:1 263:3 279:2 281:10
wrong 14:12 49:15 87:4 105:8 121:17 145:2 161:13 219:16
wrote 35:15 65:2 223:6
wui 121:9,13
wysocki 22:23,23 23:5 27:3,7,8,16 46:17,17 55:4,4

X

Y

yeah 197:16
year 14:19 44:9
years 7:22 12:7 18:11 20:17 33:12 39:6 40:6 57:5 58:6 67:13 68:2,9 72:11 74:7 81:8 91:6 126:21 127:6 156:5 161:16 164:16 196:11 208:11 214:2 214:4 223:1 223:17 225:1 235:3 259:5 268:14,19 275:18,19
yesterday 104:8 131:2 137:8 147:20 165:15 170:4 200:6 267:6 272:17 276:10 286:12
york 99:22 124:2 206:1
youd 8:12 18:9 52:6 58:12 181:6
youll 161:20 183:11 245:11
younger 48:23
youre 24:16,17 50:12 64:8 73:15 73:18 74:3 82:14 87:7 90:23 113:4 118:16 120:20 130:20 145:17 146:10 147:7 152:2,3,7,13 154:20 165:5 173:4 184:15 184:16 213:4 215:22 219:7 219:22 220:3 229:16 237:20 273:23 277:15 279:13 282:13 283:8 287:12,13,15 287:16,18 290:7,9
youve 83:11 85:6 107:12 116:1 119:19 155:10 186:17 197:20 226:4 276:19 277:1

Z

zaremba 94:19,19 99:15 99:15
zero 12:12 16:5 33:14 56:14 249:17
zone 245:20

0

000 12:10 146:12 147:7 219:21 219:22
000square 125:4
05 39:22
07 187:13
09 35:16,18

1

1 8:15,15,20 9:4 9:4,13,13,17 10:7,7,12,12 10:18 13:1

13:16 16:1 16:10 26:5 27:11 30:6 39:8,13,13 39:17,18,22 39:22,22 41:23 42:13 43:23 51:12 52:23 53:5 54:6,15 65:8 70:6 77:18 80:5 82:18 98:15 124:13 129:12 131:16 136:8 138:1 151:16 159:12 174:9 174:9 175:18 180:21 183:19,21 185:14 186:2 186:6,7,11 195:14 209:11 217:23 219:16,16 231:21 233:16 237:11 242:18,23 243:7,9,18 250:16,17 251:14 256:7 263:5 267:17 278:10 280:12 281:4 281:4,8 284:19,19 287:5 288:2
10 9:12 14:7 17:5 43:20 45:20 52:6 55:1 60:9 63:9 86:9 111:4 148:21 150:17 151:1 160:22 162:3 165:2 264:7
100 56:12 292:14
1005 231:18,22 232:1
1006 231:18
101 64:8 83:2 84:16 86:16 86:21 89:2 105:8 120:2 145:8 166:17 166:17,17 170:21 171:13 186:7 203:4 220:14 220:14 223:4 224:2,3,10 235:3 255:19 256:3 259:2 259:2
1011 64:21 85:8 87:21
10110 2:10 139:10
10111 2:10 159:17 166:6
10112 2:11 166:13 169:22
101122 105:12,22 109:8
10113 2:11 170:18
10114 2:12 179:12
101144c 105:7 109:18 109:22 118:15 123:19
101145 109:18,22 123:19
101146 140:2
10115 2:12 187:16 201:6
101153 188:8
10116 202:1
101161 84:22
10117 202:3
101189 100:2 104:4,14
10119 2:13 202:5,7
101193 105:6,10
101193a 105:19,21 109:7
1012 2:6 64:21 86:4 88:4 89:8
10120 212:2
101203 128:16,17
101204 128:16
101205 128:17
101206 132:10,12 133:23 136:12 139:5 139:8
101208 135:21
10121 212:3
10122 212:5
101221 109:17,21 123:18
101222 105:7 109:17 109:21 118:14 123:18
101223 139:15,17 141:15 159:6
101224 84:21
10123 2:13 88:10,12 89:8 212:12 215:9
101232 159:20 160:1 161:23 166:6 166:10
101233 166:17,21 170:15
101235 175:17
101235a 177:19
101236 170:21 171:2 179:9
101237 179:18,22 181:9,22 187:3
101238 192:11
101239 187:21,23 195:17 201:7 201:21
10124 2:14 85:20,22 86:14 87:21 88:1 215:10
101250 159:21 160:1 162:1 166:7 166:10
101251 166:21 170:16
101253 170:22 171:2 179:9
101276 124:3,7 131:8 131:20
101277 202:18,20 211:21
101292 140:2 142:3
1013 2:7 89:11
101303 212:15,18 215:8 216:7
101305a 179:17,21 181:23 187:2
101307 188:7 212:15 212:18 215:8 216:7
10136 93:20
1014 99:13
1015 2:6,7 99:20 104:11
1016 2:8 105:2 108:16 109:2
1017 2:8 109:12
101703 117:19
1018 2:9 84:21,22 123:22 131:5
10189 89:15,18 92:16 96:21 99:11 99:23
1019 2:9 132:3
103 140:1
104 91:2 94:6
105 2:8 91:3
109 2:8
10minute 112:1 115:4 118:18 120:17
11 135:22 249:9 294:15
110264 173:22
117 242:18,23 243:7,9,18 251:14
12 1:15 3:3 146:12 234:4 242:9 244:23 245:2 285:13 294:10
120volt 269:1
123 2:9
13 92:14 95:1 102:3 187:14
130 281:4,8 282:22 284:19
1301 9:1
132 2:9
139 2:10
14 146:12
14520 9:15
147 95:1
15 1:11 3:3 17:5 40:6 56:9 58:6 68:9 72:11 86:9 268:14 287:12 294:9
159 2:10
16 61:15
160 291:4
166 2:11
17 9:12 28:10 284:11 293:15
170 2:11
179 2:12
18 124:13 125:1 136:18,19 137:3 141:1 147:2 157:14 182:4 202:3
187 2:12
18inch 26:11,11
19 81:7 136:18,20 137:4 182:4 191:11 194:23 195:9 201:12
191 12:11 19:1,4,4 33:12
1910 272:4 278:16
192a 105:10
193 105:6,11
193a 105:19
1960s 247:6
1970s 247:7
1972 167:7
1973 23:2
1978 160:8,19,20
199 281:13 283:14
1990s 6:12 43:14
1993 12:10 19:1
1994 5:11
1999 126:21

2

2 4:19 8:15 9:13 10:7,12,18 13:16 14:17 14:18 16:1 21:15 22:22 24:3 26:5 27:11,15 28:20 30:7 38:2 39:1 42:11 48:4 51:13 69:15 72:3 78:9 82:18 86:22 87:7 98:15 100:9 104:4 114:9,11 120:13 124:13,14 130:21 131:17 136:18,18,18 136:19,20 137:3,4 143:11 148:2 150:14,14,20 155:13 159:13 194:23,23,23 195:9,9,9 201:12,12,12 209:11,15,15 209:15 222:19 228:11 229:21 244:23 245:2 253:13 266:23 286:7 291:10 292:15
20 3:13 12:7 16:21 20:17 33:11,13 57:4 119:19 129:12 148:21 195:14 236:21 272:5 275:2,19
200 146:3,16
2000 126:21 270:7
2001 4:3 5:11 12:16 12:18 13:4 13:18 15:22 17:8 19:4,14 23:1 24:2,7 29:19 33:1,4 38:2 40:18 42:5 44:19 46:18 48:6 55:5,13 57:8 57:17 84:11
20011 2:3 4:9,10,15
200112 4:10
200116 8:7 10:10 29:21 30:10
200117 2:4 30:22 45:20 51:5 51:17 52:5 53:21 55:1 60:8
20012 2:3 30:14 51:3
200124 8:6,10 29:21 30:10
200126 30:21 51:4,17
200133 4:9
20016 55:1
2002 219:1 226:6
2003 240:21
2004 264:5
2005 225:20
2007 34:11 40:22 274:17
2008 38:2 47:9 55:21 283:18 283:22 284:3
2009 81:16 129:16 188:12 189:7 189:20 194:12 196:16 197:5 201:10 228:7 231:21 232:13 270:9 283:17,22,23
2010 3:23 55:2 268:15
2011 1:1,11 3:3 60:22 61:9 84:2 216:21 217:7 232:14 232:21 244:11 259:22 260:7 278:22 293:10 294:9
2012 268:20 269:17 271:1
2015 95:5
2018 294:15
202 2:13
2030 239:22
206 136:3,7
207 135:19
208 135:19
20th 239:20
20to1 124:18
21 286:22
212 2:13,14
2127 11:19
216 2:14
2166 11:19
217 2:15
218 2:15
22 144:20 240:1 266:11
223 140:1
227 2:16
23 11:1 12:10 19:1 278:22
230 2:16
233 166:17

24
5:19,19 133:8
165:20
25
10:5 63:7
79:22 119:18
219:21,22
229:12,15
260:13
275:18
251
90:5 166:18
255
2:17
256
2:17
257
2:18
259
2:18
261
2:19
263
90:6
267
2:19
27
136:8
28
129:20 164:4
169:20
175:22
182:19
280
2:20
29
4:6
293
294:5
2c
282:22

3

3
2:2,3 4:16
8:15,20 9:13
9:17 10:5,7
10:12 25:21
28:1 37:15
45:6 52:2,23
53:5 81:20
94:18 99:14
99:20 108:2
108:16
116:10
123:23
124:13 132:3
136:18,18,18
136:19,20
137:3,4,4
139:11 145:3
147:16
149:21
150:14,14
153:7 156:15
199:23
209:15
219:16 220:5
220:19 227:2
242:3 244:23
245:2 261:1
263:5,5
275:5 289:14
30
1:15 2:3 3:3
16:21 18:2
63:6 72:12
112:4 121:20
127:20
148:21
161:16
164:16 208:9
294:10
300
146:1
30minute
66:16 67:2
71:7 74:22
111:21 116:6
157:9
31
270:19
32
182:6
33
214:4 244:23
245:2
332
272:4 278:16
34
209:11,15,21
35
42:13 54:6,15
239:20
287:12
37
93:20
3m
13:3 42:5
43:13 44:4
58:4

4

4
4:19,19 11:1
38:2 42:11
43:23 58:2
67:20 77:12
101:16 108:2
142:6,8
150:14,14
157:18 174:9
174:10 184:2
186:12
187:13,14
195:17 201:7
210:23
223:19
244:23
254:18
273:14
292:15,22
293:3,4
40
213:15 214:2
400
19:1 290:12
415
1:7
42
213:16
450
125:4
45a
219:10 227:18
480
32:6 53:9
54:13
48inch
147:5,11

5

5
4:19 9:4,12
11:3 18:14
19:11 30:15
38:2,2 42:11
42:11 46:16
47:4 55:3
56:6 57:16
59:6 62:1
63:9 75:5
77:12 80:12
81:5 85:16
87:19 88:6
89:11 94:10
96:23 98:16
101:16 105:2
109:12 110:4
117:15 122:6
122:15
136:12,18,18
136:19,20
137:3,4
142:9 147:7
159:17 164:8
166:14 170:8
170:18 176:4
177:12
178:23 182:4
185:6 187:17
200:8 201:12
202:8 215:12
218:11
224:12
228:19
230:22
237:21 245:2
246:12
250:10
261:14 279:9
288:22 293:3
50
36:23 147:10
207:18
229:12,15
500
144:20
5000
64:9 69:8
86:16 89:1
97:21 216:12
217:11
218:21,23
219:7,12
220:8,9
223:5 224:1
224:2,6,10
225:23 230:3
231:18
232:20
233:22 234:3
234:9 235:3
242:7,16,22
245:10 251:5
251:9 256:3
257:20
258:20
50001
2:15 217:22
5000137
231:8,12 233:5
242:14 255:6
5000140
242:13 243:3
5000140a
242:13 243:3
5000155
217:16
5000164
231:16 232:11
233:2
5000183
257:8,10
258:15
50002
2:15 218:10
50003
2:16 227:2
230:15
500031
255:13 256:19
500032
255:13 256:20
50004
2:16 230:21
237:23
500045a
218:14 226:22
227:10
230:19
50005
2:17 64:21
255:8 256:21
50006
2:17 64:22
255:9,9
50007
2:18 257:3
500080a
227:9 230:19
50009
217:16,17
500096
217:17
5000a
221:11
52
2:4
53
281:1
5424
14:14
5600
11:20

6

6
9:4 16:1 39:8
39:13,17
49:2 69:3
79:10 100:9
101:16 123:8
124:14
146:19
158:18 165:9
169:22 177:6
182:23
194:23 195:9
209:9,13,21
231:22 242:2
243:19 263:5
277:19
284:11
286:18 293:4
293:15
60
2:4 31:21
43:20 68:2
270:21
61
2:5
65
239:21 240:2
6921
182:13

7

7
16:12 39:13,18
55:2 114:8
133:8 147:9
150:14,14
165:20 182:4
182:4 292:22
70
223:3 239:22
264:2
701
171:20
7024
271:6
7025
271:6
703
61:11 69:7
70:23 71:4
71:14 77:12
77:14 79:13
81:1 86:18
86:21 89:2
117:23
255:19 256:3
7031
2:5 61:18,19
61:23 82:10
7032
61:19 65:18
7033
61:18 62:4
82:11,21
7035
65:18
70e
260:10 263:18
264:3,5,16
264:20
265:13,16
266:9,15
268:18 270:3
270:9,11,18
271:1,4
273:17 276:8
278:2 288:6
70e1
2:19 261:1
267:7
70e107
267:20,22
280:9
70e12
261:14 264:11
70e127
260:19
70e14
261:5,7,12
263:13
267:14
70e180
280:15,17
291:19
70e199
283:11 284:10
284:16
70e2
2:19 267:16
272:19
70e232
260:18
70e3
2:20 260:18,19
280:11
286:14
70e363
284:5
70e39
280:23
70e403
283:17 284:5,8
70e404
283:22 284:3
70e52
281:1
70e53
283:14
75
44:12 249:19
76
44:12
79
282:22

8

8
16:12 28:16
92:14 95:1
100:9,9
106:16,17
107:9 124:12
124:14,14
80s
195:23
83
2:5
85
2:6 138:6
851
264:7
88
2:6
89
2:7 198:5

9

9
83:15 249:9
90
150:17 221:5
261:14
90a
218:21 219:12
219:15
220:11,21
221:9,20
222:8,9,11
223:2,5,11
223:13 224:1
224:3,4
225:6,9
228:16 229:5
258:9
90s
6:22 14:6
44:17
96
182:10
99
2:7