Act on the issuance of NFPA 13, *Standard for the Installation of Sprinkler Systems*, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:

**09-8-1-a** Amendment No.13-1 (CAM 13-4): Accept Comment 13-84. (Passed TCC/Passed TC ballot) See Attachment 09-8-1-a. **SA09-8-1-a**

**09-8-1-b** Amendment No.13-2 (CAM 13-5): Accept Comment 13-136. (Failing TCC/Failed TC ballot) See Attachment 09-8-1-b

**09-8-1-c** Appeal of D. Burkhart, Code Consultants, Inc. requesting that the Council uphold the floor action to accept Comment 13-136 and related Proposal 13-195 (CAM 13-5). The motion passed at the Association Meeting. (Failing TCC/Failed TC ballot). See Attachment 09-8-1-c

**09-8-1-d** Amendment No.13-3 (CAM 13-6): Reject Comment 13-141. (Passed TCC/Passed TC ballot) See Attachment 09-8-1-d

**09-8-1-e** Amendment No.13-4 (CAM 13-11) Reject an Identifiable Part of Comment 13-302. The rejection of the identifiable part results in reinstating Figure A.22.4.4.5.1 (Moody Diagram) and Table A.22.4.4.5.1 (aged pipe table) from the 2007 edition of NFPA 13. (Passed TCC/Passed TC ballot) See Attachment 09-8-1-e

**09-8-1-f** Appeal of L. Swantek, Victaulic, requesting that the Council overturn the Association action, and reject Comment 13-34 (CAM 13-1). This motion failed on the floor of the Association Meeting. See Attachment 09-8-1-f

**09-8-1-g** Appeal of W. Kish, No-Burn, Inc., requesting that the Council overturn the Committee Action on Proposal 13-501. See Attachment 09-8-1-g

**09-8-1-h** Appeal of D. Burkhart, Code Consultants, Inc. requesting that the Council overturn the Association action, and accept Comment 13-104 (CAM 13-7). This motion failed on the floor of the Association Meeting. See Attachment 09-8-1-h

Act on the issuance of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:

**09-8-2-a** Amendment No.13D-1 (CAM 13D–2): Reject Comment 13D-18. (Passed TCC/Failed TC Ballot) See Attachment 09-8-2-a

**09-8-2-a-1** Appeal of J Bittenbender, REHAU Unlimited Polymer Solutions, requesting that the Council uphold the floor action, and reject Comment 13D-18 (CAM 13D-2). This motion passed at the Association Meeting. (Passed TCC/Failed TC Ballot) See
<table>
<thead>
<tr>
<th>09-8-2-b</th>
<th>Appeal of M. Cabral, REHAU Unlimited Polymer Solutions, requesting that the Council overturn the Association action, and accept Proposals 13D-27 and 13D-30 (CAM 13D-1). This motion failed on the floor of the Association Meeting. See Attachment 09-8-2-b SA09-8-2-b</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-8-3</td>
<td>Act on the issuance of NFPA 20, <em>Standard for the Installation of Stationary Pumps for Fire Protection</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:</td>
</tr>
<tr>
<td>09-8-3-a</td>
<td>Amendment No. 20-1 (CAM 20-1): Return a portion of a Report in the form of an identifiable part of Proposal 20-3 and related Comment 20-2. The identifiable part that is returned reads as follows: “4.3.1 Fire pumps operating in series and their controllers shall be located within the same fire pump room.” (Failed TC Ballot) See Attachment 09-8-3-a</td>
</tr>
<tr>
<td>09-8-3-a-1</td>
<td>Position paper of the Technical Committee on Fire Pumps regarding Amendment No. 20-1 (CAM 20-1) SEE STAFF NOTE See Attachment 09-8-3-a-1</td>
</tr>
<tr>
<td>09-8-3-a-2</td>
<td>Letter from D. Haagensen regarding the position paper submitted in the name of the Technical Committee on Fire Pumps. See Attachment 09-8-3-a-2</td>
</tr>
<tr>
<td>09-8-3-b</td>
<td>Amendment No. 20-2 (CAM 20-3): Accept Comment 20-66. (Failed TC Ballot) See Attachment 09-8-3-b</td>
</tr>
<tr>
<td>09-8-3-b-1</td>
<td>Position paper of the Technical Committee on Fire Pumps regarding Amendment No. 20-2 (CAM 20-3) SEE STAFF NOTE See Attachment 09-08-3-b-1</td>
</tr>
<tr>
<td>09-8-3-b-2</td>
<td>Letter from D. Haagensen regarding the position paper submitted in the name of the Technical Committee on Fire Pumps. See Attachment 09-8-3-b-2</td>
</tr>
<tr>
<td>09-8-4</td>
<td>Act on the issuance of NFPA 52, <em>Vehicular Fuel Systems Code</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:</td>
</tr>
<tr>
<td>09-8-4-a</td>
<td>Amendment No. 52-1 (CAM 52-1): Accept Comment 52-34. (Failed TC Ballot) See Attachment 09-8-4-a (SEE RELATED MINUTE ITEM 06-3-14)</td>
</tr>
<tr>
<td>09-8-4-a-1</td>
<td>Appeal of L. Fluer, Fluer, Inc., requesting the Council uphold the Association action and accept Comment 52-34 (CAM 52-1). This motion passed on the floor. (Failed TC Ballot) See Attachment 09-8-4-a-1 SA09-8-4-a-1</td>
</tr>
<tr>
<td>09-8-4-a-2</td>
<td>Letter from Carl Rivkin regarding the scopes between NFPA 52 and NFPA 55. See Attachment 09-8-4-a-2</td>
</tr>
<tr>
<td>09-8-4-a-3</td>
<td>Letter from Martin Gresho, Fire Protection Programs supporting the appeal of L. Fluer to accept Comment 52-34 (CAM 52-1). See Attachment 09-8-4-a-3</td>
</tr>
<tr>
<td>09-8-4-a-4</td>
<td>Letter from Michael St. Clair, Chair of Industrial and Medical Gases Technical Committee submitted in support of Certified Amending Motion (CAM) 52-34 and the vote of the General Membership in support of the proposed 2010 Edition of NFPA 52, <em>Vehicular Fuel Systems Code</em>.</td>
</tr>
<tr>
<td>09-8-5</td>
<td>Act on the issuance of NFPA 72, <em>National Fire Alarm Code</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows: (SEE RELATED TIA ITEMS 09-08-17, 09-08-18, and 09-08-19)</td>
</tr>
<tr>
<td>09-8-5-a</td>
<td>Amendment No. 72-1 (CAM 72-8): Accept Comment 72-164. (Passed TCC/Failed TC</td>
</tr>
</tbody>
</table>

7/27/2009 2:09 PM
<table>
<thead>
<tr>
<th>Ballot</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-8-5-a-1</td>
<td>Appeal of T. Hammerberg, Automatic Fire Alarm Association, Inc., requesting that the Council uphold floor action and accept Comment 72-164 (CAM 72-8). (Passed TCC/Failed TC Ballot) See Attachment 09-8-5-a-1</td>
</tr>
<tr>
<td>09-8-5-b</td>
<td>Amendment No. 72-2 (CAM 72-11): Accept Comment 72-235. (Passed TCC/Passed TC Ballot) See Attachment 09-8-5-b</td>
</tr>
<tr>
<td>09-8-5-c</td>
<td>Amendment No. 72-3 (CAM 72-17): Reject an Identifiable Part of Comment 72-394. The rejection of the identifiable part results in the deletion from the table the proposed new (15)(1)(16), which reads: “Fire pump supervisory indicating devices – (with a quarterly test frequent – same as current).” (Passed TCC/Passed TC Ballot) See Attachment 09-8-5-c</td>
</tr>
<tr>
<td>09-8-5-d</td>
<td>Amendment No. 72-4 (CAM 72-18): Accept Comment 72-405. (Passed TCC/Passed TC Ballot) See Attachment 09-8-5-d</td>
</tr>
<tr>
<td>09-8-5-e</td>
<td>Amendment No. 72-5 (CAM 72-22): Accept and Identifiable Part of Comment 72-457. The acceptance of identifiable part results in the reinstatement of 12.1.6.1.1, which reads as follows: “Refer to the 2010 Annex C for previous nomenclature and cross reference.” (Passed TCC/Passed TC Ballots) See Attachment 09-8-5-e</td>
</tr>
<tr>
<td>09-8-5-f</td>
<td>Amendment No. 72-6 (CAM 72-23): Reject an Identifiable Part of Comment 72-450. The rejection of the identifiable part results in the deletion of 12.4.2.20.3, which reads as follows: “Strobes used solely for mass notification shall be amber in color.” (Passed TCC/Passed TC Ballot) See Attachment 09-8-5-f</td>
</tr>
<tr>
<td>09-8-5-g</td>
<td>Amendment No. 72-7 (CAM 72-26): Reject Comment 72-527. (Passed TCC/Passed TC Ballot) See Attachment 09-8-5-g</td>
</tr>
<tr>
<td>09-8-5-h</td>
<td>Appeal of J. Elvove, U.S. General Services Administration, requesting that the Council Accept Comment 72-388, (CAM 72-16). This motion failed on the floor of the Association Meeting. See Attachment 09-8-5-h</td>
</tr>
<tr>
<td>09-8-6</td>
<td>Act on the issuance of NFPA 80, <em>Standard for Fire Doors and Other Opening Protectives</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows: (SEE RELATED TIA ITEM 09-08-20)</td>
</tr>
<tr>
<td>09-8-6-a</td>
<td>Amendment No. 80-1 (CAM 80-1): Accept Comment 80-10. (Passed TC Ballot) See Attachment 09-8-6-a</td>
</tr>
<tr>
<td>09-8-7</td>
<td>Act on the issuance of NFPA 99, <em>Standard for Health Care Facilities</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows: (SEE RELATED TIA ITEMS 09-8-21, 09-8-22 and 09-8-23)</td>
</tr>
<tr>
<td>09-8-7-a</td>
<td>Amendment No. 99-1 (CAM 99-8): Return entire report. (Passed TCC Ballot/Passed 5TCs/Failed 3TCs) Informational Ballot on proposed revision cycle of NFPA 99 (Passed TCC Ballot) See Attachment 09-8-7-a</td>
</tr>
<tr>
<td>09-8-7-b</td>
<td>Appeal of J. Ehrenwerth, Yale University, requesting that the Council overturn the Association action, and reject Certified Amending Motion 99-8 which returned the entire Report (CAM 99-8). This motion passed on the floor of the Association Meeting. (Passed TCC Ballot/Passed 5TCs/Failed 3TCs) See Attachment 09-8-7-b</td>
</tr>
<tr>
<td>09-8-7-c</td>
<td>Appeal of F. Mummolo, Smart Tap, Inc. requesting that the Council uphold the</td>
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<tr>
<td>Date</td>
<td>Action</td>
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<tr>
<td><strong>09-8-8</strong></td>
<td>Act on the issuance of NFPA 105, <em>Standard for the Installation of Smoke Door Assemblies and Other Opening Protective</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:</td>
</tr>
<tr>
<td><strong>09-8-8-a</strong></td>
<td>Amendment No. 105-1 (CAM 105-1): Accept an Identifiable Part of Proposal 105-4. The acceptance of the identifiable part results in the addition of an annex note and asterisk to 6.5.2, the deletion of text in 6.5.5, and no change to 6.6.5. (Passed TC Ballot) See Attachment 09-8-8-a</td>
</tr>
<tr>
<td><strong>09-8-9</strong></td>
<td>Act on the issuance of NFPA 130, <em>Standard for Fixed Guideway Transit and Passenger Rail Systems</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting without amendments. No Attachment</td>
</tr>
<tr>
<td><strong>09-8-10</strong></td>
<td>Act on the issuance of NFPA 400, <em>Hazardous Materials Code</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, without amendments. No Attachment</td>
</tr>
<tr>
<td><strong>09-8-11</strong></td>
<td>Act on the issuance of NFPA 501, <em>Standard on Manufactured Housing</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting, with amendments as follows:</td>
</tr>
<tr>
<td><strong>09-8-11-a</strong></td>
<td>Amendment No. 501-1 (CAM 501-1): Accept Comment 501-7. (Failed TC Ballot) See Attachment 09-8-11-a</td>
</tr>
<tr>
<td><strong>09-8-11-a-1</strong></td>
<td>Appeal of M. Hirschler, GBH International, requesting the Council issue NFPA 501 as it appeared at the end of the ROP (Proposal 501-13) where the appellant believes technical consensus was achieved (CAM 501-1). The motion to accept Comment 501-7 passed at the Association Meeting. (Failed TC Ballot) See Attachment 09-08-11-a-1</td>
</tr>
<tr>
<td><strong>09-8-11-b</strong></td>
<td>Appeal of S. Martin, Plumbing Manufacturers Institute, requesting the acceptance of Comment 501-8 (CAM 501-2). This motion failed on the floor of the Association meeting. See Attachment 09-8-11-b SA09-8-11-b</td>
</tr>
<tr>
<td><strong>09-8-11-c</strong></td>
<td>Amendment No. 501-2 (CAM 501-3): Accept Comment 501-10. (Failed TC Ballot) See Attachment 09-8-11-c</td>
</tr>
<tr>
<td><strong>09-8-11-c-1</strong></td>
<td>Appeal of M. Hirschler, GBH International, requesting the Council issue NFPA 501 as it appeared at the end of the ROP (Proposal 501-15) where the appellant believes technical consensus was achieved (CAM 501-3). The motion to accept Comment 501-10 passed at the Association Meeting. (Failed TC ballot) See Attachment 09-08-11-c-1</td>
</tr>
<tr>
<td><strong>09-8-12</strong></td>
<td>Act on the issuance of NFPA 909, <em>Code for the Protection of Cultural Resources Properties - Museums, Libraries, and Places of Worship</em>, with an issuance date of August 6, 2009 and effective date of August 26, 2009, as acted on at the Association Meeting without amendment. No Attachment (SEE RELATED TIA ITEM 09-8-28)</td>
</tr>
<tr>
<td><strong>09-8-13</strong></td>
<td>The 2009 Revision Cycle Consent Documents were letter balloted by the Council with an issuance date of May 26, 2009 and effective date of June 15, 2009, as shown below: No action is necessary</td>
</tr>
<tr>
<td>13R</td>
<td>Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height</td>
</tr>
</tbody>
</table>
| 24 | Standard for the Installation of Private Fire Service Mains and Their
<table>
<thead>
<tr>
<th>#</th>
<th>Standard/Code</th>
<th>Comments/Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks</td>
<td></td>
</tr>
<tr>
<td>99B</td>
<td>Standard for Hypobaric Facilities</td>
<td></td>
</tr>
<tr>
<td>101A</td>
<td>Guide on Alternative Approaches to Life Safety</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>Standard for Emergency and Standby Power Systems</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Standard on Stored Electrical Energy Emergency and Standby Power Systems</td>
<td></td>
</tr>
<tr>
<td>291</td>
<td>Recommended Practice for Fire Flow Testing and Marking of Hydrants</td>
<td></td>
</tr>
<tr>
<td>302</td>
<td>Fire Protection Standard for Pleasure and Commercial Motor Craft</td>
<td></td>
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<tr>
<td>430</td>
<td>Code for the Storage of Liquid and Solid Oxidizers (withdrawal)</td>
<td></td>
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<tr>
<td>432</td>
<td>Code for the Storage of Organic Peroxide Formulations (withdrawal)</td>
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<td>434</td>
<td>Code for the Storage of Pesticides (withdrawal)</td>
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<tr>
<td>490</td>
<td>Code for the Storage of Ammonium Nitrate (withdrawal)</td>
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<tr>
<td>1123</td>
<td>Code for Fireworks Display</td>
<td></td>
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<tr>
<td>1221</td>
<td>Standard for the Installation, Maintenance, and Use of Emergency Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communications Systems</td>
<td></td>
</tr>
<tr>
<td>1710</td>
<td>Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments</td>
<td></td>
</tr>
<tr>
<td>1720</td>
<td>Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments</td>
<td></td>
</tr>
</tbody>
</table>

**09-8-14**
Act on the issuance of a proposed Tentative Interim Amendment to Table 8.3.1 of the 2008 edition of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, (TIA No. 956). Comment closing date was June 12, 2009.

**09-8-14-a**

**09-8-14-b**
Ballot results on proposed Tentative Interim Amendment to Table 8.3.1 of the 2008 edition of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, (TIA No. 956). Passed TC ballot on both. See Attachment 09-8-14-b.

**09-8-14-c**
Two public comments received on proposed Tentative Interim Amendment to Table 8.3.1 of the 2008 edition of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, (TIA No. 956). See Attachment 09-8-14-c.

**09-8-15**
Act on the issuance of a proposed Tentative Interim Amendment to 5.4.1.2 and 5.4.2.4(4) of the 2008 edition of NFPA 59, *Utility LP-Gas Plant Code*, (TIA No. 963). Comment closing date is July 17, 2009.

**09-8-15-a**

**09-8-15-b**
Ballot results on proposed Tentative Interim Amendment to 5.4.1.2 and 5.4.2.4(4) of the 2008 edition of NFPA 59, *Utility LP-Gas Plant Code*, (TIA No. 963). Passed TC ballot on both. See Attachment 09-8-15-b.

**09-8-15-c**
No public comments received to date. No Attachment.
<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-8-16</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 250.104 of the 2008 edition of NFPA 70, <em>National Electrical Code</em>, (TIA No. 941). Comment closing date was April 17, 2009.  (<em>SEE RELATED MINUTE ITEM 09-8-42</em>)</td>
</tr>
<tr>
<td></td>
<td>09-8-16-a Text of proposed Tentative Interim Amendment to 250.104 of the 2008 edition of NFPA 70, <em>National Electrical Code</em>, (TIA No. 941). See Attachment 09-8-16-a</td>
</tr>
<tr>
<td></td>
<td>09-8-16-b Ballot results on proposed Tentative Interim Amendment to 250.104 of the 2008 edition of NFPA 70, <em>National Electrical Code</em>, (TIA No. 941). Failed TCC on both; Failed TC on Technical Merit. See Attachment 09-8-16-b</td>
</tr>
<tr>
<td></td>
<td>09-8-16-c One public comment was received in support of proposed Tentative Interim Amendment to 250.104 of the 2008 edition of NFPA 70, <em>National Electrical Code</em>, (TIA No. 941). See Attachment 09-8-16-c</td>
</tr>
<tr>
<td></td>
<td>09-8-16-d Appeal of R. Torbin, Cutting Edge Solutions LLC, requesting that the Standards Council issue the proposed TIA to NFPA 70, <em>National Electrical Code</em>, (TIA No. 941). See Attachment 09-8-16-d</td>
</tr>
<tr>
<td>09-8-17</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 12.2.4.2, A.12.2.4, and A.12.2.4.2 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 960). Comment closing date is July 17, 2009.</td>
</tr>
<tr>
<td></td>
<td>09-8-17-a Text of proposed Tentative Interim Amendment to 12.2.4.2, A.12.2.4, and A.12.2.4.2 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 960). See Attachment 09-8-17-a</td>
</tr>
<tr>
<td></td>
<td>09-8-17-b Ballot results of proposed Tentative Interim Amendment to 12.2.4.2, A.12.2.4, and A.12.2.4.2 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 960). Passed TCC on both; Failed TC on Emergency Nature. See Attachment 09-8-17-b</td>
</tr>
<tr>
<td></td>
<td>09-8-17-c No public comments received to date. No Attachment</td>
</tr>
<tr>
<td></td>
<td>09-8-18-a Text of proposed Tentative Interim Amendment to Chapter 3 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 961). See Attachment 09-8-18-a</td>
</tr>
<tr>
<td></td>
<td>09-8-18-b Ballot results of proposed Tentative Interim Amendment to Chapter 3 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 961). Passed TCC/TCs ballot on both. See Attachment 09-8-18-b</td>
</tr>
<tr>
<td></td>
<td>09-8-18-c No public comments received to date. No Attachment</td>
</tr>
<tr>
<td>09-8-19</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 17.4.9 and 17.7.5.5.8 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 964). Comment closing date is July 17, 2009.</td>
</tr>
<tr>
<td></td>
<td>09-8-19-a Text of proposed Tentative Interim Amendment to 17.4.9 and 17.7.5.5.8 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 964). See Attachment 09-8-19-a</td>
</tr>
<tr>
<td></td>
<td>09-8-19-b Ballot results of proposed Tentative Interim Amendment to 17.4.9 and 17.7.5.5.8 of the proposed 2010 edition of NFPA 72, <em>National Fire Alarm Code</em>, (TIA No. 964). Passed TCC/TC ballot on both. See Attachment 09-8-19-b</td>
</tr>
<tr>
<td>Item</td>
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<tr>
<td>09-8-19-c</td>
<td>No public comments received to date. No Attachment</td>
</tr>
<tr>
<td>09-8-20-a</td>
<td>Text of proposed Tentative Interim Amendment to Chapter 2, Annex D, Annex L of the proposed 2010 edition of NFPA 80, <em>Standard for Fire Doors and Other Opening Protectives</em>, (TIA No. 950). See Attachment 09-8-20-a</td>
</tr>
<tr>
<td>09-8-20-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to Chapter 2, Annex D, Annex L of the proposed 2010 edition of NFPA 80, <em>Standard for Fire Doors and Other Opening Protectives</em>, (TIA No. 950). Passed TC ballot on both. See Attachment 09-8-20-b</td>
</tr>
<tr>
<td>09-8-20-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td><strong>09-8-21</strong></td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 17.3.8.1 of the 2005 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 927). This TIA went to the SC October, 2008 and the SC instructed that the TCC/TC be reballed.</td>
</tr>
<tr>
<td>09-8-21-a</td>
<td>Text of proposed Tentative Interim Amendment to 17.3.8.1 of the 2005 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 927). See Attachment 09-8-21-a</td>
</tr>
<tr>
<td>09-8-21-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 17.3.8.1 of the 2005 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 927). Passed TCC ballot on both; Failed TC on Emergency Nature. See Attachment 09-8-21-b. (<em>SEE RELATED MINUTE ITEMS 08-10-1-b IN ATTACHMENT</em>) SA09-8-21-b</td>
</tr>
<tr>
<td>09-8-21-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td><strong>09-8-22</strong></td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to Chapter 6 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 952). Comment closing date was May 15, 2009. See Staff Note</td>
</tr>
<tr>
<td>09-8-22-a</td>
<td>Text of proposed Tentative Interim Amendment to Chapter 6 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 952). See Attachment 09-8-22-a</td>
</tr>
<tr>
<td>09-8-22-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to Chapter 6 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 952). Passed TCC/TC ballot on both. See Attachment 09-8-22-b</td>
</tr>
<tr>
<td>09-8-22-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td><strong>09-8-23</strong></td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 5.1.3.4.5.1 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 955). Comment closing date was June 12, 2009. See Staff Note</td>
</tr>
<tr>
<td>09-8-23-a</td>
<td>Text of proposed Tentative Interim Amendment to 5.1.3.4.5.1 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 955). See Attachment 09-8-23-a</td>
</tr>
<tr>
<td>09-8-23-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 5.1.3.4.5.1 of the proposed 2010 edition of NFPA 99, <em>Standard for Health Care Facilities</em>, (TIA No. 955). Passed TCC ballot on both/Failed TC on Emergency Nature. See Attachment 09-8-23-b</td>
</tr>
<tr>
<td>09-8-23-c</td>
<td>No public comments received. No Attachment</td>
</tr>
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<td>Date</td>
<td>Agenda Item</td>
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<tr>
<td>09-8-24</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 43.10.4.6.2 and 43.10.5.5 of the 2009 edition of NFPA 101, <em>Life Safety Code</em>, (TIA No. 951). Comment closing date was May 15, 2009.</td>
</tr>
<tr>
<td>09-8-24-a</td>
<td>Text of proposed Tentative Interim Amendment to 43.10.4.6.2 and 43.10.5.5 of the 2009 edition of NFPA 101, <em>Life Safety Code</em>, (TIA No. 951). See Attachment 09-8-24-a</td>
</tr>
<tr>
<td>09-8-24-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 43.10.4.6.2 and 43.10.5.5 of the 2009 edition of NFPA 101, <em>Life Safety Code</em>, (TIA No. 951). Failed TCC/TC ballot on Emergency Nature. See Attachment 09-8-24-b</td>
</tr>
<tr>
<td>09-8-24-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td>09-8-24-d</td>
<td>Appeal of M. Hirschler, GBH International, requesting that the Standards Council issue TIA 951 on NFPA 101. One comment received to date. See Attachment 09-8-24-d</td>
</tr>
<tr>
<td>09-8-25-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td>09-8-26</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to Table 8.3.1 of the proposed 2010 edition of NFPA 110, <em>Standard for Emergency and Standby Power Systems</em>, (TIA No. 965). Comment closing date is July 17, 2009.</td>
</tr>
<tr>
<td>09-8-26-a</td>
<td>Text of proposed Tentative Interim Amendment to Table 8.3.1 of the proposed 2010 edition of NFPA 110, <em>Standard for Emergency and Standby Power Systems</em>, (TIA No. 965). See Attachment 09-8-26-a</td>
</tr>
<tr>
<td>09-8-26-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to Table 8.3.1 of the proposed 2010 edition of NFPA 110, <em>Standard for Emergency and Standby Power Systems</em>, (TIA No. 965). Passed TCC/Passed TC Ballot. See Attachment 09-8-26-b</td>
</tr>
<tr>
<td>09-8-26-c</td>
<td>No public comments received to date. No Attachment</td>
</tr>
<tr>
<td>09-8-27-c</td>
<td>No public comments received to date. No Attachment</td>
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<tr>
<td>Date</td>
<td>Item Description</td>
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<tr>
<td>09-8-28-c</td>
<td>No public comments received to date. No Attachment</td>
</tr>
<tr>
<td>09-8-29-a</td>
<td>Text of proposed Tentative Interim Amendment to 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the 2007 edition of NFPA 1500, <em>Standard on Fire Department Occupational Safety and Health Program</em> (TIA No. 938). See Attachment 09-8-29-a</td>
</tr>
<tr>
<td>09-8-29-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the 2007 edition of NFPA 1500, <em>Standard on Fire Department Occupational Safety and Health Program</em> (TIA No. 938). Passed TC ballot on both. See Attachment 09-8-29-b</td>
</tr>
<tr>
<td>09-8-29-c</td>
<td>Thirty public comments were received on proposed Tentative Interim Amendment to 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the 2007 edition of NFPA 1500, <em>Standard on Fire Department Occupational Safety and Health Program</em> (TIA No. 938). See Attachment 09-8-29-c</td>
</tr>
<tr>
<td>09-8-30-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to Annex C of the 2007 edition and proposed 2010 edition of NFPA 1600, <em>Standard on Disaster/Emergency Management and Business Continuity Programs</em> (TIA No. 948). Failed TC ballot on both. See Attachment 09-8-30-b</td>
</tr>
<tr>
<td>09-8-30-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td>09-8-31</td>
<td>Act on the issuance of a proposed Tentative Interim Amendment to 19.6.4.6 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 954). Comment closing date was June 12, 2009.</td>
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<tr>
<td>09-8-31-a</td>
<td>Text of proposed Tentative Interim Amendment to 19.6.4.6 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 954). See Attachment 09-8-31-a</td>
</tr>
<tr>
<td>09-8-31-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 19.6.4.6 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 954). Passed TC ballot on both. See Attachment 09-8-31-b</td>
</tr>
<tr>
<td>09-8-31-c</td>
<td>No public comments received. No Attachment</td>
</tr>
<tr>
<td>09-8-32-a</td>
<td>Text of proposed Tentative Interim Amendment to 19.24.2.5.1 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 958). See Attachment 09-8-32-a</td>
</tr>
<tr>
<td>09-8-32-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 19.24.2.5.1 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 958).Passed TC ballot on both. See Attachment 09-8-32-b</td>
</tr>
<tr>
<td>09-8-32-c</td>
<td>Two public comment received on the issuance of a proposed Tentative Interim Amendment to 19.24.2.5.1 (New) of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 958). See Attachment 09-8-32-c</td>
</tr>
<tr>
<td>09-8-33-a</td>
<td>Text of a proposed Tentative Interim Amendment to 4.11.1, 14.1.3.10 thru 14.1.3.15 of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 967). See Attachment 09-8-33-a</td>
</tr>
<tr>
<td>09-8-33-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 4.11.1, 14.1.3.10 thru 14.1.3.15 of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 967). Failed TC ballot on both. See Attachment 09-8-33-b</td>
</tr>
<tr>
<td>09-8-33-c</td>
<td>One public comment received to date on the issuance of a proposed Tentative Interim Amendment to 4.11.1, 14.1.3.10 thru 14.1.3.15 of the 2009 edition of NFPA 1901, <em>Standard for Automotive Fire Apparatus</em>, (TIA No. 967). See Attachment 09-8-33-c</td>
</tr>
<tr>
<td>09-8-34-a</td>
<td>Text of proposed Tentative Interim Amendment to 19.8.4.10(7) of the 2007 edition of NFPA 1911, <em>Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</em>, (TIA No. 959). See Attachment 09-8-34-a</td>
</tr>
<tr>
<td>09-8-34-b</td>
<td>Ballot results of proposed Tentative Interim Amendment to 19.8.4.10(7) of the 2007 edition of NFPA 1911, <em>Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</em>, (TIA No. 959). Passed TC ballot</td>
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<tr>
<td><strong>09-8-34-c</strong></td>
<td>One public comment received to date on proposed Tentative Interim Amendment to 19.8.4.10(7) of the 2007 edition of NFPA 1911, <em>Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</em>, (TIA No. 959). See Attachment 09-8-34-c</td>
</tr>
<tr>
<td><strong>09-8-35</strong></td>
<td>Consider the request of T. LeMaster, FotoLum, that NFPA consider the establishment of a new project on high-grade photo luminescence in conjunction with retro reflective properties for fire fighters. See Attachment 09-8-35 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-36</strong></td>
<td>Consider the request of R. Locati, Apex Electrical Interconnection Consultants, LLC, that NFPA consider the establishment of a new project on safety tools for installation and servicing of wiring devices. See Attachment 09-8-36 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-37</strong></td>
<td>Consider the request of D. Hall, Deputy Fire Chief, Westminster Fire Department, that NFPA consider the establishment of a new recommended practice on developing and conducting after action reviews (AAR) or critiques. See Attachment 09-8-37 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-38</strong></td>
<td>Consider the request of E.L. Medlin, APPA, that NFPA consider the establishment of a national safety standard for educational facilities. See Attachment 09-8-38 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-39</strong></td>
<td>Consider the request of the Technical Committee on Hazardous Materials Response Personnel, that NFPA consider the establishment of a new recommended practice on minimum requirements for the organization and management of hazardous materials/weapons of mass destruction (WMD) emergency response program. See Attachment 09-8-39 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-40</strong></td>
<td>Consider the request of S. Pitts, Marine Corps Systems Command, that NFPA consider the establishment of a new proposed project on power air purifying respirator (PAPR). See Attachment 09-8-40 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-41</strong></td>
<td>Consider the request of T. Letterman, Riverside County Fire Department, that NFPA consider the establishment of a new proposed project on Use of Sprinklers for Structure Protection from Wildfire. See Attachment 09-8-41 <em>(ADMINISTRATIVELY WITHDRAWN - DEFERRED TO OCTOBER 2009 MTG.)</em></td>
</tr>
<tr>
<td><strong>09-8-42</strong></td>
<td>Consider the request of the NEC Technical Correlating Committee to review the Code-Making Panel 5 Chair’s Report regarding jurisdictional responsibility that would impact the Panel Action on Proposal 5-251. <em>(SEE RELATED MINUTE ITEM 09-8-16 ON TIA 941)</em> See Attachment 09-8-42 <em>SA09-8-42</em></td>
</tr>
<tr>
<td><strong>09-8-43</strong></td>
<td>At the October 2008 meeting, the Standards Council voted to approve, with revisions, the National Electrical Code Operating Procedures, (Minute Item 08-10-31). The Council requested the NEC TCC to review Annex 3.0 regarding the 15 member limitation on CMPs, and report back as to its rationale for this number, or a proposed revision to Annex 3.0 to reflect its current position on recommended size of CMPs. Included is related Minute Item Attachment 08-10-31 and the NEC TCC response in</td>
</tr>
<tr>
<td>Topic</td>
<td>Details</td>
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</tr>
<tr>
<td><strong>09-8-44</strong></td>
<td>At the October 2007 meeting, the Council approved develop a new document on Respiratory Standards for Wildland Fire Fighting. The Technical Correlating Committee (TCC) on Fire and Emergency Service Protective Clothing and Equipment has assigned the development of this document to the TC on Respiratory Protection Equipment to assure that the TC has appropriate wildland fire fighting expertise. See the TC’s recommendations for membership in Attachment 09-8-44 (SEE RELATED MINUTE ITEM 09-3-17 IN ATTACHMENT)</td>
</tr>
<tr>
<td><strong>09-8-46</strong></td>
<td>The Technical Committee on Smoke Management Systems is notifying the SC that NFPA 204, <em>Standard for Smoke and Heat Venting</em>, slipped from the Fall 2009 ROC revision cycle to the Annual 2010 ROC revision cycle. They needed additional time to develop a position on the design issues involving sprinklers in buildings equipped with smoke and heat vents. An ROC meeting is scheduled for October 7, 2009 to complete the Committee’s work. See Attachment 09-8-46</td>
</tr>
<tr>
<td><strong>09-8-47</strong></td>
<td>The Technical Committee on Fire Tests is requesting for a one time revision cycle change for seven documents. The TC is requesting moving NFPA 252, NFPA 257, NFPA 268, NFPA 269, NFPA 275, NFPA 287 and NFPA 288 from the A2011 revision cycle to the F2011 revision cycle. See Attachment 09-8-47</td>
</tr>
<tr>
<td><strong>09-8-49</strong></td>
<td>Request of the Technical Committee on Industrial Trucks for a one time, three year revision cycle change for the 2006 edition of NFPA 505, <em>Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation</em> from the Fall 2014 revision cycle to the Fall 2012 revision cycle. See Attachment 09-8-49</td>
</tr>
<tr>
<td><strong>09-8-51</strong></td>
<td>Request of the Fire Service Training Committee for a one time cycle change for the 2008 edition of NFPA 1404, <em>Standard for Fire Service Respiratory Protection Training</em>, from the Fall 2010 revision cycle to the Fall 2012 revision cycle. See Attachment 09-8-51</td>
</tr>
<tr>
<td><strong>09-8-53</strong></td>
<td>The Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment is notifying the Council that they have skipped from the ROC stage in the F2009 revision cycle because there were too many new changes introduced at ROC stage that the Committee felt needed to be addressed. The Committee will now issue a new ROP of NFPA 1977 in the F2010 revision cycle. See Attachment 09-8-53</td>
</tr>
<tr>
<td><strong>09-8-54</strong></td>
<td>Policy and Procedures Task Group (S. Clary, Chair). See Attachment 09-8-54</td>
</tr>
<tr>
<td><strong>09-8-55-a</strong></td>
<td>Committee Membership. See Attachment 09-8-55-a</td>
</tr>
<tr>
<td><strong>09-8-55-b</strong></td>
<td>Consider correspondence from A. Philips, Oregon Office of State Fire Marshal, regarding Committee Member G. Hanson, Precocious Pyrotechnics, and shipment of illegal fireworks. See Attachment 09-8-55-b</td>
</tr>
<tr>
<td><strong>09-8-55-c</strong></td>
<td>Request of the NEC Technical Correlating Committee (TCC) for approval of the reconstitution of the Technical Committee (TC) for Electrical Safety in the Workplace (NFPA 70E) in conjunction with the approval of the proposed declared structure of the TC. See Attachment 09-8-55-c</td>
</tr>
<tr>
<td><strong>09-8-55-d</strong></td>
<td>Discuss the future structure of the Technical Committee on Fire Service Occupational Safety and Health. See Attachment 09-8-55-d</td>
</tr>
<tr>
<td><strong>09-8-55-e</strong></td>
<td>Consider a request of T. Lindsey, Travis Lindsey Consulting Services, Inc., that the Regulations Governing Committee Projects be revised to include regulations to address the appearance of a conflict of interest or ethics violations. See Attachment 09-8-55-e</td>
</tr>
<tr>
<td><strong>09-8-56</strong></td>
<td>Request of the Technical Committee on Fixed Guideway Transit Systems to revise their scope and title of the Committee. See Attachment 09-8-56</td>
</tr>
<tr>
<td><strong>09-8-58</strong></td>
<td>Request from the Building Code and Safety to Life Correlating Committees for the Council to provide guidance to the TCCs as to which TC should be assigned the responsibility for the high rise building criteria. See Attachment 09-8-58</td>
</tr>
</tbody>
</table>
| **09-8-59** | Dates and places of upcoming meetings, as follow:  
   - October 27 (noon Task Groups) San Francisco, CA  
   - Full Council October 28, 2009  
   - March 1 (noon Task Groups) San Juan, Puerto Rico  
   - Full Council March 2-3, 2010  
   - August 2 (noon Task Groups) Quincy, MA  
   - Full Council August 2-5, 2010 Tentative  |
| **09-8-60** | NEC Schedule for the 2014 edition of NFPA 70.  |
| **09-8-61** | Report of the Task Group on Inter-Committee Coordination on Emergency Electrical Systems.  |
Agenda
August (3)-6, 2009
Quincy, MA
Item 09-8-29
1. Revise 3.3.37.1 to read as follows:

**3.3.37.1** *Proximity Fire Fighting.* Specialized fire-fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing very high levels of conductive, convective, and radiant heat such as aircraft fires, bulk flammable gas fires and bulk flammable liquid fires.

2. Revise A.3.3.37.1 to read as follows:

A.3.3.37.1 *Proximity Fire Fighting.* Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be an oil refinery fire or tank farm fire generating high levels of radiant heat. Although large-frame aircraft contain large amounts of aviation fuel, modern Aircraft Rescue and Fire Fighting (ARFF) vehicle technology, extinguishing agents, and application techniques (roof turrets, bumper turrets, and boom nozzles) enable firefighters to control fires from great distances and essentially extinguish large aviation fuel fires while still in the attacking ARFF vehicle, thus eliminating high levels of conductive, convective, and radiant heat exposure prior to firefighters leaving the vehicle and advancing handlines.

3. Add a new paragraph as 7.3.1 to read as follows:

**7.3.1** When determining the need for proximity fire-fighting protective ensembles, the organization shall perform a risk assessment as required by Chapter 5 of NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.*

4. Renumber existing 7.3.1 as 7.3.2 and revise to read:

**7.3.2** When the risk assessment determines that members whose primary responsibility is proximity fire-fighting operations and that when members participate in proximity fire-fighting training, they shall be provided with and shall use proximity fire-fighting protective ensembles that are compliant with NFPA 1971.

5. Renumber A.7.3.1 as A.7.3.2 and revise to read as follows:

A.7.3.2 The technical committee's intent is that members utilize the appropriate protective clothing designed specifically for the type of fire-fighting activities for which the member is regularly engaged. The committee recognizes that any fire department might encounter a rare occasion when the members must engage in fire fighting operations at a fire that is producing very high levels of conductive, convective, and radiant heat. The fire department’s SOPs should address the safest procedures for accomplishing such operations. The type of fire-fighting activity is based upon the particular fire-fighting techniques used, such as using limited agents or chemicals, rather than the types of fuels involved.

6. Renumber existing 7.3.2 through 7.3.4.1 as 7.3.3 through 7.3.5.1.

**Substantiation:** Although large-frame aircraft contain large amounts of aviation fuel, improved ARFF vehicle technology, extinguishing agents and application techniques (roof turrets, bumper turrets and boom nozzles), enable firefighters to control fires from greater distances and essentially extinguish large aviation fuel fires while still in the attacking vehicle, thus eliminating high levels of conductive, convective and radiant heat exposure prior to firefighters leaving the vehicle and advancing handlines. Furthermore, fuel tank trucks, barges, gas stations, etc. that are prevalent in...
our communities are not cited as examples driving a need for proximity PPE even though these conveyers will have a higher fuel load than aircraft.

NFPA 1500 provides conflicting guidance within the document itself. It directs departments to provide PPE for the hazard firefighters are “likely” to be exposed or PPE specific to the actual operation. However, for proximity PPE it specifically requires proximity ensembles based on primary responsibility or mission. The annex material further states the type of fire fighting is based on fire fighting techniques used, not the actual fuels involved.

The NFPA 1500 guidance was provided prior to the existence of NFPA 1851, a selection care and maintenance document that requires the organization perform a risk assessment first and refers back to NFPA 1500 which considers the “likely” hazards firefighters will encounter. NFPA 1851 provides the best method for determining selection of firefighter PPE through a sound risk assessment identifying the hazards firefighters are likely to encounter within their jurisdiction.

A problem with the existing NFPA 1500 guidance is that it may lead the AHJ to choose proximity gear instead of structural gear. A major health and safety concern we have is increased core body temperatures experienced by firefighters wearing proximity PPE when performing any firefighting or emergency response evolutions. Elevated temperatures and dehydration rapidly deplete firefighter energy levels, greatly reduce effective working time and jeopardize personal safety during operations. Independent laboratory test data confirms structural PPE provides greater “breathability” as the outer shell of structural PPE allows heat to escape; proximity PPE does not.

Although aircraft fires can pose high levels of radiant heat, military and commercial airport fire departments employ state-of-the-art Aircraft Rescue and Fire Fighting vehicles, agents and firefighting techniques that eliminate this hazard from a great distance. This occurs prior to firefighters dismounting vehicles to initiate interior fire attack and rescue operations. At this point, the aircraft fuselage interior falls within the definition of structural firefighting as defined in NFPA 1500, Para 3.3.37.2., which would require the use of structural PPE.

**Emergency Nature:** The NFPA has conflicting language regarding the selection of PPE. This includes guidance within NFPA 1500 that requires departments select PPE depending on the hazards a firefighter can be expected to be exposed to except for proximity firefighting where it is based on the primary responsibility of a firefighter. Additionally, NFPA 1851 specifically requires departments to conduct a risk assessment when selecting PPE for structural or proximity firefighting prior to referring back to NFPA 1500. Due to the conflicts within these documents there is confusion among the users and the authorities having jurisdiction as to the appropriate time when proximity firefighting PPE is required.

1. Common practice in the civilian ARFF community is to have proximity PPE available, but it is not necessarily required on all emergencies. This is based on a risk assessment having been completed by the authority having jurisdiction. Furthermore, firefighters responding to aircraft emergencies at civilian airports to assist the airport ARFF crews typically do not have proximity PPE and are operating in close proximity to the aircraft while the airport ARFF crews are operating inside the ARFF vehicles. Additionally, today’s NFPA compliant structural PPE is designed to provide limited protection to radiant heat.

2. Many departments are outfitting all of their firefighters in proximity gear for response to all emergencies including structural fires. Proximity gear does not provide the firefighter the best protection for this type of firefighting and since proximity gear doesn’t breathe the firefighter is subjected to a higher thermal burden. The TIA should be processed so departments are clearly selecting the most appropriate and safest PPE for firefighters.

3. All airport fire departments (military & civilian) may find it difficult to meet the advanced cleaning requirements specified in NFPA 1851. Product manufacturers specifically forbid machine washing of proximity PPE due to concerns of delamination (peeling/flaking) of the aluminized shell. Inability to properly clean contaminated proximity PPE means the garments must be discarded and replaced at high cost to the organization.
Agenda Item: TIA 1500-2007
Document: NFPA 1500, Standard on Fire Department Occupational Safety and Health Program
Reference: 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4
(TIA Log 938)

Comment Closing: 6/12/2009
30 Public Comments Received

TIA FINAL TC BALLOT RESULTS

According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 20 [31 (eligible to vote) – 4 (not returned) – 1 (abstention) = 26 × 0.75 = 19.5]

31 Eligible to Vote
4 Not Returned (Nelson, Norris, Prezant, Wann)

TC FINAL Ballot results for Technical Merit are as follows:
23 Affirmative (Kreis w/comment)
3 Negative (Aldridge, Childress, Cuff)
1 Abstention (Foley)
PASS

TC FINAL Ballot results for Emergency Nature are as follows:
23 Affirmative
3 Disagreement (Bradley, Childress, Cuff)
1 Abstention (Foley)
PASS
MEMORANDUM

TO: Technical Committee on Fire Service Occupational Safety and Health

FROM: Stacey Van Zandt

SUBJ: NFPA 1500 proposed TIA No. 938 FINAL BALLOT RESULTS

DATE: June 26, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA **HAS** achieved the ¾ majority vote needed on both Question 1 (**Technical Merit**) and Question 2 (**Emergency Nature**).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 20 (31 eligible to vote - 4 not returned - 1 abstentions × 0.75 = 20)

**Technical Merit**
31 Eligible to Vote
4 Not Returned (Nelson, Norris, Prezant, & Wann)
1 Abstentions (Foley)
23 Affirmative
3 Negative (Aldridge, Childress, & Cuff)

**Emergency Nature:**
31 Eligible to Vote
4 Not Returned (Nelson, Norris, Prezant, & Wann)
1 Abstentions (Foley)
23 Agreement
3 Disagreement (Childress, Cuff, & Bradley)

Copies of principal members’ final ballots are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received. Also attached are the comments.

Attachments
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the
2007 Edition of NFPA 1500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1, 
A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

____ AFFIRMATIVE     X  NEGATIVE*    _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

See attached Comments

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please 
record me as voting:

X AGREEMENT   DISAGREEMENT*   _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Signature  
Donald Aldridge

Name (Please Print)  
Donald Aldridge

Date  
5-18-2009

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor 
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056  
E-mail: svanzandt@nfpa.org

Standards Council Agenda - August 4-6, 2009   Page 1407 of 2106
5/18/2009

Subject: NFPA 1500 Proposed Tentative Interim Amendment (TIA) No. 938

Explanation:

#1- 3.3.37.1 - I disagree with the proposed changes to the definition. It is true that aircraft fires produce very high levels of radiant, conductive and convective heat, therefore making this change would not be accurate, unless the other examples were also eliminated. The definition in NFPA 1971 (3.3.91) should be used because it eliminates selective examples and such a change would provide consistency between the 1500 and 1971 standard.

#2- A.3.3.37.1 - I disagree with the proposed changes to the definition. It is true that aircraft fires produce very high levels of radiant heat therefore making this change would not be accurate, unless the other examples were also eliminated. The definition in NFPA 1971 (A3.3.91) should be used because it eliminates selective examples and such a change would provide consistency between the 1500 and 1971 standard.

#3- 7.3.1 – I agree that each organization should conduct a risk assessment to determine the need for protective clothing, including a statement of the hazard, the degree of the hazard, whether proximity fire fighting protective clothing is required, and whether special tactics, procedures, and/or other equipment are used by the person that eliminate the radiant heat hazards associated with proximity fire fighting activities. This amendment should be proposed during the next revision cycle.

#4- 7.3.2 – I do not agree with the proposed wording. Personnel should be provided and should use proximity firefighting protective ensembles if the risk assessment determines that there is any risk of exposure to such hazards during proximity firefighting operations conducted by the organization and there is no other equipment, tactic and/or procedure that eliminates the risk of exposure to high levels of radiant heat. The words “primary responsibility” or “primarily respond” do not address the fact that any risk of exposure to extremely dangerous hazards must be avoided, regardless of the primary responsibility of the person. This language should be removed from the standard. The paragraph should be reviewed during the next revision cycle.

#5- A.7.3.2 – I disagree with the proposed wording for the reasons stated in #4.

#6 – The renumbering is not required because the proposal should be rejected.

I believe that the issue should be addressed in how the organization conducts its risk assessment. Revisions to the language in the standard concerning the risk assessment process should be reviewed during the next revision cycle.

Sincerely,

[Signature]

Don Aldridge
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the
2007 Edition of NFPA 1500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1,
A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

☑ AFFIRMATIVE ☐ NEGATIVE* ☐ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

☐ AGREEMENT ☑ DISAGREEMENT* ☐ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

I believe that the information can wait
for the revision cycle.


Signature
Sonice C. Bradley
Name (Please Print)
5-4-09 2009
Date

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056

E-mail: svanzandt@nfpa.org

Standards Council Agenda - August 4-6, 2009  Page 1409 of 2106
TOTAL P. 01
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the 2007 Edition of NFPA 1500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

_________ AFFIRMATIVE __________ NEGATIVE* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

I came from a "civilian" dept. that adamantly uses Proximity Suits at our airport. I disagree with some of the reasoning given in the arguments.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_________ AGREEMENT __________ DISAGREEMENT* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

I did not feel the argument in favor of this change was compelling enough. I feel that the language in 1520 was carefully selected.

[Signature]
Dennis Childress

Name (Please Print)
4/30/09

Date

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056 E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the
2007 Edition of NFPA 1500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1,
A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

--------- AFFIRMATIVE  X  NEGATIVE*  --------- ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

See Attached

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Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

--------- AGREEMENT  X  DISAGREEMENT*  --------- ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

I believe this requires further consideration

-----------

Signature

THOMAS J. CUFF, JR

Name (Please Print)

May 15, 2009

Date

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056

E-mail: svanzandt@nfpa.org

Standards Council Agenda - August 4-6, 2009  Page 1411 of 2106
COMMENTS ON NEGATIVE VOTE FOR TIA 938

1. I fail to see that within the present language a jurisdiction really could not or would not choose the appropriate personal protective equipment (PPE) for the conditions expected. I also believe that aircraft fires certainly are examples of incidents capable of "producing very high levels of conductive, convective and radiant heat...", and should stay in the language, regardless of the outcome of this discussion.

2. I have a concern that a jurisdiction would, under the proposed language, opt for the PPE based on cost alone and not equip the firefighter with appropriate PPE. I believe there are locations where the AHJ should be providing both types of PPE.

3. I have great difficulty believing that any off-airport fire department would provide its members with proximity rated PPE only.

4. I would also like to hear from non-military airport organizations on this subject. While I fully understand the radical changes and greatly enhanced capabilities in fire extinguishments in motorized airport fire apparatus, military and naval installations would, I believe, be routinely dealing with low occupant aircraft while commercial airport personnel should be heard from as they would routinely face much greater occupancy aircraft with passengers in the hundreds and large crews. Consider the super-passenger planes with 500 passengers.

5. I specifically object to the language proposed for new 7.3.2 as I believe it would be too restrictive and may lead to firefighters being in inappropriate PPE just because such exposure is not "primarily" anything. All exposures, primary or otherwise, should be considered in selecting PPE for firefighters.

Thomas J. Cuff, Jr.
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the
2007 Edition of NFPA 1500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1,
A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

________ AFFIRMATIVE ________ NEGATIVE*  × ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

USFA has directed technical committee member to ABSTAIN.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

________ AGREEMENT ________ DISAGREEMENT*  × ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

USFA has directed technical committee member to ABSTAIN.

Signature

Name (Please Print)

Date

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056

E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 938
To Revise 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1 of the
2007 Edition of NFPA 1.500,
Standard on Fire Department Occupational Safety and Health Program

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 3.3.37.1,
A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1, please record me as voting:

☑ AFFIRMATIVE ☐ NEGATIVE* ☐ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

This is long overdue and needs to be addressed

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

☑ AGREEMENT ☐ DISAGREEMENT* ☐ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

[Signature]

[Name (Please Print)]

[Date]

Please return the ballot on or before Monday, May 18, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056
E-mail: svanzandt@nfpa.org
MEMORANDUM

TO: Technical Committee on Fire Service Occupational Safety and Health
FROM: Stacey Van Zandt
DATE: June 15, 2009
SUBJ: NFPA 1500 proposed TIA No. 938 Circulation of Ballots

The preliminary ballot results on proposed TIA No. 938 are as follows:

**Technical Merit**
31 Eligible to Vote
4 Not Returned (Nelson, Norris, Prezant, & Wann)
1 Abstentions (Foley)
23 Affirmative
3 Negative (Aldridge, Childress, & Cuff)

**Emergency Nature:**
31 Eligible to Vote
4 Not Returned (Nelson, Norris, Prezant, & Wann)
1 Abstentions (Foley)
23 Agreement
3 Disagreement (Childress, Cuff, & Bradley)

The number of affirmative votes necessary for Question 1 (**Technical Merit**) and Question 2 (**Emergency Nature**) to pass balloting is based on the number eligible to vote, minus the not returned and abstentions. Therefore, based on the responses received to date the preliminary results show that this TIA is achieving the necessary ¾ majority needed to pass ballot.

(31 eligible to vote - 4 not returned - 1 abstentions × 0.75 = 20)

Explanation of votes received from principal members are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received. Also attached are public comments received regarding this TIA.

If you wish to submit your ballot or change your vote, please do so no later than Monday, June 22, 2009. Ballots or changes may be submitted to Stacey Van Zandt via email to svanzandt@nfpa.org or fax to 617-984-7056. If you do not wish to change your vote, no response is necessary.

Attachments
MEMORANDUM

To: Technical Committee on Fire Service Occupational Safety and Health

From: Stacey Van Zandt

Date: April 30, 2009

Subject: NFPA 1500 Proposed Tentative Interim Amendment (TIA) No.938

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by Joe Rivera and endorsed by Tamara Lopes.

This proposed TIA is being published for public comment in the May 1, 2009 issue of NFPA News with a Public Comment Closing Date of June 12, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. Ballots are due on Monday, May 18, 2009.

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.

Attachments
From: Ford, Terry G CIV USAF AFMC 72 ABW/CEF [mailto:Terry.Ford@tinker.af.mil]
Sent: Friday, May 01, 2009 11:56 AM
To: Maynard, Mary
Cc: Giuliano, Mark T CIV USAF AFMC 96 CES/CEF; Smith, Kevin B CIV USAF AFMC 72 ABW/CEFL
Subject: Support for TIA 938

As the Fire Chief for a large airport firefighting and rescue operation at the Air Force's largest aircraft overhaul facility I wholeheartedly concur with the provisions of TIA 938.

//Signed///
Terry G. Ford, YN-02
Chief, Fire and Emergency Services
From: Smith, Kevin B Civ USAF AFMC 72 ABW/CEFL [mailto:Kevin.B.Smith@tinker.af.mil]
Sent: Friday, May 01, 2009 6:38 PM
To: Maynard, Mary
Cc: Ford, Terry G Civ USAF AFMC 72 ABW/CEF
Subject: tia 938

To whom it may concern:

As a 20 year ARFF firefighter, Logistics Officer and PPE buyer for a large Air Force crash rescue operation and the Air Force's largest overhaul facility I fully agree with TIA 938.

Kevin B. Smith
Lieutenant/Logistics Officer
Tinker AFB Fire and Emergency Services
3680 "A" Ave.
Tinker AFB, OK 73145
405-734-3977 Office
405-734-6917 Fax
405-409-2721 Cell
From: Horrigan, Sean V  CIV USAF AFMC 96 CES/CEFO [mailto:sean.horrigan@eglin.af.mil]
Sent: Monday, May 04, 2009 6:53 AM
To: Maynard, Mary
Subject: NFPA 1500 TIA

Sir/Ma’am,

This PPE issue was presented to the NFPA 1500 Technical Committee (TC) on behalf of the USAF FES Panel. The TIA was submitted by the Air Force and endorsed by Battalion Chief, Tamara Lopes of the Reno, NV Fire Department.

I am writing in support of this change.

Thank you,

Very Respectfully,

//signed\\
SEAN V. HORRIGAN, Civ, DAF
District Chief
Eglin Fire & Emergency Services
(850) 882-9910 Ext. 5
From: Szymanski, Louis A CIV USAF AFMC 95 CES/CEFO [mailto:louis.szymanski@eglin.af.mil]
Sent: Monday, May 04, 2009 8:16 AM
To: Maynard, Mary
Subject: NFPA 1500, TIA No. 938

I support the recommended changes to NFPA 1500, TIA No. 938. It is nice to see common sense as well as safety being a factor. Should also be very cost effective.

Thanks,
Louis Szymanski
District Chief
EF&ES
From: Carrico, Stephen P CIV USAF AFMC 96 CES/CEFP [mailto:stephen.carrico@eglin.af.mil]
Sent: Monday, May 04, 2009 2:23 PM
To: Maynard, Mary
Subject: NFPA Temporary Interim Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE

I have reviewed the proposal for USAF Fire and Emergency Services to utilize Structural Firefighting personal protective ensembles instead of Proximity PPE and concur. In the event of an aircraft crash USAF Firefighters utilize state of the art Aircraft Rescue and Fire Fighting vehicles, agents and firefighting techniques to attack a fire on the exterior of the aircraft prior to making entry into the fuselage of a large frame aircraft. A fire within the fuselage can be attacked by personnel wearing structural personal protective clothing without any compromise to their safety. I also feel that the benefits of wearing structural gear versus proximity gear in relation to dehydration of firefighters needs to be considered. Proximity gear doesn’t breath as well as structural gear and exposes our personnel to unnecessary body core temperatures. Having worn both types of personal protective clothing since 1983 I can state that I never fought a fire in proximity gear that I couldn’t fight in structural gear without compromising my safety.
FW: TIA to NFPA 1500 (proximity gear)
Port of Seattle Fire Department

May 4, 2009

TO: Secretary, Standards Council
National Fire Protection Association

From: Rick Kruckenber, Safety Officer
Port of Seattle Fire Department

Department Occupational Safety and Health Program Temporary Interim
Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE.

Dear Secretary, Standards Council

Position: I firmly support the efforts of CMSgt Joseph W. Rivera and Civ Fire
Chief, Mark Giuliano and the United States Air Force. The following are my
comments in reference to the on-going debate on ARFF personal protective
equipment as it relates to aircraft incident and accidents and the use of proximity
PrPPE vs. Structural PPE.

1. Proximity firefighting is not synonymous with aircraft firefighting. The term
proximity does not reflect current strategic and tactical ARFF practices.

2. Each Fire Department as the local (AHJ) bares the responsibility to establish
the specific protection needs it has, relative to the department’s response
activity and circumstances. The selection of personal protective clothing
should be based on a valid risk assessment.

3. Due to the composition of the proximity ensembles outer shell (silver
reflective material) it cannot release built up heat through the system and is
susceptible to increasing the body’s core temperature. Increased heat within
the PrPPE ensemble can result in heat related injuries/illness resulting in
severe injury or death.
In conclusion:

ARFF Apparatus are far superior and possess greater capabilities than ever before; firefighters are better trained to take advantage of the apparatus capabilities and mobility in order to perform their primary mission while remaining in the apparatus and using specific fire-fighting techniques.

I also believe that it would be a relatively rare opportunity where aviation fire fighters would resort to proximity firefighting, given that each department's apparatus and capabilities are commensurate with the Airports FAA Index or aircraft size.

I fully support the NFPA 1500 TIA 938 amendments as requested by the United States Air Force. Thank you for the opportunity to provide comment. Should you have any questions, please contact me by phone at (206) 433-5040 or email, Kruckenbergr@portseattle.org

///SIGNED/// 04, May 09
Rick Kruckenbergr, Safety Officer
Port of Seattle Fire Department
From: Moore, Randy D CIV USAF AETC 312 TRS/DOFB [mailto:randy.moore@goodfellow.af.mil]
Sent: Tuesday, May 05, 2009 9:06 AM
To: Maynard, Mary
Subject: TIA Log No. 938/NFPA 1500/2007 edition

NFPA,

Totally 100% concur with Joe Rivera and Mark Giuliano's recommended changes/adjustments concerning proximity firefighting. Technology has changed in the airport firefighter arena, especially with recent modifications to crash trucks allowing the use of high pressure foam applications. Also, funding is very tight for most of us right now and this just make good common sense. I see no additional risk to firefighters by allowing their suggestions.

"Signed"
RANDY MOORE
Chief, Advanced Fire Courses
DoD Fire Academy
From: Weed, Donald G Civ USAF AETC 312 TRS/DOFAE [mailto:donald.weed@goodfellow.af.mil]
Sent: Tuesday, May 05, 2009 11:16 AM
To: Maynard, Mary
Subject: Structural vs. Proximity Gear

Dear Secretary,

The Louis F. Garland Fire Academy will comply with the standards of NFPA 1003 and 1500 on the issue of PPE. We are currently using both structural and proximity gear for training purposes that meet both NFPA standards in the Airport Firefighter block of instruction. According to NFPA 1003, individuals must don proximity gear and perform rescue operations. But during the live fire training the students are donning the structural gear due to delaminating of the proximity gear. We use strictly propane for the live fire training for both interior and exterior attack and no flammable liquids. Our number one concern for the students is their safety other than graduation.

On use of the structural gear versus proximity gear for the instructors it is widely favorable towards the structural gear. The primary and alternate instructors are in every live fire training and the structural gear give the instructors more breathability and comfort. The structural gear is preferred over proximity gear for live fire training.

My contact information is below, please feel free to contact me at any time.

v/r,

Donnie Weed, YC02, DAF
Instructor Supervisor/Master Instructor/Tech Writer
Block VI, Airport Firefighter Course
DOD Fire Academy
Goodfellow AFB, TX
312 TRS HAZCOM
654-4843
477-4843
Donald.weed@goodfellow.af.mil
From: Goddard, John R CIV USAF AETC 37 CES/CEF [mailto:John.Goddard@LACKLAND.AF.MIL]
Sent: Tuesday, May 05, 2009 6:42 PM
To: Maynard, Mary
Subject: Temporary interim amendment to NFPA 1500 clarifying the issues listed

To the Secretary of the NFPA Standards Council:

Below is a portion of the letter submitted to you by-

JOSEPH W. RIVERA, CMSgt, USAF
Fire Emergency Services Program Manager

I have included the full document as an attachment to this correspondence.

"6. An additional major health and safety concern we have is increased core body temperatures experienced by firefighters wearing proximity PPE when performing any firefighting evolution. Elevated temperatures and dehydration rapidly deplete firefighter energy levels, greatly reduce effective working time, and jeopardize personal safety during operations. An analogy AF firefighters often use is "feeling like a baked potato", when wearing proximity gear. We believe and independent laboratory test data confirms, structural PPE provides greater "breathability" as the outer shell of structural PPE allows heat to escape; proximity PPE does not."

This is a strong statement about the physical heat stress placed on the individual wearing proximity PPE. Unfortunately, it gets even worse for military fire fighters participating in fire fighting operations under chemical threats. These fire fighters must wear chemical protection suits under the same proximity PPE and provide the same emergency services. I have had to do this many times while serving on active duty as a military fire fighter. I believe that approved structural fire fighting gear would have reduced the heat stress placed on me and my fellow airman, while still providing the protection needed to do aircraft fire fighting duties.

MSgt John R. Goddard (Retired)
Lackland Fire Emergency Services Dispatcher
210-671-2921
MEMORANDUM FOR NFPA 1500 TECHNICAL COMMITTEE

Mr. Glenn P. Benarick
1 Battery March Park
Quincy, MA 02169-7471

FROM: HQ AFCESA/CEXF
139 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: Clarification on Determining Proper Personal Protective Ensembles (PPE) for Members, Definition Change and Temporary Interim Amendment Issuance

1. US Air Force (USAF) Fire Emergency Services (FES) has historically directed its fire departments to procure and utilize proximity firefighting PPE based upon Occupational Safety & Health Administration (OSHA) interpretations of National Fire Protection Association (NFPA) Std 1976, Standard on Protective Clothing For Proximity Firefighting (see Atch 1). OSHA’s interpretations were based upon the firefighter’s primary job; structural or crash rescue firefighting.

2. As you are aware, NFPA Std 1976 has been superseded by the NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. Additionally, NFPA 1851, Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting was created. Current guidance within NFPA Std 1500, Standard on Fire Department Occupational Safety and Health Program and NFPA 1851, offer differing methodology for determining appropriate selection of PPE. Excerpts from NFPA 1500 & 1851 are provided in Atch 2. Abridged versions are provided below:

- **NFPA 1500, Para. 7.7.1** – The fire department shall provide each member with protective clothing and protective equipment that is designed to provide protection from the hazards to which the member is likely to be exposed and is suitable for the tasks that the member is expected to perform.

- **NFPA 1500 Para. 7.2.6** – The fire department shall require all members to wear all the protective ensemble specific to the operation.

- **NFPA 1500 Para, 7.3.1** – Members whose primary responsibility is proximity firefighting operations and members who participate in proximity fire-fighting training shall be provided with and shall use proximity fire-fighting protective ensembles that are compliant with NFPA 1971. **Annex 7.3.1** The technical committee’s intent is that
members utilize the appropriate protective clothing designed specifically for the type of fire-fighting activities for which the member is engaged. The type of fire-fighting activity is based upon the particular fire-fighting techniques used, such as using limited agents or chemicals, rather than the types of fuels involved.

- **NFPA 1851, Para 5.1.1** – Prior to starting the selection process of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements, the organization shall perform a risk assessment. Annex 5.1.1 (4) Section 7.1: Requirements for ensembles and ensemble elements in the identification of hazards, the organization should consider those hazards that fire fighters are likely to encounter.

- **NFPA 1851, Para 5.1.2** – The risk assessment shall include, but not be limited to, the hazards that can be encountered by structural or proximity fire fighters based on the following:

  (1) Type of duties performed  
  (2) Frequency of use of ensemble elements  
  (3) Organization’s experiences  
  (4) Incident operations  
  (5) Geographic location and climate  
  (6)* Likelihood of or response to CBRN terrorism incident

3. NFPA 1500 directs departments to provide PPE for the hazard firefighters are “likely” to be exposed or PPE specific to the actual operation. However, for proximity PPE it specifically requires proximity ensembles based on primary responsibility or mission. The annex material further states the type of fire fighting is based on fire fighting techniques used, not the actual fuels involved. NFPA 1851 requires the organization perform a risk assessment first and refers back to NFPA 1500 which considers the “likely” hazards firefighters will encounter.

4. We believe the best method for determining selection of firefighter PPE is through a sound risk assessment identifying the hazards firefighters are likely to encounter within their jurisdiction. Although most AF installations have a flying mission, analysis of response data indicates proximity firefighting due to aircraft related mishaps is extremely rare. Furthermore, evidence shows the majority of our fire departments respond to incidents that involve emergency medical calls, motor vehicle accidents, structural response, hazardous material and other special operations. Based on this analysis, we believe structural PPE is more appropriate for the hazards our firefighters are likely to be exposed and best suited for the tasks our firefighters are performing.

5. Although aircraft crashes can pose high levels of radiant heat, USAF FES employ state-of-the-art Aircraft Rescue and Fire Fighting vehicles, agents and firefighting techniques that eliminate this hazard from a great distance. This occurs prior to firefighters dismounting vehicles to initiate interior fire attack and rescue operations. At this point, the aircraft fuselage interior falls within the definition of structural firefighting as defined in NFPA 1500, Para 3.3.37.2, which would require the use of structural PPE.
6. An additional major health and safety concern we have is increased core body temperatures experienced by firefighters wearing proximity PPE when performing any firefighting evolution. Elevated temperatures and dehydration rapidly deplete firefighter energy levels, greatly reduce effective working time, and jeopardize personal safety during operations. An analogy AF firefighters often use is “feeling like a baked potato”, when wearing proximity gear. We believe and independent laboratory test data confirms, structural PPE provides greater “breathability” as the outer shell of structural PPE allows heat to escape; proximity PPE does not.

7. USAF FES requests the NFPA 1500 Technical Committee:

(a) More precisely define the method for determining the proper PPE for members.
(b) Consider changes to the definition of proximity firefighting as describe in Atch 3.
(c) Publish a temporary interim amendment to NFPA 1500 clarifying the issues listed herein.

8. Thank you for your consideration. Should you have any questions, please contact me by phone at (850) 283-6153 or email, joseph.rivera@tyndall.af.mil

//SIGNED//jwr/30 May 08
JOSEPH W. RIVERA, CMSgt, USAF
Fire Emergency Services Program Manager
July 21, 1997

To: Bill Killen

This is in response to your e-mail of May 30th concerning PPE. You specifically asked for us to “review this issue with OSHA to determine if fire departments respond to aircraft or structural incidents which is not their primary responsibility, will they be cited for using NFPA 1976 compliant PPE at a structural fire and NFPA 1971 compliant PPE at an ARFF fire?”

Current DoD policy is for the Components to adopt national consensus standards and to use the proper PPE for the job, i.e., NFPA 1971 for structural firefighting, NFPA 1976 for ARFF, and NFPA 1977 for wildland firefighting. If the adequate PPE is not available, then the worker is placed at increased risk if he or she performs the job. The cost of proper PPE should never be the issue.

We discussed the above with an OSHA compliance officer and learned that OSHA would cite the Navy if firefighters were wearing PPE that is inadequate for the job performed. Any decision not to purchase the appropriate firefighting gear because of budgetary considerations would be considered a willful violation if the firefighters were exposed to the hazard. Further, any death resulting from the willful violation, could now subject Navy officials (including you) to criminal penalties. Because of recent conversations that you and Chief Willie Shelton had with Mr. Ron Cain, OSHA, we asked OSHA to restate its position on PPE. OSHA reconfirmed its previous position. Attached is a copy of OSHA’s July 14, 1997 memorandum restating their position for your information.

We checked with the NFPA POC for PPE regarding possible substitution of 1971 and 1976 ensembles and learned that the 1976 ensemble can be specially designed and procured so that the ARFF outer covering can be removed when fighting a structural fire or added when fighting an ARFF fire. Although the outer shell cannot be purchased separately, there would be considerable savings with a special order of the 1976 dual ensemble instead of the normal individual 1971 compliant PPE or 1976 compliant PPE.

The rule of thumb is: if you don’t have the correct PPE for the job, then you don’t do the work. In the alternative, if budget constraints prohibit purchases of the correct PPE, then agreements between the installation fire department and local fire service organizations should be consummated to cover those instances when the fire situation demands PPE that is not available in-house.

Charles Smith

Attachment
MEMORANDUM FOR: Charles W. Smith  
Assistant for Fire and Emergency Services  
(Safety and Occupational Health Policy)  

FROM: John E. Planmer, Director  
Office of Federal Agency Programs  

SUBJECT: July 2, 1997 Memo on Proper PPE for Firefighters  

To restate OSHA's position on requiring proximity gear as simply as I possibly can;  

- If a firefighter's primary job is crash and rescue, he or she must be adequately protected for that job (NFPA 1976 equipment), this is true even for those large combined fire departments with multiple tasks where personnel are rotated from station to station and expected to perform crash and rescue duties.  

- If a firefighter's primary job is structural, then he or she must be adequately protected for that job (NFPA 1971 equipment). This does not preclude being trained for incidental response to aircraft crashes as crashes can and do occur in unexpected locations.  

In the telephone conversations that you refer to between Mr. Ron Cain of my staff and Mr. Killen and Mr. Shelton of DOD, Mr. Cain stated that the directive on proper personal protective equipment for firefighters was issued to clarify OSHA's position on NFPA 1971 and NFPA 1976. As Mr. Cain explained to both these individuals, the directive was written to allow OSHA compliance officers in the field to make the determination on whether or not aluminized proximity clothing was required. Since we are not on site and the compliance officer is, we feel that he or she is able to make a better determination through interviews with firefighters, labor representatives and managers, which is critical for the compliance officer to be able to perform his or her job in the field. As Mr. Cain stated to Mr. Killen, if a firefighter's primary job is aircraft crash and rescue, then that firefighter must have the appropriate protective clothing. In the case that Mr. Killen cited, that of San Diego's combined fire department, where a firefighter can be tasked to do any type of
2

firefighting at any time (usually on a rotational basis), then all 300 firefighters are going to have to be equipped to fight any type of fire. In Mr. Shelton's case where he stated that aircraft crash and rescue is less than 5% of the tasking, then proximity firefighting is "incidental" and not the primary job. The previous memorandum issued by this office on April 3, 1997, allows the compliance officer to make that determination on-site. If during an inspection, the compliance officer discovers through interviews with firefighters, labor representatives and managers that the employees are hired and trained to primarily fight proximity fires during crash and rescue operations, the firefighters must be equipped with NFPA 1976 equipment.

This office supports the idea in your memo on procuring the 1976 ensemble that has the removable (ARFF) outer cover. That way, even the rotational units would be fully protected (with adequate training). Your office can require that all DOD units have such equipment, my office or OSHA can not under current standards.
MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS AND HOUSING)
DEPUTY ASSISTANT SECRETARY OF THE NAVY
 ENVIRONMENT AND SAFETY)
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE
(EENVIRONMENT, SAFETY & OCCUPATIONAL HEALTH)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Aluminized Proximity Protective Clothing for Aircraft Rescue Firefighting (ARFF)

This is to clarify Department of Defense (DoD) policy on the use of the subject personal protective equipment (PPE).

The attached letter of April 3, 1997, from the Occupational Safety and Health Administration (OSHA) communicates its intent to enforce the National Fire Protection Association (NFPA) 1976 Standard on “Aluminized Proximity Protective Clothing for Aircraft Firefighting” under the General Duty Clause. Although this standard has not as yet been formally adopted by OSHA, this highlights its assessment of the risk to firefighters of not using this level of PPE.

Regardless of any future action that OSHA may take, current DoD policy requires that we provide this level of protection to our workers. Paragraph 2e of Enclosure 2 to DoD Instruction 6055.1, “DoD occupational Safety and Health Program,” requires that in workplaces where OSHA standards apply but do not cover, or only partially cover, existing conditions:

“If the uncovered conditions are not military-unique, DoD Components shall (1) modify, as necessary, or adopt available national consensus standards as a supplementary standard...”

Recently, the Navy granted a waiver from an internal Navy requirement to use NFPA 1976 PPE, in the belief that OSHA had approved the use of structural PPE for ARFF in 1990. Please inform your field activities that only PPE that meets the requirements of NFPA 1976 shall be used to fight aircraft fires. Any waivers of NFPA 1976 requirements for aircraft firefighting purposes should be rescinded.

Thank you for your support in this matter. If you have any questions concerning the requirements of NFPA 1971 or 1976, or OSHA’s ruling regarding these standards, please have your staff contact Mr. Charles W. Smith at (703) 604-1876.

George W. Siebert, CHI, RS
Assistant Deputy Under Secretary of Defense
(Safety and Occupational Health Policy)

Attachment
cc: OSHA
DASA(ESOH)

Environmental Security Defending Our Future
Mr. George W. Siebert  
ODUSD (ES) SH  
Department of Defense  
3400 Defense Pentagon  
Washington, D.C. 20301-3400

Dear Mr. Siebert:

The attached memorandum from the Commander In Chief, United States Pacific Fleet, regarding a waiver on Aluminized Proximity Protective Clothing for Aircraft Firefighting, NAVAIR 00-80R-14 has come to our attention. This letter is to correct a misunderstanding and avoid further confusion on this area.

The memo states in paragraph 2 that "the OSHA position is that changes in design materials of structural firefighting clothing have resulted in state-of-the-art gear that provides equal or greater protection than that afforded by crash rescue suits and that OSHA has approved the use of structural protective clothing meeting the requirements of 29 CFR 1910.156(e) (NFPA Standard 1971) for both structural and airport crash rescue firefighting."

This statement is misleading and the memorandum that the paragraph refers to was written as a specific response to a 1990 question from OSHA Region 3 regarding citations issued to the U.S. Army Transportation Command at Fort Eustis, Virginia and to the U.S. Navy at the Oceania Air Station. In that response, OSHA did not approve the use of structural gear for aircraft firefighting, OSHA stated that the employer would not be cited for using structural gear for aircraft crash response (copy of memo attached). The issue was stated that way at the time because no consensus standard existed that addressed aircraft crash and rescue protective equipment and OSHA had no basis to issue a general duty citation for failure to provide aluminized proximity protective clothing. In 1992, the National Fire Protection Association promulgated NFPA 1976 Standard on Protective Clothing for Proximity Firefighting which does address the issue and which requires aluminized proximity protective clothing for aircraft firefighting. Since there is now a consensus standard for aircraft firefighting, that earlier memorandum is no longer valid and an employer may be cited for failure to follow NFPA 1976.
Please advise DOD agencies and CINCPAC that any agency that fails to follow the equipment and other requirements of NFPA 1976 for aircraft firefighting will be subject to OSHA citation.

Should you have any further questions, please contact me or Mr. Ron Cain of my staff at 202-219-9129, extension 170 or 161 respectively.

Thank you in advance for your quick action.

Sincerely,

[Signature]

John E. Plummer, Director
Office of Federal Agency Programs

2 Attachments
NFPA Standard Excerpts Related to Firefighter Personal Protective Ensembles

**NFPA 1500**

3.3.37.1* Proximity Fire Fighting. Specialized fire-fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing very high levels of conductive, convective, and radiant heat such as aircraft fires, bulk flammable gas fires, and bulk flammable liquid fires.

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations.

7.1 General.

7.1.1* The fire department shall provide each member with protective clothing and protective equipment that is designed to provide protection from the hazards to which the member is likely to be exposed and is suitable for the tasks that the member is expected to perform.

A.7.1.1

The provision and use of protective clothing and protective equipment should include safety shoes, gloves, goggles, safety glasses, and any other items appropriate to the members’ activities. This applies to all activities members are expected to perform, including non-emergency activities. The applicable regulations pertaining to industrial worker safety should be consulted to determine the need for protective equipment in non-emergency activities.

7.1.2* Protective clothing and protective equipment shall be used whenever the member is exposed or potentially exposed to the hazards for which it is provided.

A.7.1.2 The fire department should provide body armor for all members who operate in areas where a potential for violence or civil unrest exists.

7.2 Protective Clothing for Structural Fire Fighting.

7.2.1* Members who engage in or are exposed to the hazards of structural fire fighting shall be provided with and shall use a protective ensemble that shall meet the applicable requirements of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

A.7.2.1 The fire department should consider providing each member with two complete sets of structural fire-fighting protective clothing that meet the requirements of NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, whenever possible. It is not reasonable to expect that a fire department would have enough stock protective clothing available to all members in the event that the protective clothing became soiled, wet, or contaminated during daily activities. Fire fighters provided with two complete sets of structural fire-fighting protective clothing can change easily into proper fitting garments and will not be unnecessarily exposed or expose the public to contaminants. Structural protective clothing that is cleaned and
properly and completely dried before the next use will last longer and provide greater protection than soiled or damp garments.

7.2.5 The fire department shall adopt and maintain a protective clothing and protective equipment program that addresses the selection, care, maintenance, and use of structural firefighting protective ensembles, and training in its use.

7.2.5.1 The selection, care, and maintenance of protective ensembles for structural firefighting shall be as specified in NFPA 1851.

7.2.6 The fire department shall require all members to wear all the protective ensemble specific to the operation.

7.3 Protective Clothing for Proximity Fire-Fighting Operations.

7.3.1* Members whose primary responsibility is proximity fire-fighting operations and members who participate in proximity fire-fighting training shall be provided with and shall use proximity fire-fighting protective ensembles that are compliant with NFPA 1971.

A.7.3.1 The technical committee's intent is that members utilize the appropriate protective clothing designed specifically for the type of fire-fighting activities for which the member is engaged. The type of fire-fighting activity is based upon the particular fire-fighting techniques used, such as using limited agents or chemicals, rather than the types of fuels involved.

NFPA 1971

3.3.80 Protective Clothing. See 3.3.121, Structural Fire Fighting Protective Ensembles, and

3.3.91 Proximity Fire Fighting. Examples of fires that commonly produce high levels of radiant heat, as well as convective and conductive heat, and could result in incidents incorporating proximity fire fighting operations include, but are not limited to, bulk flammable liquid fires, bulk flammable gas fires, bulk flammable metal fires, and aircraft fires. These operations usually are exterior operations but might be combined with interior operations. Proximity fire fighting is not structural fire fighting but might be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. The fire fighting activities differ from “entry fire fighting” as proximity fire fighting does not include direct entry of fire fighters into flames. Proximity operations are performed close to the actual fire where the high levels of radiant heat as well as the convective and conductive heat would overcome the thermal protection provided by structural fire fighting protective ensembles and the proximity fire fighting protective ensembles provide enhanced protection from these thermal exposures. After the fire and heat have been controlled at a proximity fire fighting incident, entry into structures or enclosures by fire fighters protected by proximity fire fighting protective ensembles could be made where the incident requires additional operations for control of the incident.

3.3.95, Proximity Fire Fighting Protective Ensemble.

3.3.95 Proximity Fire Fighting Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.

3.3.117 Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation.
3.3.118 Structural Fire Fighting Protective Clothing. See 3.3.121, Structural Fire Fighting Protective Ensemble.

3.3.121* Structural Fire Fighting Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.

A.3.3.121 Structural Fire Fighting Protective Ensemble. Structural fire fighting protective ensembles include, but are not limited to, garments, helmets, hoods, gloves, and footwear.

NFPA 1851

Chapter 5 Selection

5.1* Selection and Purchase.

A.5.1 The organization should consider establishing a committee to oversee the process of selecting ensembles or ensemble elements. The committee should consist of interested individuals representing a cross section of the organization (i.e., from both labor and management who collectively have several years of experience in fire fighting activities). The role of the committee should be to set and define goals and requirements and identify areas of responsibility for each member, plus provide recommendations to the authority making the final decisions. Copies of specifications on the organization’s current ensembles and ensemble elements should be distributed to the committee as a point of reference. The committee should consider if there are possible areas for improvement to the existing specifications. Examples of improvement criteria over existing specifications include heat stress, weight, design, style, interface with other components, durability, comfort, flexibility, safety, performance, price, customer service, delivery, compliance, reliability, and warranty.

5.1.1* Prior to starting the selection process of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements, the organization shall perform a risk assessment.

A.5.1.1 In general, some hazards that can be encountered include, but are not limited to, physical, environmental, thermal, chemical, biological, electrical, radiation, operational, and ergonomic hazards. The organization should also consider the frequency and severity of the identified hazards when conducting the risk assessment.

The safety officer is the logical individual to perform this function since that is his or her role in the organization. The safety officer should consider national trends when performing this task. NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, substantiates OSHA’s regulations as follows:

(1) Section 4.3: Mandatory evaluation of safety and health programs
(2) Subsection 4.4.2: Mandatory compliance with state and federal laws
(3) Section 4.7: Safety officer’s responsibilities also defined in NFPA 1521, Standard for Fire Department Safety Officer
(4) Section 7.1: Requirements for ensembles and ensemble elements in the identification of hazards, the organization should consider those hazards that fire fighters are likely to encounter. A list of hazards is provided in Table A.5.1.1. In determining risk, the organization should consider the frequency or likelihood of exposure to the hazard along with its potential severity (consequence) if exposure occurs.
<table>
<thead>
<tr>
<th>Physical Hazards</th>
<th>Chemical Hazards</th>
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<tr>
<td>Falling objects</td>
<td>Inhalation</td>
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<td>Flying debris</td>
<td>Skin absorption or contact</td>
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<td>Projectiles or ballistic objects</td>
<td>Chemical ingestion or injection</td>
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<td>Abrasive or rough surfaces</td>
<td>Liquefied gas contact</td>
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<td>Sharp edges</td>
<td>Chemical flashover</td>
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<td>Pointed objects</td>
<td>Chemical explosions</td>
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<td>Slippery surfaces</td>
<td>Electrical Hazards</td>
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<td>Excessive vibration</td>
<td>High voltage</td>
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<td>Environmental Hazards</td>
<td>Electrical arc flashover</td>
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<td>High heat and humidity</td>
<td>Static charge buildup</td>
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<td>Ambient cold</td>
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<td>Wetness</td>
<td>Ionizing radiation</td>
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<td>High wind</td>
<td>Non-ionizing radiation</td>
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<td>Insufficient or bright light</td>
<td>Person-Position Hazards</td>
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<td>Excessive noise</td>
<td>Daytime visibility</td>
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<td>High convective heat</td>
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<td>High radiant heat</td>
<td>Person-Equipment Hazards</td>
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<td>Material biocompatibility</td>
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<td>Hot solids</td>
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<td>Hot surfaces</td>
<td>Ankle and back support</td>
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<td>Biological Hazards</td>
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<td>Bloodborne pathogens</td>
<td>Communications ease</td>
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<td>Airborne pathogens</td>
<td>Fit (poor)</td>
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<td>Biological toxins</td>
<td>Ease of donning and doffing</td>
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<td>Biological allergens</td>
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5.1.2 The risk assessment shall include, but not be limited to, the hazards that can be encountered by structural or proximity fire fighters based on the following:

(1) Type of duties performed
(2) Frequency of use of ensemble elements
(3) Organization’s experiences
(4) Incident operations
(5) Geographic location and climate
(6)* Likelihood of or response to CBRN terrorism incident

A.5.1.2 (6) In determining the need for CBRN protection, the organization should determine homeland security priorities for their jurisdiction, including, but not limited to, whether the organization would be responding to a CBRN terrorism incident, the specific roles and missions to be undertaken in response to a CBRN terrorism incident, the expected types of hazards that might be encountered for its members during a CBRN terrorism incident, and the capabilities of the organization to provide sufficient training and support for the use of CBRN protective ensembles (e.g., decontamination for safe doffing of ensemble elements). If it is determined that CBRN protection is needed, the organization should review both the CBRN terrorism agent protection option in NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, the different classes of ensembles addressed in NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, and the protective ensemble defined in NFPA 1991, Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies, together with its intended CBRN terrorism agent response or action plan to determine the suitability of requiring protective ensembles meeting the CBRN terrorism agent protection option of NFPA 1971 versus obtaining separate ensembles that comply with specific classes of ensembles for NFPA 1994 or ensembles meeting NFPA 1991.

5.1.3* The organization shall review the current edition of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting; NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; NFPA 600, Standard on Industrial Fire Brigades; and any applicable federal or state OSHA standards relating to structural fire fighting protective ensembles and ensemble elements to determine how they affect the selection process.

A.5.1.3 These standards provide minimum requirements. In order to fully utilize this standard, organizations should be familiar with the performance requirements in NFPA 1971. Additional requirements can be necessary. Organizations should also solicit information from and exchange information with other organizations.

5.1.5* Based on the risk assessment, the organization shall compile and evaluate information on the comparative strengths and weaknesses of the elements under consideration.

A.5.1.5 The majority of tests in NFPA 1971 provide quantitative results; however, some tests are established on the basis of pass or fail results and cannot be readily compared. Specific tests that offer comparative performance results include, but are not limited to, the following:

(1) Protective garment elements
(a) Thermal protective performance of the material composite
(b) Total heat loss of the material composite
© Conductive and compressive heat resistance of reinforcements
(d) Thermal shrinkage of the material layers (outer shell, moisture barrier, thermal barrier)
(e) Flame resistance of material layers and other components (outer shell, moisture barrier, thermal barrier, other material layers and components)
(f) Tear resistance of the material layers (outer shell, moisture barrier, thermal barrier)
(g) Cleaning shrinkage of the material layers (outer shell, moisture barrier, thermal barrier)
(h) Water absorption resistance of the outer shell
(i) Tensile strength of the outer shell
(j) Seam strength of outer shell, moisture barrier, and thermal barrier layers
(k) Visibility properties of the trim
(l) Radiant reflectance of the outer shell (for proximity fire fighting protective clothing)
(2) Protective helmet elements
(a) Impact resistance (top and acceleration) after selected preconditions
(b) Flame resistance
© Heat resistance (level of sagging)
(3) Protective glove elements
(a) Thermal protective performance of glove body and, if present, wristlet
(b) Conductive heat resistance of glove body
© Thermal shrinkage of glove and innermost material
(d) Cut resistance of glove body
(e) Puncture resistance of glove body
(f) Burst strength of wristlet material
(g) Dexterity of whole gloves
(h) Grip of whole gloves
(4) Protective footwear elements
(a) Flame resistance
(b) Radiant heat resistance of upper
© Conductive heat resistance of sole and upper
(d) Puncture resistance of sole and upper
(e) Cut resistance of upper
(f) Abrasion resistance of sole
(5) Protective hood interface elements
(a) Thermal protective performance of hood material
(b) Flame resistance of hood material

© Thermal shrinkage of hood material

(d) Burst strength of hood material

(e) Cleaning shrinkage of hood material

Additional testing can also be specified for performance properties not addressed in NFPA 1971 based on the organization’s hazard and risk assessment. When additional testing is specified, standard test methods should be used when available, and testing should be conducted at accredited, independent laboratories.

Organizations should consider the use of an RFI (Request for Information) or an RFP (Request for Proposal) format when soliciting quotations for structural or proximity fire fighting protective ensemble elements. The advantage of an RFI or an RFP proposal is that it allows manufacturers the option of providing all of the most current technologies for organization review (the offering is then not limited to the requirements of the specification). The organization can then choose among proposals for offered items finally accepted. Typically an RFI and an RFP have the following characteristics:

(1) Minimum requirements, such as NFPA product certification, required materials, or available options

(2) Inclusion of current specifications and a requirement that each manufacturer explain how its offering differs from the currently specified product

(3) Background on the offering firm’s finances, capabilities, and references

(4) Field test procedures and results (see 5.1.6) of offered products

Using this approach, the organization can then employ a rating system that assigns values and weights to several factors, including but not limited to product design, manufacturer references, and field test results.

In this approach, a separately sealed cost proposal is opened only after the point ratings have been assigned to each offering. The organization can then apply separate criteria considering both technical merits and cost. This approach allows fire departments to compare prices and product acceptability.

Organizations should also consider integrated personal protective equipment programs that address various levels of care and maintenance as provided by or coordinated by the manufacturer of the fire fighter personal protective equipment. These programs can address many of the aspects of care and maintenance that are addressed in this standard, including, but not limited to, cleaning, inspection, and repairs, in addition to the offer of program guidance and reporting and documentation of procedures.

5.1.6* The organization shall ensure that the ensembles and ensemble elements under consideration interface properly with other personal protective items with which they will be used.

A.5.1.6 The organization should consider the interface of items, such as helmets with hoods and SCBA; gloves and hoods with coats; trousers with boots; and so forth.
5.1.7* Where a field evaluation of an ensemble or ensemble element is conducted, the organization shall establish criteria to ensure a systematic method of comparing products in a manner related to their intended use and assessing their performance relative to the organization's expectations.

A 5.1.7 Organizations should contact manufacturers or vendors about field evaluation programs. Many provide sample items for tests. The following criteria should be used to conduct an effective field evaluation:

1) Test participants should be selected based on a cross section of personnel, willingness to participate, objectivity, and level of operational activity.

2) Participants should conduct field evaluations of each different product model being evaluated from each manufacturer for a particular ensemble element. Participants should be fitted for each product model being evaluated from each manufacturer. Evaluations should be conducted with the same participants to use and evaluate each ensemble.

3) A product evaluation form should be developed for each element and interface area. The form should include a rating system for those characteristics considered important to the organization, facilitating a quantitative evaluation. Evaluation forms should include general performance criteria, a specific length of time for the field evaluation, and criteria addressing ease of movement, ability to work, and so forth. Size and fit issues should be addressed since they relate to comparative evaluation of ensembles and ensemble elements. Evaluation forms that provide only narrative responses should be avoided.

4) The organization should solicit periodic reports from participants in the field evaluation. At least three evaluation reports should be completed and filled out independently.

5) The organization should conclude the evaluation process in a timely manner and analyze the results.
Attachment 3

3.3.37.1 Proximity Fire Fighting. Specialized fire-fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing very high levels of conductive, convective, and radiant heat such as aircraft fires, bulk flammable gas fires, and bulk flammable liquid fires.

Recommend deleting: aircraft fires.

3.3.37.2 Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire fighting operations.

Recommend adding:

Although commercial and military aircraft contain large amounts of aviation fuel, improved ARFF vehicle technology, extinguishing agents and application techniques (roof turrets, bumper turrets and boom nozzles), enable firefighters to control fires from greater distances and essentially extinguish large aviation fuel fires while still in the attacking vehicle, thus eliminating conductive, convective and radiant heat exposure prior to firefighters leaving the vehicle and advancing handlines.

The airport/military installation fire protection AHJ will determine the appropriate PPE airport firefighters will wear based on sound risk analysis. If non-reflective PPE is authorized for use, firefighters will be trained in the PPE limitations
Subject: FW: Proposed TIA #938 to NFPA 1500-2007 Edition

From: Everett, Lewis H Civ USAF AETC 37 CES/CEF [mailto:LEWIS.EVERETT@LACKLAND.AF.MIL]
Sent: Wednesday, May 06, 2009 7:59 PM
To: Maynard, Mary
Subject: Proposed TIA #938 to NFPA 1500-2007 Edition

To The Secretary of the NFPA Standards Council:

I highly recommend approval of subject TIA. As an Air Force Fire Emergency Services professional for over 40 years, I speak from experience that mandating the wearing of proximity fire fighting protective clothing for Aircraft Firefighting and Rescue (ARFF) is overkill. I have fought a few aircraft fires and all were small to being totally extinguished by vehicle turret application of extinguishing agent. Once the exterior fire is extinguished on large frame aircraft, you must fight and extinguish interior fire the same as a in structure.

Texas A&M fire school use structural protective clothing when training for oil refinery firefighting. The trainees are subjected to far more exposure and heat that firefighters would experience at an ARFF fire. I have watched many fire departments respond to and fight ARFF fires on the news, and I have never seen anyone except a DoD component in proximity clothing.

Please favorably consider approval of this TIA.

LEWIS H. EVERETT

Chief, Fire Emergency Services

Lackland AFB TX
Walker, Nancy

From: Jeffrey Hansen [firemedicjmh@yahoo.com]
Sent: Saturday, May 09, 2009 1:06 PM
To: Walker, Nancy
Subject: Proposed TIA for NFPA 1500

This email is in regards to the proposed TIA Log number 938 for the NFPA 1500. I fully agree with the rewrite of the standard to allow the base to do a risk assessment to determine the type of gear that should be purchased. The black and white requirement for proximity gear in ARFF applications seems outdated with the new technology that we have on the responding trucks. I don't have the specific numbers from my base, but working aircraft fires are definitely not the primary response. Through discussion with other firefighters around the Air Force, it seems that the primary responses are medical, vehicle collisions and structural. By passing this TIA, departments around the world will be able to better respond to the emergencies that they see on a daily basis with less risk to the personnel by wearing the proper gear for such responses. Thank you for your time and attention to this matter.

Jeff Hansen, GS-06
Firefighter
USAF
Subject: FW: Response to the TIA for protective clothing

From: Stanforth, Christopher L CIV USAF AETC 37 CES/CEFO [mailto:Christopher.Stanforth@LACKLAND.AF.MIL]
Sent: Saturday, May 09, 2009 9:00 PM
To: Maynard, Mary
Subject: Response to the TIA for protective clothing

To Whom It May Concern

In response to the information I have received concerning crash gear versus structural gear, I would like to plead my case for structural gear for all aspects of fire fighting.

Structural gear not only lasts longer and is more durable, it is more cost effective and lasts longer. Personally, I have gone through three sets of Crash gear in the last four years here at Lackland. When I was assigned to all structural stations one set of structural gear was all I ever needed. The reduced cost alone to go with structural gear warrants the change.

Protection of the Firefighter should be top priority and, again, structural gear is the way to go for overall safety, being that in my opinion a firefighter is more protected in any emergency in structural gear. Even with ARFF structural gear would be safer because the way we switch from offensive attacks to defensive if a situation gets out of hand negates the need for the added protection of the crash gear. And again one is less likely to have a PPE breakdown with structural gear even in an ARFF situation.

In closing, I truly believe that we should switch to structural gear for all use in the fire service because of cost effectiveness and overall rescuer safety. Thank you very much.

Christopher L Stanforth
Firefighter/EMT
Lackland AFB, Texas
Subject: FW: NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, regarding PPE selection guidance

From: Rhoades, Frank A CIV USAF AETC 37 CES/CEF [mailto:Frank.Rhoades@LACKLAND.AF.MIL]
Sent: Saturday, May 09, 2009 9:33 PM
To: Maynard, Mary
Subject: NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, regarding PPE selection guidance

To Secretary of the NFPA Standards Council,

In regards to the use of structural PPE or ARFF PPE for Air Force fire fighters. I believe that the proposal made by Air Force Fire & Emergency Service to use solely structural firefighting personal protective equipment would be in the best interest for DoD firefighters for several reasons.

1. For the protection of all fire fighters, the material used for structural gear is more durable than ARFF gear, less likely to tear.
2. On ARFF gear the aluminized coating that is used cracks and begin to peel after a short period of time, causing a break down in its reflective capabilities. Areas that breakdown quickly on the coat are the shoulder and waist area where the straps from the SCBA lay, and elbows from the constant bending of the arms. For the pants it is the crotch area from the constant rubbing while walking and the knee area from crawling.
3. The ARFF PPE is not able to be washed/decontaminated properly due to the aluminized material peeling while being washed.
4. Structural gear is able to breathe, ARFF gear does not allow this to happen due to the aluminized coating. This causing a danger of firefighters core temperature overheating while on the job.
5. As for the cost, each time the aluminized coating begins to peel or crack it renders the gear out of service due to a breakdown in the coating. This does not take long for the breakdown which cost approximately $2000.00 to replace each time.

Thank you for listening to the personnel who use this equipment every day, the firefighters. They are the ones who know the equipment the best.

Frank Rhoades Jr.
District Fire Chief
Fire & Emergency Services
Lackland AFB, Tx
671-2921
Subject: FW: Proximity Gear

TIA 938(1500)

From: Carey, James Civ USAF AETC 312 TRS/DOF [mailto:james.carey@goodfellow.af.mil]
Sent: Monday, May 11, 2009 11:53 AM
To: Maynard, Mary
Subject: Proximity Gear

I personally have used structural gear during over 100 fires here at the DoD Fire Academy. I noted that cool down was quicker between fires as the only difference from proximity gear during exterior fires. On interior fires heat buildup was a little faster however at no time did it get unbearable.

James C. Carey
Instructor Supervisor
DoD Fire Academy
Goodfellow AFB, TX
(325) 654 4843
Walker, Nancy

Subject: FW: ppe

TIA 938 (1500)

From: Spalding, Jacob L CIV USAF 37 CES 37 CES/CEF [mailto:Jacob.Spalding@LACKLAND.AF.MIL]
Sent: Wednesday, May 13, 2009 7:27 PM
To: Maynard, Mary
Subject: ppe

I would like to see the switch to structural gear. It lasts longer, it's easier to work in, and easier to maintain. Structural emergencies are also a majority of our responses air force wide. Thank you.
From: Reese, Benjamin C Civ USAF AFMC 72 ABW/CEF [mailto:Benjamin.Reese@tinker.af.mil]
Sent: Friday, May 15, 2009 9:26 AM
To: Maynard, Mary
Cc: Ford, Terry G Civ USAF AFMC 72 ABW/CEF; Lambert, Todd A Civ USAF AFMC 72 ABW/CEF
Subject: FW: NFPA 1500 Temporary Interim Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE

Comment on PPE for Aircraft Rescue Fire Firefighters.

Recommend approval and adoption.

I am not a scientist, technician, or graduate of any notable university. I am simply an Air Force Firefighter who has been on the job for almost 30 years and I can say without hesitation that proximity PPE has created more risk factors for our firefighters than the value of additional protection that it provides.

For 95% of our CFR folks their proximity gear will never see combat in an actual aircraft fire event. 100% of our CFR folks will respond to aircraft emergencies that do not require proximity PPE. Why is this problematic? Not because of the cost. Because it exposes firefighters to additional health risks 100% of the time. This stuff does not breath and firefighters become quickly exhausted.

Are we providing a better service to our customers on the aircraft using aluminized PPE? What about their safety? Firefighters have better dexterity and mobility using structure PPE, giving them an edge during rescue activities, which they are more likely to be involved in.

Why not use strip away gear? I tested that gear in the 1980’s when I was a CFR Rescue man at one of the busiest CFR departments in the world. Our department (Clark Air Base, Philippines) determined that combination PPE with aluminized removable outer shell did not provide increased protection, was difficult to wear properly, and broke down quickly or tore.

It took so much time to put the CFR protection over the structure set that it wasn’t always completely snapped up and sometimes not complete before a firefighter needed to respond at the beginning of a shift or assignment change. All the gear we tested was destroyed in testing (training) during the 1yr trial test. This lack of durability lead firefighters to pronounce the PPE as unreliable.

The requirement for a specific level of PPE on the fire ground should be a Risk Management consideration/decision unless specific HAZMAT conditions exist that require otherwise.

I highly encourage adoption as requested. I trust our leadership to provide the proper PPE for the exposure hazards our firefighters face. Our firefighters want this and we believe it is the best way we can serve the flying public and our military aviators.

Benjamin Reese, CFPS
Deputy Fire Chief
Tinker AFB, OK 73145
DSN 884-3968
Comm: 405-734-3968
Response to: NFPA 1500-2007 Edition TIA Log No. 938
Standard on Fire Department Occupational Safety and Health Program

Submitter: Harry P. Winer

Submitters Qualifications: I have been a member of NFPA committees since 1989 and have served on NFPA 1976/1971 and others. I have been the research and development manager for the US Navy and US Air Force on Proximity Protective Clothing. Please see attached Bio for additional qualifications.

Recommendation: I recommend that the committee vote negative on the technical merits of this TIA and also vote negative on the emergency nature. First of all the current definition in 1500 is inaccurate for Proximity Fire Fighting and the change the submitter has asked for is also inaccurate. Changing a definition does not meet any of the criteria that the NFPA has established for emergency nature.

Background: The National Fire Protection Association wrote the first standard on Proximity Protective Clothing NFPA 1976 in 1992. In 2007 NFPA 1976 and NFPA 1971 were combined into one document NFPA 1971. This is a performance driven standard based on the hazards. NFPA 1976 adopted the requirements and test methods from the military specifications at that time. The requirements were outlined in an Air Force letter entitled Fire Proximity Clothing Design Limits. The performance design requirements were established from two US Air Force R&D programs and reported in the following reports: Aerospace Medical Research Laboratory Report AMRL/TR-73-6 (Human Exposure to High Radiant Environment) and Cornell Aeronautical Laboratory, Inc. Technical Report AGFSRS 71-2 (Fire fighters Exposure Study). Even through these reports are a number of years old the heat intensity of the fire has not changed. The radiant heat produced by the fuel fire is 1.9 gram cal per sq cm per sec compared to the radiant heat produced by a structural fire 0.2 gram cal per sq cm per sec as recorded by NIST.

Comments and Justification for a Negative Response: I will comment on each paragraph individually.

3.3.37.1: The current and future definitions are incorrect. How can you eliminate one example in a definition and leave all the remaining ones there. Examples should never be placed in a definition. Examples should be placed in the annex of the document. Fuel fires produce very high levels of radiant heat, but not high levels of conductive and convective heat.

A better definition is in NFPA 1971 paragraph 3.3.91 “Specialized fire fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant heat as well as conductive and convective heat.”
It is my recommendation that NFPA perform a global search on all documents to determine how many documents contain a definition on proximity fire fighting. Establish a task group of all those committees to develop an official definition for Proximity Fire Fighting. This definition will be placed in the NFPA glossary of definitions and used by all standards.

A.3.3.37.I: This section is supposed to clarify the definition. In here we talk about the high levels of radiant heat produced by bulk flammable fuels and then go on to discuss new technology in vehicle development. Vehicle technology doesn’t eliminate the high radiant heat produced by aircraft fuel fires it only aids us in the extinguishing of such fuels. This section gives the perception that if you have this vehicle you will never be exposed to high radiant heat loads. First of all we do not write performance standards for personnel protection around equipment—we write them around the hazards. This vehicle as discussed is not widely used at this time; the Air Force only has less than 50% of their bases with vehicles that have boom nozzles. Arcing dispersion of agent is very inefficient since only 30 – 50% of the agent reaches the burning fuel. A wind change at the site could be extremely dangerous for all personnel in the area if there is a re-ignition of the fire because the agent was blown off of the fuel. The aircraft may have landed off of the runway and may only be reached by a brush truck configured with agent and hose line. This section leads us to believe we have this great truck and we will always be at great distance a way.

We don’t write standards for special interest groups—we write standards for all fire fighters. In this case the Air Force is looking for us to make changes that will meet their particular needs. In addition to the Air Force there are many other groups that fight aircraft fires two of which I will mention now. The US Navy fights aircraft fires on their ships and they do not have the luxury of being great distances from the burning craft and without the proper protection, a sailor could be burnt or die. The FAA lists commercial airports by a letter indexing system, this system identifies the minimum fire fighting equipment and amount of agent the airport is required to have. This is all accomplished through a formula developed by the FAA. A letter A index airport is required only to have a commercial chassis vehicle equipped with a small amount of agent. The information guidance provided by the FAA to the airports is that the first trucks on the scene establish an emergency slide egress path for all personnel to escape from the plane and then worry about the plane fire. To perform this task, the non-driver, when arriving at the scene, leaves the truck and establishes a hose line to maintain the egress path. This fire fighter definitely needs the proper protection from the radiant heat.

NFPA 1971 has an annex section A3.3.91 that discusses the definition of proximity fire fighting. In this section it discusses the different hazards that have to be protected from. This committee, before going any further, should review this section of NFPA 1971-2007 edition.

A.7.3.2: Here again we muddy up the waters and do not clarify the body of the text—when we say that the fire fighter shall wear the protective clothing for the type of firefighting activities that we are regularly engaged. I’m not sure what regularly engaged
means—does it mean if I’m on a structural truck 70% of time it is ok for me to wear my structural clothing the other 30% of the time on a crash truck at a runway. This paragraph then goes on to use words like rare occasion—another undefinable term, how often is a rare occasion.

Substantiation: Substantiation further mentions the vehicle technology, which I went into in great detail and will not mention again. Then the writer discusses conflict within the document and conflict with NFPA 1851. These types of conflicts can be resolved at normal revision time. I don’t see a conflict with NFPA 1851 at all, 1851 requires a risk assessment be made and the first criteria it mentions is the hazard. Well when we are protecting from aircraft fires our hazard is a large fuel fire with high radiant heat. Therefore you would be outfitting your fighter in proximity clothing. Just because this type of fire is not an everyday occurrence doesn’t mean the fire fighter shouldn’t be prepared for this incident. If the writer felt strongly about this conflict why didn’t the writer contact the NFPA 1851 committee to resolve the conflict?

The writer mentions that there is independent laboratory test data comparing structural clothing to proximity clothing as to its breathability. I’m not aware of any recent physiological test that were conducted comparing these two types of ensembles. The reason for recent data is that since 2000 there have been major changes in both types of garments, especially in the area of breathable membranes which are used in both systems as well as design and closure system configurations. Therefore physiological test data prior to 2000 would not be relevant today. It would have been good if the writer included such data as an appendix to substantiate the claims.

Emergency Nature: I cannot see the conflict that the writer talks about between NFPA 1500 and NFPA 1851. If he believes there is such a problem then he should suggest a joint meeting between these committees to resolve the issues before jumping to this TIA, which only confuses the issues even more.

Item 1. Item 1 states that mutual aid crews that arrive at civilian airports to assist the ARFF crews are wearing structural clothing. Yes this is true but they arrive 15–20 minutes after the ARFF crew reaches the scene. I would disagree with the writer when he states that today’s structural clothing is designed to offer limited protection from radiant heat, again where is the data to support it. Radiant heat must be reflected back from the outershell. Radiant heat is a line of sight energy and after it is absorbed into the outershell it is either conductive or convective depending where in the garment it is at that time. Especially when fire departments are going to dark outershells such as black ones where is my reflectivity? I have a graph that compares the results of radiant heat exposure of a PBI/Kevlar outershell to a PBI/Kevlar aluminized outershell. This demonstrates that a structural material offers you no radiant heat protection. The solid line is the 2nd degree burn curve and the line that rises fast is the structural material vs the low sloping aluminized material. NFPA 1971 states that you shall not receive a second degree burn before 20 seconds.
Item 2: The writer makes the same statements about breathability again; I will not repeat my comments again. As to selection of the best ensemble, the best ensemble is the ensemble that was designed for that particular hazard. Structural ensembles for structural events and proximity ensembles for high radiant heat events which include aircraft fires. If this means that a fire department has to have two different ensembles than this is a management issue not a standard issue. Proximity clothing meets all the same requirements for thermal protection as does structural clothing, therefore it would not be dangerous to wear proximity clothing for a structural incident if it should be needed (not recommending it), but it would be dangerous to wear structural clothing to a high radiant heat fire.

During the 1980’s DOD had a combination fire fighters suit, which had a removable lightweight, aluminized shell that was added for proximity fire fighting. This ensemble was estimated to have saved DOD 12.0 million dollars over a five-year period. Maybe a new version of this type of suit would be appropriate today at locations that have dual responsibility.

Item 3: NFPA 1851 does state that the outershells of proximity garments not be machine washed or dried. So I don’t see any conflict here, the writer shall follow the procedures outlined by the manufacturer for advanced cleaning techniques. The garments can be cleaned and decontaminated following manufacturers instructs in line with NFPA 1851. By the way there is no standard that states proximity garments have to be made out of aluminized material, NFPA 1971 has only performance requirements for the outer shell.

Note: There are current research and development programs on proximity protective clothing looking at extending the service life of these garments. The US Navy funds these programs. Instead of looking to get around performance requirements maybe the writer should place the same effort into help improving the proximity ensembles through R&D programs.
MEMORANDUM FOR NFPA 1500 TECHNICAL COMMITTEE
Secretary of the NFPA Standards Council

FROM: William A. Moore, Fire Chief
Hickam Fire Emergency Services
Hickam AFB, Hawaii 96853

SUBJECT: Clarification on Determining Proper Personal Protective Ensembles (PPE) for Members, Definition Change and Temporary Interim Amendment Issuance

1. I have reviewed a letter dated 2 Jun 08, same subject from CMSgt Joseph W. Rivera, Air Force Fire Emergency Services Program Manager, asking for a definition change and temporary interim amendment to NFPA 1500. In brief, Chief Rivera requested the definition change and interim amendment due to several inconsistencies found when comparing National Fire Protection Association (NFPA) Std 1976, Standard on Protective Clothing For Proximity Firefighting, NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, NFPA 1851, Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, and NFPA Std 1500, Standard on Fire Department Occupational Safety and Health Program.

2. In his letter, Chief Rivera noted that the type of firefighting activity is of particular importance, and that with today’s Aircraft Rescue Firefighting (ARFF) vehicles, little, if any, proximity firefighting is actually performed by the firefighter. Risk assessments can also be employed to determine the likelihood of fighting an aircraft fire on the airport proper. In fact, the majority of emergencies responded to by Air Force firefighters deal with structural, medical, or motor vehicle accidents. Finally, breathability of firefighting garments is paramount to the firefighter’s ability to sustain operations without overheating. Proximity suits do not allow for proper ventilation during the kinds of routine emergency responses outlined above.

3. I strongly support Chief Rivera’s position and echo his request for a definition change and the implementation of a temporary interim amendment allowing the airport/military installation fire protection AHJ to determine the appropriate PPE airport firefighters will wear based on sound risk analysis.

4. Thank you for your consideration. Should you have any questions, please contact me by phone at (808) 449-8115 or email, william.moore@hickam.af.mil

//signed//

WILLIAM A. MOORE, Jr., YN-02
Chief, Hickam Fire Emergency Services Flight
MEMORANDUM FOR NFPA 1500 TECHNICAL COMMITTEE

Mr. Glenn P. Benarick
1 Battery March Park
Quincy, MA 02169-7471

FROM: HQ AFCSA/CEXP
459 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: Clarification on Determining Proper Personal Protective Ensembles (PPE) for Members, Definition Change and Temporary Interim Amendment Issuance

1. US Air Force (USAF) Fire Emergency Services (FES) has historically directed its fire departments to procure and utilize proximity firefighting PPE based upon Occupational Safety & Health Administration (OSHA) interpretations of National Fire Protection Association (NFPA) Std 1976, Standard on Protective Clothing For Proximity Fighting (see Aotch 1). OSHA’s interpretations were based upon the firefighter’s primary job: structural or crash rescue firefighting.

2. As you are aware, NFPA Std 1976 has been superseded by the NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. Additionally, NFPA 1581, Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting was created. Current guidance within NFPA Std 1500, Standard on Fire Department Occupational Safety and Health Program and NFPA 1851, offers differing methodology for determining appropriate selection of PPE. Excerpts from NFPA 1500 & 1851 are provided in Aotch 2. Abridged versions are provided below:
   • NFPA 1500, Para. 7.7.1 – The fire department shall provide each member with protective clothing and protective equipment that is designed to provide protection from the hazards to which the member is likely to be exposed and is suitable for the tasks that the member is expected to perform.
   • NFPA 1500 Para. 7.2.6 – The fire department shall require all members to wear all the protective ensemble specific to the operation.
   • NFPA 1500 Para. 7.3.1 – Members whose primary responsibility is proximity firefighting operations and members who participate in proximity fire-fighting training shall be provided with and shall use proximity fire-fighting protective ensembles that are compliant with NFPA 1971. Annex 7.3.1 The technical committee’s intent is that...
members utilize the appropriate protective clothing designed specifically for the type of fire-fighting activities for which the member is engaged. The type of fire-fighting activity is based upon the particular fire-fighting techniques used, such as using limited agents or chemicals, rather than the types of fuels involved.

- **NFPA 1851, Para 5.1.1** – Prior to starting the selection process of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements, the organization shall perform a risk assessment. Annex 5.1.1 (4) Section 7.1: Requirements for ensembles and ensemble elements in the identification of hazards the organization should consider those hazards that fire fighters are likely to encounter.

- **NFPA 1851, Para 5.1.2** – The risk assessment shall include, but not be limited to, the hazards that can be encountered by structural or proximity fire fighters based on the following:
  1. Type of duties performed
  2. Frequency of use of ensemble elements
  3. Organization’s experiences
  4. Incident operations
  5. Geographic location and climate
  6. Likelihood of or response to CBRN terrorism incident

3. NFPA 1500 directs departments to provide PPE for the hazard firefighters are “likely” to be exposed or PPE specific to the actual operation. However, for proximity PPE it specifically requires proximity ensembles based on primary responsibility or mission. The annex material further states the type of fire fighting is based on fire fighting techniques used, not the actual fuels involved. NFPA 1851 requires the organization perform a risk assessment first and refers back to NFPA 1500 which considers the “likely” hazards firefighters will encounter.

4. We believe the best method for determining selection of firefighter PPE is through a sound risk assessment identifying the hazards firefighters are likely to encounter within their jurisdiction. Although most AF installations have a flying mission, analysis of response data indicates proximity firefighting due to aircraft related mishaps is extremely rare. Furthermore, evidence shows the majority of our fire departments respond to incidents that involve emergency medical calls, motor vehicle accidents, structural response, hazardous material and other special operations. Based on this analysis, we believe structural PPE is more appropriate for the hazards our firefighters are likely to be exposed and best suited for the tasks our firefighters are performing.

5. Although aircraft crashes can pose high levels of radiant heat, USAF FES employs state-of-the-art Aircraft Rescue and Fire Fighting vehicles, agents and firefighting techniques that eliminate this hazard from a great distance. This occurs prior to firefighters dismounting vehicles to initiate interior fire attack and rescue operations. At this point, the aircraft fuselage interior falls within the definition of structural firefighting as defined in NFPA 1500, Para 3.3.37.2., which would require the use of structural PPE.
6. An additional major health and safety concern we have is increased core body temperatures experienced by firefighters wearing proximity PPE when performing any firefighting evolution. Elevated temperatures and dehydration rapidly deplete firefighter energy levels, greatly reduce effective working time, and jeopardize personal safety during operations. An analogy AF firefighters often use is “feeling like a baked potato”, when wearing proximity gear. We believe and independent laboratory test data confirms, structural PPE provides greater “breathability” as the outer shell of structural PPE allows heat to escape; proximity PPE does not.

7. USAF FES requests the NFPA 1500 Technical Committee:

(a) More precisely define the method for determining the proper PPE for members,
(b) Consider changes to the definition of proximity firefighting as describe in Atech 3.
(c) Publish a temporary interim amendment to NFPA 1500 clarifying the issues listed herein.

8. Thank you for your consideration. Should you have any questions, please contact me by phone at (850) 283-6153 or email joseph.rivera@tyndall.af.mil

//SIGNED//fwr/30 May 08  
JOSEPH W. RIVERA, CMSgt, USAF  
Fire Emergency Services Program Manager

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Subject: FW: NFPA 1500 Temporary Interim Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE

From: Ehrenberger, Bruce R Mr CIV USAF AFMC 96 CES/CEFO [mailto:Bruce.Ehrenberger@EGLIN.AF.MIL]
Sent: Thursday, May 21, 2009 1:07 PM
To: Maynard, Mary
Subject: NFPA 1500 Temporary Interim Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE

I would like to say that going to structure gear for ARFF is the BEST idea every in my 19 year career as a DOD Firefighter. While testing out new gear I found the new structural gear to be so much lighter in weight breath better and are just all around less taxing to be in for long periods of time the fatigue factor I feel has dropped to almost nonexistent with the use of structural gear over proximity gear and I pray that the amendment goes through.

Thank You,
Reference: 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1

Recommendation: I believe that the original description or a modified description such as the one below better describes the associated proximity fire and the need to wear proximity clothing. I do not agree with the USAF submitted changes. First and for most, I do not think that this TIA meets the requirements for an emergency change as stated. Therefore I recommend that the committee reject this TIA as stated by the USAF with a negative vote.

1. Revise 3.3.3 7.1 to read as follows:

3.3.37.1 Proximity Fire Fighting. Specialized fire-fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing very high levels of conductive, convective, and radiant heat such as aircraft fires, bulk flammable gas fires and bulk flammable liquid fires. Current wording:

2. Revise A.3 .3 .3 7.1 to read as follows:

Submitter’s: Joseph Rivera, US Air Force and Mark Giuliano, Eglin AFB, TIA Log No. 938

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be an oil refinery fire or tank farm fire generating high levels of radiant heat. Although large-frame aircraft contain large amounts of aviation fuel, modern Aircraft Rescue and Fire Fighting (ARFF) vehicle technology, extinguishing agents, and application
techniques (roof turrets, bumper turrets, and boom nozzles) enable fire fighters to control fires from great distances and essentially extinguish large aviation fuel fires while still in the attacking ARFF vehicle, thus eliminating high levels of conductive, convective, and radiant heat exposure prior to fire fighters leaving the vehicle and advancing handlines.

New Revision wording should be:

A.3.3.37.1 Proximity Fire Fighting. Specialised thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be a post crash aviation fuel fire with associated high levels of radiant heat or an oil refinery fire or tank farm fire generating these same kinds of high levels of radiant heat.

Statement of Problem and Substantiation for Comment:

I believe that a modified description such as the one above better describes the associated proximity fire and the need to wear proximity clothing. I do not agree with the USAF submitted changes. It took many years of diligent research to develop proximity clothing that properly protects the airport fire fighters when responding to any post crash fire. Seconds not minutes can make the difference between survival and death. Equipping responding ARFF firefighters with structural fire fighting clothing will assure that fire fighters will never leave their vehicles unless all associated high radiant heat fires are reduced and negates any possibility that they will save any survivors.

In the four decades that I have worked in aviation fire safety I feel this is one of the most ill advised efforts to save money that the USAF has ever made. At a time when budgets are being drastically cut I feel that the training and cleaning issues that brought this problem to light can be resolved without compromising the ARFF response capability. I would also point out that there are just as many civil airport fire fighters who will be affected by this decision as USAF fire fighters.

The Federal Aviation Administration (FAA) in the United States is the authority having jurisdiction and regulatory authority over civil fire fighting. Has the USAF communicated to these officials and what do they have to say about this
TIA application? I believe that little to none of the public civil fire fighters are even aware that this TIA has been developed.

Revised:

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be a post crash aviation fuel fire with associated high levels of radiant heat or an oil refinery fire or tank farm fire generating these same kinds of high levels of radiant heat.

Further Substantiation:

It is true that newer technologies are available today which are more effective than older nozzles and turrets. But their use is not mandated by the regulations controlling fire responses at either military or civil airports. Regulators and authorities having jurisdiction have been slow to approve and provide these newer more effective technologies. Many older vehicles still make up the majority of the fleet mix at air fields and air bases, and thus only a small portion of major rescue vehicles at airports and air bases worldwide use these newer more effective technologies.

The first initial fire fighters responding have a unique and difficult task to perform at any aircraft accident. Their first responsibility is to secure and provide a safe egress from the aircraft. Providing assistance to evacuating passengers and protecting the fragile escape slides. Initial response may call for post crash fire fighting with large roof and bumper turrets by a single truck, operator driver, but simultaneously while this action is being undertaken, other ARFF fire fighter will disembark the major ARFF vehicle and assist passenger evacuation and start initiation of handheld fire fighting requirements. These simultaneous events and operations expose those who have exited the vehicle to high radiant heat loading.

Many post crash fuel fires include running or three dimensional fuel fires which are difficult to extinguish. These types of running or three dimensional fires may often require fire fighters to get up close and into the crash debris, having to do this they will be very definitely exposed to these high radiant heat sources.

I worked in aviation fire research and safety for the FAA for over thirty three years; I was the Program Manager for ARFF research for the FAA for 12 years. My job was to develop and test many of the new technologies mentioned in the USAF TIA request. These products were developed out of necessity to gain quicker knockdown and rapid fire control to larger and larger post crash fuel fires resulting from the vast size and heavy fuel loading of today's aircraft.

I was the administrator for a large FAA funded computer controlled training facility for two years where we trained over 750 civil and military fire fighters. Fire fighters were trained in post crash large fuel fires with trucks, handheld pool fire attacks, three dimensional fuel fires and interior fire fighting. During my period of time as the administrator we had we had at least three cases where fire fighters wearing their NFPA compliant structural gear experienced scalding or steam burns to the harm and front shoulder areas. At
this same period of time we had no fire fighters who wore aluminized proximity fire fighting ensembles that experienced scolding or steam burns.

During my thirty three years of performing thousands of research pool and aircraft fires we never had anyone who experienced a burn that required medical attention simply because we always donned aluminized fire fighting ensembles to protect ourselves. There is a place and a time to wear structural fire fighting gear. It is just not in the early elements of a major high radiant heat fire rescue response.

Although large-frame aircraft contain large amounts of aviation fuel, modern Aircraft Rescue and Fire Fighting (ARFF) vehicle technology, extinguishing agents, and application techniques (roof turrets, bumper turrets, and boom nozzles)—enable fire fighters to control fires from great distances and essentially extinguish large aviation fuel fires while still in the attacking ARFF vehicle, thus eliminating high levels of conductive, convective, and radiant heat exposure prior to fire fighters leaving the vehicle and advancing handlines.
Attention: Codes & Standards Council

N. Walker

TIA Log No. 938

From:
Joe Teixeira

ARFF Program Coordinator
Kellogg Community College
Battle Creek, Michigan

Reference to Proximity Fire Fighting Gear Rewrite

We all know that fire fighting is inherently dangerous. As fire fighters we know and except this hazardous profession but, the recommendation to revise the wording of proximity fire fighting gear from aircraft fires would increase the hazardous we already face as airport fire fighters. I know I also work at an airport crash station for the military. Aircraft fire fighting requires specialized training, equipment and a higher protection as compared to structural fire fighting. I have been on both structural and airport departments, fought structural fires and aircraft fires. I instruct ARFF across the county, instructing and observed departments with ARFF gear or structural gear. Most use the ARFF gear and those that do not wish they had the ARFF gear.

When you arrive on the scene of aircraft fire with only one ARFF vehicle and passengers need rescue, hand lines are pulled to protect those passenger exiting and yourself. Yes, the truck turret can knockdown the fires around to burning aircraft but, sometimes the turret is busy controlling one side while the hand lines fight fire on the other side. Number one priority is your protection so you can do your job (fire fight and rescue). With structural gear, once wet can cause second degree burns from the high radiant heat (steam burns). The proximity gear we wear will reflect 80% of that heat, I can work more effectively and perform my job knowing I am wearing a higher protection. Why reduce or take away a proven fire protection to save money. You wouldn't reduce the number of sprinklers in a building just to save money, why fire gear. You can have the newest technologies available today; high dollar trucks, new foams, high speed computerized pumps, but without a specialized trained fire fighter all that new technology is worthless. Protection of the aircraft fire fighter should remain the same or improved to an even higher standard but never reduced. When a airport fire fighter arrives on the scene, his one thought is those passengers inside the burning aircraft with only about three minutes to survive.
I believe that the modified description the USAF has submitted will endanger the airport fire fighters. I do not agree with the with the USAF submitted changes. First and for most, I do not think that this TIA meets the requirements for an emergency change as stated. I recommend that the committee reject this TIA as stated by the USAF with a negative vote.

**New Revision wording should be:**

**A.3.3.37.1 Proximity Fire Fighting.** Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be a post crash aviation fuel fire with associated high levels of radiant heat or an oil refinery fire or tank farm fire generating these same kinds of high levels of radiant heat.

I believe that a modified description such as the one above better describes the associated proximity fire and the need to wear proximity clothing. It took many years of diligent research to develop proximity clothing that properly protects the airport fire fighters when responding to any post crash fire. Seconds not minutes can make the difference between survival and death. Equipping responding ARFF firefighters with structural fire fighting clothing will assure that fire fighters will never leave their vehicles unless all associated high radiant heat fires are reduced and negates any possibility that they will save any survivors.

Signed [Signature]
To: National Fire Protection Association-Codes and Standards

Fax #617-770-3500

From Louis Ott –Gentex Corporation- Carbondale PA

Phone# 570-282-8514
Fax# 570-282-8595

Re: Response to Proposed TIA 938 (NFPA 1500)

As a Committee member on NFPA 1971-Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting 2007 Edition, and the manufacturer of the Proximity Outer shell fabric, I would like to make a few comments to clarify several of the statements made in the TIA. For background, following I have attached in its entirety Section A.3.3.91 Proximity Fire Fighting from the NFPA 1971-2007 edition.

"A.3.3.91 Proximity Fire Fighting. Examples of fires that commonly produce high levels of radiant heat, as well as convective and conductive heat, and could result in incidents incorporating proximity fire fighting operations include, but are not limited to, bulk flammable liquid fires, bulk flammable gas fires, bulk flammable metal fires, and aircraft fires. These operations usually are exterior operations but might be combined with interior operations. Proximity fire fighting is not structural fire fighting, but might be combined with structural fire fighting. Proximity fire fighting is also not entry fire fighting. The fire fighting activities differ from "entry fire fighting" as proximity fire fighting does not include direct entry of fire fighters into flames. Proximity operations are performed close to the actual fire where the high levels of radiant heat as well as the convective and conductive heat would overcome the thermal protection provided by structural fire fighting protective ensembles and the proximity fire fighting protective ensembles provide enhanced protection from these thermal exposures. After the fire and heat have been controlled at a proximity fire fighting incident, entry into structures or enclosures by fire fighters protected by proximity fire fighting ensembles could be made where the incident requires additional operations for control of the incident."

The ability to reflect the radiant heat encountered in a large fuel fire is critical in life threatening situations that firefighters frequently encounter. When new, the aluminized Outer Shell will reflect 8-10 times more radiant heat than Structural Outer Shells. The test to qualify aluminized fabric for Proximity in NFPA 1971-2007 edition is performed after a sample is preconditioned in a high abrasion extended wear test. In this case, the aluminized fabric provides 5-6 times greater reflection of radiant heat after extended wear. This radiant heat protection has been proven over the years to be critical in protecting many firefighters.

The breathability, or thermal burden, as defined in NFPA 1971-2007 is the Total Heat Loss (THL) number. The THL of the most common Proximity composite used today is 124. The last edition of NFPA 1971 defined the structural minimum as 130. Although the current edition now requires 205, Proximity gear is not far off from what was acceptable only a few years ago. All firefighting gear develops high thermal loads.
- It is true that you should not machine wash a Proximity Outer Shell. However, the cleaning is very simple. The aluminized surface does not allow contaminants to get into the fibers of the fabric. Any fuel, soil, dirt and most chemicals will lay on the surface and can be sponged down with a mild soap and water solution or possibly plain water. This can be done at the scene or later. As with Structural Gear, you remove the lining and that can be machine washed as needed.

- On the question of entering a structure with Proximity Gear as opposed to Structural Gear, the standard clearly states that this is not an issue. NFPA 1971-2007 compliant Proximity Outer Shells are designed to be at least equal to the Structural Outer Shell. They pass all the same thermal protection levels.

I respectively request that this TIA does not pass based on misunderstanding as stated above. We would be very interested in responding to all questions that this TIA has raised.

I do not believe that changing a definition would quality as an emergency to allow a standard to be changed between document cycles.

Louis V. Ott
Gentex Corporation

6-1-09
FIRE & EMERGENCY SERVICES
Naval Air Station Sigonella
PSC 812 Box 3100
FPO AE 09627-3100

From: Fire Chief, Naval Air Station Sigonella  5 June 2009
To: Secretary, Standards Council
Subj: TIA Log Number 938 (1500)

I strongly endorse the TIA revision to NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. The AHI must have the flexibility to conduct a comprehensive risk assessment to determine the appropriate PPE for fire and emergency services personnel. We have encountered numerous heat related problems with our firefighters during emergency responses and training scenarios due to the use of proximity PPE.

Here at Naval Air Station Sigonella located in Sicily, we run a combination aircraft and structural fire department working out of a single fire station. Temperatures reach into the high 90's for many months of the year. Personnel assigned to structural vehicles very often must respond to aircraft emergencies. Similarly, our ARFF firefighters are required to respond to structural emergencies. The vast improvement by manufacturers in the development of structural turn-outs finally allows us to reduce costs and provide the highest level of safety to our firefighters using a single system of PPE.

Thank you for your support in this most important improvement for our firefighters!

Sincerely,

James D. LaCorte
Fire Chief
Naval Air Station, Sigonella, Italy
Response to: NFPA 1500-2007 Edition TIA Log No. 938
Standard on Fire Department Occupational Safety and Health Program

Submitter:

Gary T. Schott
Member NFPA Technical Committee on Aircraft Rescue Fire Fighting
Member NFPA (Since 1990)

Submitters Qualifications:

44 Years ARFF Experience
USAF CMSgt. (Ret.), Fire Protection
Previously Chairman of Board of Directors ARFF Working Group (3 years) and Director (4 Years)
Previously Fire Chief Peterson AFB
Previously Fire Chief Rhein-Main AB Germany
Previously Asst Chief Fire Protection HQ Pacific Air Forces
Previously Asst Chief Fire Protection HQ Strategic Air Command
Currently Fire Chief Omaha Airport Authority, Omaha Nebraska

Recommendation: I recommend that the committee vote negative on the technical merits of this TIA and also vote negative on the emergency nature. First of all the current definition in 1500 is inaccurate for Proximity Fire Fighting and the change the submitter has asked for is also inaccurate. Changing a definition does not meet any of the criteria that the NFPA has established for emergency nature.

Background: The National Fire Protection Association wrote the first standard on Proximity Protective Clothing NFPA 1976 in 1992. In 2007 NFPA 1976 and NFPA 1971 were combined into one document NFPA 1971. This is a performance driven standard based on the hazards. NFPA 1976 adopted the requirements and test methods from the military specifications at that time. The requirements were outlined in an Air Force letter entitled Fire Proximity Clothing Design Limits. The performance design requirements were established from two US Air Force R&D programs and reported in the following reports: Aerospace Medical Research laboratory Report AMRL/TR-73-6 (Human Exposure to High Radiant Environment) and Cornell Aeronautical laboratory, Inc. Technical Report AGFSRS 71-2 (Fire fighters Exposure Study). Even through these reports are a number of years old the heat intensity of the fire has not changed. The radiant heat produced by the fuel fire is 1.9 gram cal per sq cm per sec. compared to the radiant heat produced by a structural fire 0.2 gram cal per sq cm per sec as recorded by NIST.

Personal Experience:

During my years in USAF Fire Protection especially at the Headquarters level, I conducted numerous live training fires at each base I visited. One of the problems we
were always trying to address was how the larger exterior fires were extinguished and the remaining three dimensional fires were left burning much longer. These too were high radiant heat fires that were difficult to extinguish and that fire fighters were not always properly trained to handle. Today with the modern ARFF Live Fire Training Centers the training problems are amplified due to the inability to use the correct fire fighting agents that would normally be required and because of the differences between propane fuel now in use and ordinary jet fuels. Today the ARFF fire fighters are still exposed to these fires and must receive protection from radiant heat sources.

Comments and Justification for a Negative Response: I will comment on each paragraph individually.

3.3.37.1: The current and future definitions are incorrect. How can you eliminate one example in a definition and leave all the remaining ones there. Examples should never be placed in a definition. Examples should be placed in the annex of the document. Fuel fires produce very high levels of radiant heat, but not high levels of conductive and convective heat.

A better definition is in NFPA 1971 paragraph 3.3.91 “Specialized fire fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant heat as well as conductive and convective heat.”

It is my recommendation that NFPA perform a global search on all documents to determine how many documents contain a definition on proximity fire fighting. Establish a task group of all those committees to develop an official definition for Proximity Fire Fighting. This definition will be placed in the NFPA glossary of definitions and used by all standards.

A.3.3.37.1: This section is supposed to clarify the definition. In here we talk about the high levels of radiant heat produced by bulk flammable fuels and then go on to discuss new technology in vehicle development. Vehicle technology doesn’t eliminate the high radiant heat produced by aircraft fuel fires it-only aids us in the extinguishing of such fuels. This section gives the perception that if you have this vehicle you will never be exposed to high radiant heat loads. First of all we do not write performance standards for personnel protection around equipment—we write them around the hazards. This vehicle as discussed is not widely used at this time; the Air Force only has less than 50% of their bases with vehicles that have boom nozzles. Arcing dispersence of agent is very inefficient since only 30 – 50% of the agent reaches the burning fuel. A wind change at the site could be extremely dangerous for all personnel in the area if there is a re-ignition of the fire because the agent was blown off of the fuel. The aircraft may have landed off of the runway and may only be reached by a brush truck configured with agent and hose line. This section leads us to believe we have this great truck and we will always be at great distance a way.
We don’t write standards for special interest groups—we write standards for all fire fighters. In this case the Air Force is looking for us to make changes that will meet their particular needs. In addition to the Air Force there are many other groups that fight aircraft fires—two of which I will mention now. The US Navy fights aircraft fires on their ships and they do not have the luxury of being great distances from the burning craft and without the proper protection, a sailor could be burnt or die. The FAA lists commercial airports by a letter indexing system, this system identifies the minimum fire fighting equipment and amount of agent the airport is required to have. This is all accomplished through a formula developed by the FAA. A letter A index airport is required only to have a commercial chassis vehicle equipped with a small amount of agent. The information guidance provided by the FAA to the airports is that the first trucks on the scene establish an emergency slide egress path for all personnel to escape from the plane and then worry about the plane fire. To perform this task, the non-driver, when arriving at the scene, leaves the truck and establishes a hose line to maintain the egress path. This fire fighter definitely needs the proper protection from the radiant heat.

NFPA 1971 has an annex section A3.3.91 that discusses the definition of proximity fire fighting. In this section it discusses the different hazards that have to be protected from. This committee, before going any further, should review this section of NFPA 1971-2007 edition.

A.7.3.2: Here again we muddy up the waters and do not clarify the body of the text—when we say that the fire fighter shall wear the protective clothing for the type of fire-fighting activities that we are regularly engaged. I’m not sure what regularly engaged means—does it mean if I’m on a structural truck 70% of time it is ok for me to wear my structural clothing the other 30% of the time on a crash truck at a runway. This paragraph then goes on to use words like rare occasion—another undefinable term, how often is a rare occasion.

**Substantiation:** Substantiation further mentions the vehicle technology, which I went into in great detail and will not mention again. Then the writer discusses conflict within the document and conflict with NFPA 1851. These types of conflicts can be resolved at normal revision time. I don’t see a conflict with NFPA 1851 at all, 1851 requires a risk assessment be made and the first criterion it mentions is the hazard. Well when we are protecting from aircraft fires our hazard is a large fuel fire with high radiant heat. Therefore you would be outfitting your fighter in proximity clothing. Just because this type of fire is not an everyday occurrence doesn’t mean the fire fighter shouldn’t be prepared for this incident. If the writer felt strongly about this conflict why didn’t the writer contact the NFPA 1851 committee to resolve the conflict?

The writer mentions that there is independent laboratory test data comparing structural clothing to proximity clothing as to its breathability. I’m not aware of any recent physiological tests that were conducted comparing these two types of ensembles. The reason for recent data is that since 2000 there have been major changes in both types of garments, especially in the area of breathable membranes which are used in both systems as well as design and closure system configurations. Therefore physiological test data
prior to 2000 would not be relevant today. It would have been good if the writer included such data as an appendix to substantiate the claims.

**Emergency Nature:** I cannot see the conflict that the writer talks about between NFPA 1500 and NFPA 1851. If he believes there is such a problem then he should suggest a joint meeting between these committees to resolve the issues before jumping to this TIA, which only confuses the issues even more.

**Item 1.** Item 1 states that mutual aid crews that arrive at civilian airports to assist the ARFF crews are wearing structural clothing. Yes this is true but they arrive 15 – 20 minutes after the ARFF crew reaches the scene. I would disagree with the writer when he states that today’s structural clothing is designed to offer limited protection from radiant heat, again where is the data to support it. Radiant heat must be reflected back from the outershell. Radiant heat is a line of sight energy and after it is absorbed into the outershell it is either conductive or convective depending where in the garment it is at that time. Especially when fire departments are going to dark outershells such as black ones where is my reflectivity? I have a graph that compares the results of radiant heat exposure of a PBI/Kevlar outershell to a PBI/Kevlar aluminized outershell. This demonstrates that a structural material offers you no radiant heat protection. The solid line is the 2nd degree burn curve and the line that rises fast is the structural material vs. the low sloping aluminized material. NFPA 1971 states that you shall not receive a second degree burn before 20 seconds.
Item 2: The writer makes the same statements about breathability again; I will not repeat my comments again. As to selection of the best ensemble, the best ensemble is the ensemble that was designed for that particular hazard. Structural ensembles for structural events and proximity ensembles for high radiant heat events which include aircraft fires. If this means that a fire department has to have two different ensembles than this is a management issue not a standard issue. Proximity clothing meets all the same requirements for thermal protection as does structural clothing, therefore it would not be dangerous to wear proximity clothing for a structural incident if it should be needed (not recommending it), but it would be dangerous to wear structural clothing to a high radiant heat fire. During the 1980's DOD had a combination fire fighters suit, which had a removable lightweight, aluminized shell that was added for proximity fire fighting. This ensemble was estimated to have saved DOD 12.0 million dollars over a five-year period. Maybe a new version of this type of suit would be appropriate today at locations that have dual responsibility.

Item 3: NFPA 1851 does state that the outershells of proximity garments not be machine washed or dried. So I don't see any conflict here, the writer shall follow the procedures outlined by the manufacturer for advanced cleaning techniques. The garments can be cleaned and decontaminated following manufacturers instructs in line with NFPA 1851. By the way there is no standard that states proximity garments have to be made out of aluminized material; NFPA 1971 has only performance requirements for the outershell.

Note: There are current research and development programs on proximity protective clothing looking at extending the service life of these garments. The US Navy funds these programs. Instead of looking to get around performance requirements maybe the writer should place the same effort into help improving the proximity ensembles through R&D programs.
From: Jones, Floyd A Civ USAF ACC 7 CES/CEF [mailto:Floyd.Jones@dyess.af.mil]
Sent: Friday, June 05, 2009 10:04 AM
To: Maynard, Mary
Subject: NFPA 1500 Temporary Interim Amendment (TIA) LOG 938 Regarding the Selection of Firefighting PPE

Good Morning,

I would like to contribute my comments on the Selection of Firefighting PPE. I have been a member of the USAF Fire Dept since 1980.

During the 29 years service here, I have participated in hundreds of live fire training exercises and have responded to 3 aircraft crashes (B-1 Bomber, KC-135 Fuel Tanker, and a P-31 Mustang). We have participated with local paid and volunteer departments in live fire training both on the Air Force Installation and off installation. I have seen aircraft fuels (used in the AF) go from JP-4 highly flammable to the current JP-8 combustible fuel. We have used over 100,000 gallons of JP-4 (no longer used) and over 100,000 JP-8 in our training ground during the last 29 years.

I fully support structural firefighting gear in aircraft operations and have found no difference in the level of protection of wearing proximity gear and structural firefighting ensembles. During all of our aircraft accidents, local paid/volunteer departments were on scene fighting the exact same fire side by side. We never had any off base firefighter sustain any heat related injuries compared to the AF firefighters donned in proximity gear. I have participated in live fire training exercises in our fuel pit dressed in proximity gear and structural gear - I have found that I lasted longer and was able to perform better in structural gear. I can state that proximity gear was actually hotter to work in and tired me out faster verses the structural gear.

Although our primary job in the AF is to protect the billions of dollars of aircraft sitting on the flightline, we respond more to structural, wildland, medical and vehicle emergencies than aircraft incidents. Our firefighters have worked 8 actual aircraft fires on Dyess AFB in 29 years and the over 30,000 other emergencies not related to aircraft in the same time frame. We have wasted tens of thousands, if not $100,000’s, of dollars in proximity gear, due to wear and tear from all the emergencies we encounter beyond aircraft incidents. I see proximity

I fully support proximity gear when entering an area that requires such selection based on the incident factors at the time. Case in point, we responded to a 600,000 JP-8 POL tank leak. The leak was out of a 1” line spraying a mist 20 ft in the air. We were forced to place firefighters in proximity gear to enter the area (into the mist) to seal the 1” leak. During this operation, it was deem necessary to provide the best protection as firefighters were covered in fuel. In all the aircraft accidents we have had, we have never faced this type of hazard and structural gear would have provided the same level protection.

There should be more factors in the selection process. To say all aircraft fuels are the same, is as saying all motor vehicle fuels are the same (Diesel vs Gasoline). At a civilian airline where aviation fuels (not Kerosene based fuels) are used, then I can see proximity gear maybe more of a factor if higher octane/lower flash point fuel is used.

To close, I don’t think this is a matter of saving money. I am for outfitting my firefighters in the safest PPE possible. However, in this case, structural gear provides the same level of protection (that we have seen) during all our aircraft incidents and live training fires.
I truly hope strong consideration is given for the adoption of structural gear for aircraft firefighting.

Thank you for the work the committee does. I know the entire goal is to provide firefighter safety and in no way do I see this as lowering the standard.

FLOYD A. JONES, YN-02, DAF
Deputy Chief, Fire & Emergency Services
7 CES/CEF
Dyess AFB, Texas
Phone: 325-696-5223
Cell: 325-201-7287
DSN: 461-5223
To: The Committee for NFPA 1500-2007, Standard on Fire Department Occupational Safety and Health Program fax 617-770-3500, ATTN: Codes & Standards.

TIA 938

From: Battalion Chief Matt Mauer, Aircraft Rescue Division, Kansas City (Missouri) Fire Department

Silver vs. "regular" Nomex or PBI gear—all opinion

The Committee for NFPA 1500-2007, Standard on Fire Department Occupational Safety and Health Program, is considering a Technical Interim Amendment (TIA) that would eliminate "aircraft fires" from the guidelines for Proximity Fire Fighting.

I don't think that the NFPA is often wrong on many ARFF issues, but this TIA should be voted down.

I agree that in the NFPA/ICAO world in which a C index airport has a minimum of 12 dedicated and highly trained NFPA 1003 certified ARFF Firefighters riding 5 or 6 3000 gallon crash rigs to perform actual rescue and evacuation, put the fire out and do all the little things that need to be done in the fuel soaked environment that is the modern plane crash that structural gear is probably OK. They'll have lots of equipment and help.

But in the a world where FAR 139 gets written by to a large extent by AAAE and in which airports only have to do the bare minimum and may only have 2 guys who get one live fire a year for an hour operating 2 trucks on a C airport under the assumption that just squirting some foam from the crash truck onto the egress path will ensure that the stewardesses can evacuate the plane while the ARFF guys stand by bravely with their finger on the button is the way to find both 139 compliance and passenger survivability, the silvers may provide both ARFF guys and passengers a happier and less crispy future. Especially if the scene reignites.

Call me crazy, but what if they actually have to get out of the truck and fight fire inside the mangled aircraft?

As long as the FAA airports are allowed to conduct firefighting on the cheap we will need every tool and advantage we can get. See who is leading the charge against increased staffing and equipment requirements. Their initials are AAAE and ACI.

My opinion, not my FD's.
June 11, 2009

Secretary
Standards Council
1 Battlemarch Park,
Quincy, MA 02169-7471.

Dear Secretary:

The International Association of Fire Fighters strongly opposes the proposed NFPA 1500, TIA No. 938.

First, the issue is not of an emergency nature. This issue has been addressed and rejected by the committee for over 20 years.

Second, a decision to provide fire fighter protection based on the type of "primary response" rather than the hazard for which protection is needed is absurd. Additionally, if proper protection, in this case proximity fire-fighting protective ensembles that are compliant with NFPA 1971, is not provided to employees that are engaged in proximity fire fighting, then it would be a citable offense under federal OSHA. In fact federal OSHA has informed DOD agencies and CINCPAC that any agency that fails to follow the equipment and other requirements of proximity fire-fighting protective ensembles that are compliant with NFPA 1971 for aircraft firefighting will be subject to OSHA citation.

Third, to eliminate aircraft fuel fire, because some tactics rely on vehicles should not be allowed. Airport fire fighters must be prepared and are trained to not only put out such fuel fires, but must also be prepared and are trained to effectuate a rescue. Proper proximity protective clothing, not structural protective clothing, must be utilized to protect fire fighters from the conductive, convective, and radiant heat fluxes encountered during such rescues of fuel laden aircraft. Further, such rescue operations cannot be conducted from within vehicles.

Again, if the employer is expect to perform aircraft rescue and fire fighting operations, then those employees must be provided and trained to use proper NFPA compliant ensembles. We ask that the Standards Council reject this request.

Sincerely,

Richard M. Duffy
Assistant to the General President
NFPA 1500-2007 Edition

Standard on Fire Department Occupational Safety and Health Program

TIA Log No. 938

Reference: 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1

Comment Closing Date: June 12, 2009

Submitter’s: Marc Tonnacliff, Federal Aviation Administration, Washington, D.C.

To: Chairman, National Fire Protection Association (NFPA) 1500 Technical Committee

From: Marc Tonnacliff

Subj: COMMENTS TO BE CONSIDERED, NFPA 1500 TIA 938

Sir,

Please consider the follow comments when deciding on whether to accept the TIA concerning the removal of aircraft fires from the definition of “PROXIMITY FIRE FIGHTING” and no longer requiring the use of proximity personal protective clothing a requirement for ARFF firefighting.

While I do agree an assessment of all equipment is necessary with all departments depending upon their mission, let us not over look safety and use it as a cost saving mechanism. While the Proximity clothing ensemble is more expensive than that of structure equipment, look at the possibilities of what the firefighter may encounter while fighting an aircraft fire.

Fires involving aircraft are specialized and with all the different materials located within an aircraft, they can and do create a fire intensity necessary for ARFF to remain categorized and included in the definition of "PROXIMITY FIRE FIGHTING." There are several factors to consider other than what the author of the TIA has taken into account. Let’s first look at the oxygen carried on aircraft used when cabin pressure is lost. Even with the smallest of fires located in the aircraft; if O2 is entered into the equation could spell disaster for someone not wearing proximity protective clothing. This alone changes the aspects of what is outlined by the author of the proposal. What size of aircraft are we looking at for this scenario? What type of fire are we looking at if you use a 747, 787, A380; 50,000 - 80,000 US gallons?

If we look at bulk storage facilities, are they not equipped with special monitor devices positioned atop the fuel storage facility and do they not also use specialize firefighting vehicles with a fire pump capable of putting out more GPM’s than that of an ARFF vehicle? I do not know of any fire chief who is going to send anyone in to any fire which has not been controlled to some point where he/she is not risking the lives of their firefighters. It doesn’t matter what type of fire it is; building, fuel farm, aircraft or even a ship.

Another issue the author brings up concerning Bunker gear, while it considered more durable in rough situation where the Proximity clothing could be cut or receive abrasions and result in the need for it to be replaced, Bunker gear is designed to absorb the heat which is produced by the fire. With proximity clothing it is possible to see when an area is warn and the garment needs replacement. This is not always possible with structure gear. It is actually possible for it to be warn past the need for replacement, thereby exposing the firefighter to an unnecessary safety factor and not only jeopardizing his life, but the lives of those fighting the fire with him.
Another issue the author does not address is the absorption of fuel and other chemicals associated with aircraft fires into the course material of structure gear. While it is somewhat easier to just put your gear into a washing matching, proximity clothing is capable of being cleaned just the same with a little bit of approved cleaner and allowed to dry. The liners are machine washable just the same. It doesn't really matter which type of protective clothing you are wearing, if it is not cleaned properly it will not protect the wearer. While the proximity clothing of previous years was easy to flake away, changes and improvements have enabled the material to become stronger and not wear off or flake away so easily.

Elevated core body temperatures and firefighter dehydration are standard conditions every fire department must deal with; it is not something specific to the wearing of proximity clothing. While the outer shell of bunker gear may breathe better than proximity gear, it also absorbs the heat being released by the fire and can and does cause these conditions.

Mutual aid departments responding are not necessarily operating in and around the actual aircraft. What they do and when they do it will be spelled out in the mutual aid agreement or are used where deemed necessary of the on scene commander. You can not use a generalization statement the way the author has.

I do not feel the author has sufficiently presented his case to remove aircraft firefighting and the use of Proximity clothing from NFPA 1500 in its definition of “PROXIMITY FIRE FIGHTING;” and therefore ask the Technical Committee to reject the TIA.

On a final note, why don’t we as an industry, develop a set of parameters by which testing is done to actually compare the two types of protective clothing to determine if one is better than the other or if there is no difference in the protection and to put this matter to rest once and for all.

These are my opinions and do not necessarily reflect the views and opinions of the Federal Aviation Administration.

Sincerely,

Marc Tonnacliff

Marc Tonnacliff
Senior ARFF Specialist, FAA
202-267-8732
Attention: Standards Council

Fax to N.Walker @ 617-770-3500

TIA Log No. 938
NFPA No. & Year
NFPA 1500-2007 Edition

Paul W. Looney  
Past Chairman ARFF Working Group  
569 Clintonville Rd.  
North Haven, CT. 06473  
Paularff@aol.com

Reference: 3.3.37.1, A.3.3.37.1, 7.3.1, A.7.3.1 and 7.3.2 through 7.3.4.1

Recommendation: I believe that the original description or a modified description such as the one below better describes the associated proximity fire and the need to wear proximity clothing. I do not agree with the USAF submitted changes. First and for most, I do not think that this TIA meets the requirements for an emergency change as stated. Therefore I recommend that the committee reject this TIA as stated by the USAF with a negative vote.

1. Revise 3.3.3 7.1 to read as follows:

3.3.37.1* Proximity Fire Fighting. Specialized fire-fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing very high levels of conductive, convective, and radiant heat such as aircraft fires, bulk flammable gas fires and bulk flammable liquid fires. Current wording:

2. Revise A.3 .3 .3 7.1 to read as follows:

Submitter’s: Joseph Rivera, US Air Force and Mark Giuliano, Eglin ARB, TIA Log No. 938

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be an oil refinery fire or tank farm fire generating high levels of radiant heat. Although large-frame aircraft contain large amounts of aviation fuel, modern Aircraft Rescue and Fire Fighting (ARFF) vehicle technology, extinguishing agents, and application techniques [roof turrets, bumper turrets, and boom nozzles] enable fire
fighters to control fires from great distances and essentially extinguish large aviation fuel fires while still in the attacking ARFF vehicle, thus eliminating high levels of conductive, convective, and radiant heat exposure prior to fire fighters leaving the vehicle and advancing handlines.

New Revision wording should be:

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be a post crash aviation fuel fire with associated high levels of radiant heat or an oil refinery fire or tank farm fire generating these same kinds of high levels of radiant heat.

Statement of Problem and Substantiation for Comment:

I believe that a modified description such as the one above better describes the associated proximity fire and the need to wear proximity clothing. I do not agree with the USAF submitted changes. It took many years of diligent research to develop proximity clothing that properly protects the airport fire fighters when responding to any post crash fire. Seconds not minutes can make the difference between survival and death. Equipping responding ARFF firefighters with structural fire fighting clothing will assure that fire fighters will never leave their vehicles unless all associated high radiant heat fires are reduced and negates any possibility that they will save any survivors.

Revised:

A.3.3.37.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is not made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations. An example of proximity fire fighting could be a post crash aviation fuel fire with associated high levels of radiant heat or an oil refinery fire or tank farm fire generating these same kinds of high levels of radiant heat.
Further Substantiation:

It is true that newer technologies are available today which are more effective than older nozzles and turrets. But their use is not mandated by the regulations controlling fire responses at either military or civil airports. Regulators and authorities having jurisdiction have been slow to approve and provide these newer more effective technologies. Many older vehicles still make up the majority of the fleet mix at airfields and air bases, and thus only a small portion of major rescue vehicles at airports and air bases worldwide use these newer more effective technologies.

The first initial fire fighters responding have a unique and difficult task to perform at any aircraft accident. Their first responsibility is to secure and provide a safe egress from the aircraft. Providing assistance to evacuating passengers and protecting the fragile escape slides. Initial response may call for post crash fire fighting with large roof and bumper turrets by a single truck, operator driver, but simultaneously while this action is being undertaken, other ARFF fire fighter will disembark the major ARFF vehicle and assist passenger evacuation and start initiation of handline fire fighting requirements. These simultaneous events and operations expose those who have exited the vehicle to high radiant heat loading.

Many post crash fuel fires include running or three dimensional fuel fires which are difficult to extinguish. These types of running or three dimensional fires may often require fire fighters to get up close and into the crash debris, having to do this they will be very definitely exposed to these high radiant heat sources.

There is a place and a time to wear structural fire fighting gear. It is just not in the early elements of a major high radiant heat fire rescue response.

Although large frame aircraft contain large amounts of aviation fuel, modern Aircraft Rescue and Fire-Fighting (ARFF) vehicle technology, extinguishing agents, and application techniques (roof turrets, bumper turrets, and boom nozzles) enable fire fighters to control fires from great distances and essentially extinguish large aviation fuel fires while still in the attacking ARFF vehicle, thus eliminating high levels of conductive, convective, and radiant heat exposure prior to fire fighters leaving the vehicle and advancing handlines.

Signed

[signature]
Item 09-8-30
Add a new C.4, Checklist for Compliance with NFPA 1600:

### Annex C Additional Resources

Checklist for Compliance with NFPA 1600

<table>
<thead>
<tr>
<th>NFPA 1600 Program Elements</th>
<th>Yes - compliant</th>
<th>No – not compliant</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| **4.1 Program Administration** The entity has a documented program that includes the following:  
(1) Executive policy including vision, mission statement, roles and responsibilities, and enabling authority  
(2) Program goals, objectives, and method of program evaluation  
(3) Program plan and procedures  
(4) Applicable authorities, legislation, regulations, and/or industry codes of practice  
(5) Program budget and project schedule  
(6) Records management practices | | | |
| **4.2 Program Coordinator.** The program coordinator has been appointed by the entity and authorized to administer and keep current the program. | | | |
| **4.3 Advisory Committee**  
4.3.1 An advisory committee is established by the entity in accordance with its policy. | | | |
| 4.3.2 The advisory committee provides input to or assist in the coordination of the preparation, implementation, evaluation, and revision of the program. | | | |
| 4.3.3 The committee includes the program coordinator and others who have the appropriate expertise and knowledge of the entity and the capability to identify resources from all key functional areas within the entity and shall solicit applicable external representation. | | | |
| **4.4 Program Evaluation**  
4.4.1 The entity has established performance objectives for program elements listed in Chapter 4 and Chapter 5 and conducts a periodic evaluation of the objectives as described in Section 5.13. | | | |
4.4.2 The entity conducts a periodic evaluation of the program based on the objectives.

5.1 General

5.1.1 The program includes the elements in Sections 5.2. through 5.16, the scope is determined by the impact of the hazards affecting the entity.

5.1.2 The organization’s program elements include prevention, mitigation, preparedness, response, and recovery.

5.2 Laws and Authorities.

5.2.1 The program complies with applicable legislation, policies, regulatory requirements, and directives.

5.2.2 The entity has implemented a strategy for addressing the need for revisions to legislation, regulations, directives, policies, and industry codes of practice.

5.3 Risk Assessment

5.3.1 The entity has identified hazards, monitors the identified hazards, assesses the likelihood of their occurrence, and assesses the vulnerability of people, property, the environment, and the entity itself to those hazards.

5.3.2 Hazards that have been evaluated for potential effect on the entity include the following:

(1) Natural hazards (geological, meteorological, and biological) that can occur without the influence of people and have potential direct or indirect impact on the entity (people, property, the environment), such as the following:

(a) Geological hazards (does not include asteroids, comets, meteors)
   i. Earthquake
   ii. Tsunami
   iii. Volcano
   iv. Landslide, mudslide, subsidence
   v. Glacier, iceberg

(b) Meteorological hazards
   i. Flood, flash flood, seiche, tidal surge
   ii. Drought
   iii. Fire (forest, range, urban, wildland, urban interface)
   iv. Snow, ice, hail, sleet, avalanche
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<tbody>
<tr>
<td>v. Win dstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm</td>
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<td>vi. Extreme temperatures (heat, cold)</td>
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<td>vii. Lightning strikes</td>
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<td>viii. Famine</td>
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<td>ix. Geomagnetic storm</td>
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<td>(c) Biological hazards</td>
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<tr>
<td>i. Emerging diseases that impact humans or animals [plague, smallpox, anthrax, West Nile virus, foot and mouth disease, SARS, pandemic disease, BSE (Mad Cow Disease)]</td>
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<td>ii. Animal or insect infestation or damage</td>
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<td>(2) Human-caused events such as the following:</td>
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<tr>
<td>(a) Accidental</td>
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<td>i. Hazardous material (explosive, flammable liquid, flammable gas, flammable solid, oxidizer, poison, radiological, corrosive) spill or release</td>
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<td>ii. Explosion/fire</td>
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<td>iii. Transportation accident</td>
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<td>iv. Building/structure collapse</td>
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<td>v. Energy/power/utility failure</td>
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<td>vi. Fuel/resource shortage</td>
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<td>vii. Air/water pollution, contamination</td>
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<td>viii. Water control structure/dam/levee failure</td>
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<td>ix. Financial issues, economic depression, inflation, financial system collapse</td>
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<td>x. Communications systems interruptions</td>
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<td>xi. Misinformation</td>
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<td>(b) Intentional</td>
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<td>i. Terrorism (explosive, chemical, biological, radiological, nuclear, cyber)</td>
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<td>ii. Sabotage</td>
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<td>iii. Civil disturbance, public unrest, mass hysteria, riot</td>
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<td>iv. Enemy attack, war</td>
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<td>v. Insurrection</td>
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<td>vi. Strike or labor dispute</td>
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<td>vii. Disinformation</td>
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<td>viii. Criminal activity (vandalism, arson, theft, fraud, embezzlement, data theft)</td>
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<td>ix. Electromagnetic pulse</td>
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<td>x. Physical or information security breach</td>
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<td>xi. Workplace violence</td>
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<td>xii. Product defect or contamination</td>
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<td>xiii. Harassment</td>
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<tr>
<td>xiv. Discrimination</td>
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</table>

3) **Technological-caused events** that can be unrelated to natural or human-caused events, such as the following:

(a) Central computer, mainframe, software, or application (internal/external)

(b) Ancillary support equipment

(c) Telecommunications

(d) Energy/power/utility

5.3.3* The entity conducted an impact analysis to determine potential detrimental impacts of the hazards on the following:

(1) Health and safety of persons in the affected area at the time of the incident (injury and death)

(2) Health and safety of personnel responding to the incident

(3)* Continuity of operations
### 5.4 Incident Prevention.

**5.4.1** The entity developed a strategy to prevent an incident that threatens people, property, and the environment.

**5.4.2** The prevention strategy is based on the information obtained from Section 5.3 and is kept current using the techniques of information collection and intelligence.

#### 5.3 Risk Assessment.

**5.3.1** The entity has identified hazards, monitors the identified hazards, assesses the likelihood of their occurrence, and assesses the vulnerability of people, property, the environment, and the entity itself to those hazards.

**5.3.2** Hazards that have been evaluated for potential effect on the entity include the following:

1. Natural hazards (geological, meteorological, and biological)
2. Human-caused events (accidental and intentional)
3. Technological-caused events

**5.3.3** The entity shall conduct an impact analysis to determine potential detrimental impacts of the hazards on the following:

1. Health and safety of persons in the affected area at the time of the incident (injury and death)
2. Health and safety of personnel responding to the incident
3. Continuity of operations
4. Property, facilities, and infrastructure
5. Delivery of services
6. The environment
7. Economic and financial condition
8. Regulatory and contractual obligations
9. Reputation of or confidence in the entity
10. Regional, national, and international considerations

**5.4.3** The entity has a system to monitor the threat level for identified hazards and adjust the level of preventive measures to be commensurate with the threat.
### 5.5 Mitigation.

**5.5.1** The entity developed and implemented a strategy that includes measures to be taken to limit or control the consequences, extent, or severity of an incident that cannot be reasonably prevented.

**5.5.2** The mitigation strategy is based on the results of hazard identification and risk assessment, impact analysis, program constraints, operational experience, and cost-benefit analysis.

**5.5.3** The mitigation strategy included interim and long-term actions to reduce vulnerability.

### 5.6 Resource Management and Logistics.

**5.6.1** The entity established resource management objectives consistent with the overall program goals and objectives as identified in Section 4.1 for the hazards as identified in Section 5.3.

**4.1 Program Administration** The entity has a documented program that includes the following:

(2) Program goals, objectives, and method of program evaluation

**5.3 Risk Assessment.**

**5.3.1** The entity has identified hazards, monitors the identified hazards, assesses the likelihood of their occurrence, and assesses the vulnerability of people, property, the environment, and the entity itself to those hazards.

**5.3.2** Hazards that have been evaluated for potential effect on the entity include the following:

(1) Natural hazards (geological, meteorological, and biological)
(2) Human-caused events (accidental and intentional)
(3) Technological-caused events

**5.3.3** The entity has conducted an impact analysis to determine potential detrimental impacts of the hazards on the following:

(1) Health and safety of persons in the affected area at the time of the incident (injury and death)
(2) Health and safety of personnel responding to the incident
(3) Continuity of operations
(4) Property, facilities, and infrastructure
(5) Delivery of services
(6) The environment
(7) Economic and financial condition
(8) Regulatory and contractual obligations
(9) Reputation of or confidence in the entity
(10) Regional, national, and international considerations

**5.6.2** The resource management established procedures to locate, acquire, store, distribute, maintain, test, and account for services, personnel, resources, materials, and facilities procured or donated to support the program.
5.6.3 Resource management objectives include the following

(1) Personnel, equipment, training, facilities, funding, expert knowledge, materials, technology, information, intelligence, and the time frames within which they will be used.

(2) Quantity, response time, capability, limitations, cost, and liability connected with using the involved resources.

(3) Resources and any needed partnership arrangements essential to the program.

5.6.4 An assessment includes the following tasks:

(1) Establishing processes for describing, inventorying, requesting, and tracking resources

(2) Activating these processes prior to and during an incident

(3) Dispatching resources prior to and during an incident

(4) Deactivating or recalling resources during or after incidents

(5) Contingency planning for shortfalls of resources

5.6.5 An assessment was conducted to identify the source capability shortfalls and the steps necessary to overcome any shortfalls.

5.6.6 A current inventory or internal and external resources is maintained.

5.6.7 Donations of goods, services, personnel, and facilities solicited and unsolicited, and the management thereof, are addressed.

5.7* Mutual Aid/Assistance

5.7.1 The need for mutual aid/assistance has been determined.

5.7.2 If mutual aid/assistance is needed, agreements have been established.

5.7.3 Mutual aid/assistance agreements are referenced in the program plan.

5.8 Planning.

5.8.1 Planning Process

5.8.1.1 The program follows a planning process that develops plan for the strategy, prevention, mitigation, emergency operations/response, business continuity, and recovery.
### 5.8.1 Planning Process

5.8.1.2 The entity is engaged in the planning process on a regularly scheduled basis or when the situation has changed to put the accuracy of the existing plan into question.

5.8.1.3 Where applicable, the entity has included key stakeholders in the planning process.

### 5.8.2 Common Plan Elements

5.8.2.1 The plan has clearly stated objectives.

5.8.2.2 Plans identify functional roles and responsibilities of internal and external agencies, organizations, departments, and positions.

5.8.2.3 Plans identify lines of authority for these agencies, organizations, departments, and positions.

5.8.2.4 Plans identify logistics support and resource requirements.

5.8.2.5 Plans identify the process for managing an incident.

5.8.2.6 Plans identify the process for managing the communication and flow of information, both internally and externally.

### 5.8.3 Plans

5.8.3.1* The program includes:

- a strategic plan
- an emergency operations/response plan,
- a prevention plan,
- a mitigation plan,
- a recovery plan, and
- a continuity plan.

5.8.3.2* The plans developed are:

- individual
- integrated into a single plan document
- a combination of individual and integrated plans

Mark N/A as appropriate
5.8.3.3* The strategic plan defines:
(See Section 4.1)

4.1 Program Administration The entity has a documented program that includes the following:
(1) Executive policy including vision, mission statement, roles and responsibilities, and enabling authority
(2) Program goals, objectives, and method of program evaluation
(3) Program plan and procedures
(4) Applicable authorities, legislation, regulations, and/or industry codes of practice
(5) Program budget and project schedule
(6) Records management practices

• the vision,

• the mission

• goals, and

• objectives of the program

5.8.3.4* The emergency operations/response plan assigns responsibilities for carrying out specific actions in an emergency

5.8.3.5 The prevention plan shall establishes:

• interim, and

• long-term actions to eliminate hazards that impact the entity.

5.8.3.6 The mitigation plan establishes:

• interim, and

• long-term actions to reduce the impact of hazards that cannot be eliminated.

5.8.3.7* The recovery plan provides for short-term priorities for restoration of:

• functions,

• services,

• resources,
- facilities,
- programs, and
- infrastructure.

**Long-term priorities for restoration of:**

- functions,
- services,
- resources,
- facilities,
- programs, and
- infrastructure.

5.8.3.9 The entity has made appropriate sections of the plans available to those assigned specific tasks and responsibilities therein and to other stakeholders as required.

5.8.3.8* The continuity plan identifies stakeholders that need to be notified, the critical and time-sensitive applications, alternative work sites, vital records, contact lists, processes, and functions that shall be maintained, as well as the personnel, procedures, and resources that are needed while the entity is recovering.

5.9 Incident Management.

5.9.1* The entity has developed an incident management system to direct, control, and coordinate response and recovery operations

- 5.9.2* The incident management system describes specific: organizational roles,
- titles, and
- responsibilities for each incident management function
5.9.3 The entity has established applicable procedures and policies for coordinating:

- response,
- continuity, and

- recovery activities with stakeholders directly involved in:

  - response,
  - continuity, and
  - recovery operations

5.9.4 The entity has established applicable procedures and policies for coordinating response, continuity, and recovery activities with appropriate authorities and resources

- including activation and deactivation of plans,
- while ensuring compliance with applicable statutes or regulations.

5.10 Communications and Warning.

5.10.1 Communications systems and procedures are established and

- regularly tested to support the program

5.10.2 Communication procedures are established by the entity and

- regularly exercised to support the program.

5.10.3* The entity has developed and does maintain the capability to notify officials and

- alert emergency response personnel

5.10.4 Emergency communications and warning protocols, processes, and procedures are developed,

- periodically tested,
- used to alert people potentially impacted by an actual or impending emergency.
5.10.5 The entity has determined communication needs,

- provide capabilities to execute plans, and

- address the interoperability of multiple responding organizations

5.11* Operational Procedures.

5.11.1 The entity has developed,

- coordinated,

- implemented operational procedures to support the program and execute its plans.

5.11.2* Procedures are established and implemented for response to and recovery from the consequences of those hazards identified in Section 5.3 and

5.3* Risk Assessment.

5.3.1* The entity has identified hazards, monitors the identified hazards, assesses the likelihood of their occurrence, and assesses the vulnerability of people, property, the environment, and the entity itself to those hazards.

5.3.2* Hazards that have been evaluated for potential effect on the entity include the following:

1. Natural hazards (geological, meteorological, and biological)
2. Human-caused events (accidental and intentional)
3. Technological-caused events

5.3.3* The entity shall conduct an impact analysis to determine potential detrimental impacts of the hazards on the following:

1. Health and safety of persons in the affected area at the time of the incident (injury and death)
2. Health and safety of personnel responding to the incident
3. Continuity of operations
4. Property, facilities, and infrastructure
5. Delivery of services
6. The environment
7. Economic and financial condition
8. Regulatory and contractual obligations
9. Reputation of or confidence in the entity
10. Regional, national, and international considerations

- address health and safety
- incident stabilization,
- operational/business continuity
- property conservation, and
- protection of the environment under the jurisdiction of the entity
5.11.3 Procedures, including life safety, incident stabilization, operational/business continuity, and property conservation, are established and implemented for response to, and recovery from, the consequences of those hazards identified in Section 5.3

5.3* Risk Assessment.

5.3.1* The entity has identified hazards, monitors the identified hazards, assesses the likelihood of their occurrence, and assesses the vulnerability of people, property, the environment, and the entity itself to those hazards.

5.3.2* Hazards that have been evaluated for potential effect on the entity include the following:
(1) Natural hazards (geological, meteorological, and biological)
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5.3.3* The entity shall conduct an impact analysis to determine potential detrimental impacts of the hazards on the following:
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(2) Health and safety of personnel responding to the incident
(3)*Continuity of operations
(4) Property, facilities, and infrastructure
(5) Delivery of services
(6) The environment
(7)*Economic and financial condition
(8) Regulatory and contractual obligations
(9) Reputation of or confidence in the entity
(10)*Regional, national, and international considerations

5.11.4* Procedures are in place to conduct a situation analysis that includes:

- a needs assessment,

- damage assessment, and

- the identification of resources needed to support response and recovery operations.

5.11.5 Procedures allow for concurrent recovery

- and mitigation activities during emergency response

5.11.6 Procedures are established for succession of management/government as required in 5.8.3.8.

5.8.3.8* The continuity plan identifies stakeholders that need to be notified, the critical and time-sensitive applications, alternative work sites, vital records, contact lists, processes, and functions that shall be maintained, as well as the
personnel, procedures, and resources that are needed while
the entity is recovering.

5.12 Facilities.

5.12.1 The entity has established a primary and

- an alternate emergency operations center, physical or virtual,
capable of managing continuity, response, and recovery
operations.

5.12.2 Facilities capable of supporting continuity, response, and
recovery operations are identified.

5.13 Training.

5.13.1 The entity has developed and implemented a
training/educational curriculum to support the program.

5.13.2 The objective of the training is to create awareness and
enhance the skills required to develop, implement, maintain, and
execute the program.

5.13.3 Frequency and

- scope of training are identified.

5.13.4 Personnel are trained in the entity’s incident management
system.

5.13.5 Training records are maintained.

5.13.6 The training and education curriculum does comply with all
applicable regulatory requirements.

5.14 Exercises, Evaluations, and Corrective Actions.

5.14.1 The entity evaluates program plans, procedures, and
capabilities through periodic reviews,

- testing, and

- exercises

5.14.2 Additional reviews are based on post-incident analyses and
reports,

- lessons learned, and

- performance evaluations.
### 5.14 Exercises

Exercises are designed to test individual essential elements, interrelated elements, or the entire plan(s).

### 5.14.4 Procedures

Procedures are established to take corrective action on any deficiency identified.

### 5.15 Crisis Communication and Public Information

The entity has developed procedures to disseminate and respond to requests for pre-disaster, disaster, and post-disaster information, including procedures to provide information to internal and external audiences, including the media, and deal with their inquiries.

### 5.15.2 The entity has established and maintain an emergency public information capability that includes the following:

1. A central contact facility for the media
2. A system for gathering, monitoring, and disseminating emergency information
3. Pre-scripted information bulletins
4. A method to coordinate and clear information for release
5. The capability of communicating with special needs populations
6. Protective action guidelines/recommendations (e.g., shelter-in-place or evacuation)

### 5.15.3 Where the public is potentially impacted by a hazard, a public awareness program are implemented.

### 5.15.4 The entity has developed procedures to advise the public, through authorized agencies, of threats to people, property, and the environment.

### 5.16 Finance and Administration

The entity has developed financial and administrative procedures to support the program before,
• during, and

• after an emergency or a disaster.

5.16.2 Procedures are created and maintained for expediting fiscal decisions in accordance with established authorization levels and fiscal policy.

5.16.3 The procedures I include, but not be limited to, the following:

(1) Establishment and definition of responsibilities for the program finance authority, including its reporting relationships to the program coordinator

(2) Program procurement procedures

(3) Payroll

(4) Accounting systems to track and document costs

(5)* Management of funding from external sources

**Substantiation:** The U.S. Department of Homeland Security has recognized NFPA 1600 since it was first mentioned in the original 9/11 Commission Report. In the report the Commission named NFPA 1600 as the National Preparedness Standard. In subsequent Amendments to the Homeland Security Act in 2004, DHS again named NFPA 1600 as the National Preparedness Standard. In 2007 Congress passed Public Law 110-53, Implementing Recommendations of the 9/11 Commission Act of 2007, it again named NFPA 1600 under Private Sector Preparedness and outlined a new certification program to be carried out by DHS.

However, the 2007 P.L. 110-53 names NFPA 1600 as a private sector preparedness standard that could be one among others, that would be selected by DHS to be part of a new Voluntary Private Sector Preparedness Certification Program. DHS plans to put in place a certification program for private sector preparedness plans on a voluntary basis. FEMA was selected to head up this effort within DHS.

FEMA has selected an accrediting body, ANAB, (an ANSI affiliate) as an accreditation entity for certifiers. FEMA is considering several emergency preparedness and business continuity standards that potential certifying bodies might use to evaluate plans. Since preparedness plans will be evaluated against standards, there is interest in having suitable evaluation tools, and even management system standards (i.e., ISO 9001), to facilitate this certification process. This application of NFPA 1600 was not contemplated during the previous revision cycle.

The 2010 edition of NFPA 1600 is expected to have an Annex with a checklist for reviewing the completeness of the elements of a preparedness plan. During their ROP meeting in Mystic, CT last August, the TC discussed processing a TIA to put this new Annex material in the current (2007) edition of NFPA 1600 to meet the new application needs identified by the DHS-FEMA certification program. This TIA is that Annex material.

**Emergency Nature:** “The document contains an error or omission that was overlooked during a regular revision process.”
Agenda Item: TIA 1600-2007 and Proposed 2010 Edition
Document: NFPA 1600®, Standard on Disaster/Emergency Management and Business Continuity Programs
Reference: Annex C
(TIA Log 948)

Comment Closing: 4/17/2009
0 Public Comments Received

TIA FINAL TC BALLOT RESULTS

According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS NOT achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 23 [33 (eligible to vote) – 3 (not returned) – 0 (abstentions) = 30 × 0.75 = 22.5]

33 Eligible to Vote
3 Not Returned (Halstead, Keupper, Stronach)

TC FINAL Ballot results for Technical Merit are as follows:
21 Affirmative (Brewster, Janko, Raisch w/comment)
9 Negative (Bokman, Charvat, Fletcher, Gazdik, Larson, Moore, Morganti, Newsome, Schmidt)
0 Abstentions
FAIL

TC FINAL Ballot results for Emergency Nature are as follows:
18 Affirmative (Brewster, Janko, w/comment)
12 Disagreement (Bokman Charvat, Fletcher, Gazdik, Hiscott, Larson, Morganti, Musson, Newsome, Raisch, Schmidt, Tierney)
0 Abstentions
FAIL
MEMORANDUM

TO: Technical Committee on Emergency Management and Business Continuity

FROM: Stacey Van Zandt

SUBJ: NFPA 1600 proposed TIA No. 948 FINAL BALLOT RESULTS

DATE: March 30, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA HAS NOT achieved the 3/4 majority vote needed on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes need to obtain a recommendation to issue the TIA is 23 (33 eligible to vote - 3 not returned - 0 abstentions × 0.75 = 22.5 – rounded to 23).

Technical Merit
33 Eligible to Vote
3 Not Returned (Halstead, Keupper, and Stronach)
0 Abstentions
21 Affirmative (Brewster, Janko, and Raisch – Affirmative with comment)
9 Negative (Schmidt, Bokman, Charvat, Fletcher, Gazdik, Larson, A. Moore, Morganti, and Newsome)

Emergency Nature:
33 Eligible to Vote
3 Not Returned (Halstead, Keupper, and Stronach)
0 Abstentions
18 Agreement (Brewster and Janko – Agreement with comment)
12 Disagreement (Schmidt, Bokman, Charvat, Fletcher, Gazdik, Hiscott, Larson, Morganti, Musson, Newsome, Raisch, and Tierney)

Copies of principal members’ final ballots are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received.

Attachments
Van Zandt, Stacey

From: Lloyd Bokman [Lbokman@columbus.rr.com]
Sent: Wednesday, March 25, 2009 6:35 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

I am voting no on question #2, it is not an emergency anymore.

Lloyd

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Wednesday, March 25, 2009 3:49 PM
To: Lloyd Bokman
Cc: Trebisacci, Dave; Walker, Nancy
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

For clarification are you changing your vote on question 1 and question 2?

From: Lloyd Bokman [mailto:Lbokman@columbus.rr.com]
Sent: Wednesday, March 25, 2009 3:44 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Stacey,

Since the 2010 edition of NFPA 1600 will be out soon, I am changing my vote to a no and not to agree with the TIA for the 2007 edition.

Regards,
Lloyd

Lloyd Bokman
577 Wickham Way
Gahanna, Ohio 43230-2244
Work: 614-799-3679
Fax: 614-799-5950
Cell: 614-657-3769
Lbokman@columbus.rr.com

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Friday, March 20, 2009 3:07 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

To Technical Committee on Emergency Management and Business Continuity:

Please find attached balloting circulation package on proposed TIA No.948 to NFPA 1600. This information has also been posted on your ECommittee Page under the "Ballot Information Heading" and within the "TIA Ballots" folder.
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new C.4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of NFPA 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C.4, Checklist for Compliance with NFPA 1600, please record me as voting:

X AFFIRMATIVE   _______ NEGATIVE*   _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

IT IS NECESSARY FOR JUDICIATION SUBMITED

-----------

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

X AGREEMENT   _______ DISAGREEMENT*   _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Necessary for inclusion in Title 9 Eurocode

-----------

Signature

PETE BIESEL

Name (Please Print)

3/12/09

Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169   FAX: (617) 984-7056   E-mail: svanzandt@nfpa.org

TG TIA Ballot Sheet - February 5, 2009
Van Zandt, Stacey

From: Steven Charvat [charvat@u.washington.edu]
Sent: Friday, March 20, 2009 3:53 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Stacey:

I am formally changing my previous vote of "Affirmative" to "NEGATIVE/DISAGREEMENT" for TIA 948 for both technical merits and emergency nature ballot questions. I do not believe that the nature of the changes merit the emergency classification and any changes for the 2010 edition can be included in the next update.

Thank you!

Steven Charvat, CEM
Representing IAEM

P.S. IAEM strives to continually improve the service we provide all our customers. We would appreciate if you could take a moment to answer a brief online survey to tell us how satisfied you were with our responsiveness. Simply go to http://www.washington.edu/emergency/survey.php. Thank you!

------------------------------------------------------------------

Steven J. Charvat, MPA, CEM
Director
UW Emergency Management
A Facilities Services Department
Box 351275
22H Gerberding Hall
Seattle, WA 98195-1275
Phone: 206-897-8080 (desk and cell)
FAX: 206-897-8061
e-mail: charvat@u.washington.edu
website: www.washington.edu/emergency
------------------------------------------------------------------
Van Zandt, Stacey

From: Bob Fletcher [robertfletcher@comcast.net]
Sent: Friday, March 06, 2009 6:18 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: RE: Reminder - NFPA 1600 TIA 948 TC Initial Ballot
Attachments: Explanation or disagreement with TIA.doc

Stacey,
See my ballot attached.
Thank you.

Bob Fletcher
President
RCS LLC

3302 Kenney Court
Edgewater, MD 21037
443-607-8481 (H)
410-903-0949 (C)

From: Van Zandt; Stacey [mailto:svanzandt@NFPA.org]
Sent: Thursday, March 05, 2009 9:15 AM
To: Van Zandt; Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: Reminder - NFPA 1600 TIA 948 TC Initial Ballot

To Technical Committee on Emergency Management and Business Continuity:

This is a reminder that this ballot is due Thursday, March 12 and according to my records you still have not returned your ballot. Please return your ballot ASAP.

Thank you.

From: Van Zandt, Stacey
Sent: Wednesday, February 18, 2009 1:52 PM
To: Van Zandt, Stacey
Cc: Walker, Nancy; Trebisacci, Dave
Subject: NFPA 1600 TIA 948 TC Initial Ballot

To Technical Committee on Emergency Management and Business Continuity:

Attached is the initial TC ballot package on proposed TIA No. 948 to NFPA 1600, 2007 Edition and Proposed 2010 Edition. Please complete and return your ballot to Stacey Van Zandt either via email at svanzandt@nfpa.org or fax to 617-984-7056, or mail to my attention at NFPA, 1 Batterymarch Park, Quincy, MA 02169.

Ballots are due back no later than March 12, 2009.

This information has also been posted on your ECommittee Page under the "Ballot Information Heading" and within the "TIA Ballots" folder.

If you have any questions, please don't hesitate to contact me.

Thank you.
Explanation for Disagreement with the Proposed TIA to add a new C.4 Checklist for compliance with NFPA 1600

The NFPA 1600 document does not contain an error or omission that was overlooked during the regular revision process. The proposed addition was not overlooked nor was it an error. Nor is it an “emergency” to get a checklist into the standard. I believe the emergency provision should be reserved for true emergencies rather than a means to bypass established the TC process.

Explanation for Question 1: Technical Merits: (Negative Vote)

The use of a checklist as a means of determining compliance with the NFPA 1600 Standard fails to recognize the complexity of assessing compliance of an emergency management program, at any but the most rudimentary levels. To break the 1600 Standard down into a standard by standard, sentence by sentence, phrase by phrase spreadsheet adds little of value. Hopefully, any entity seeking to achieve compliance can perform that simple task. It suggests that an emergency management program can be managed by following a checklist.

Explanation for Question 2: Emergency Nature (Disagreement Vote)

Emergency Nature: "The document contains an error or omission that was overlooked during a regular revision process."

The substantiation provided that "The U.S. Department of Homeland Security has recognized NFPA 1600 since it was first mentioned in the original 911 Commission Report. In the report the Commission named NFPA 1600 as the National Preparedness Standard. In subsequent Amendments to the Homeland Security Act in 2004, DHS again named NFPA 1600 as the National Preparedness Standard. In 2007 Congress passed Public Law 110-53, Implementing Recommendations of the 911 Commission Act of 2007, it again named NFPA 1600 under Private Sector Preparedness and outlined a new certification program to be carried out by DHS, " is largely irrelevant to substantiate insertion of this checklist as being of an “emergency nature.”

The position that DHS takes on the standard should have no bearing on this matter. DHS has representation on the NFPA 1600 TC and has the opportunity to express its position as part of the committee process. The position of one federal department or agency, or any one entity should not unduly influence the direction of the TC. Thus it does not meet the criteria of paragraph 5.2 Section 5 Tentative Interim Amendments.

The substantiation goes on to say "However, the 2007 P.L. 110-53 names NFPA 1600 as a private sector preparedness standard that could be one among others, that would be selected by DHS to be part of a new Voluntary Private Sector Preparedness Certification Program. DHS plans to put in place a certification program for private sector
preparedness plans on a voluntary basis. FEMA was selected to head up this effort within DHS. FEMA has selected an accrediting body, ANAB, (an ANSI affiliate) as an accreditation entity for certifiers. FEMA is considering several emergency preparedness and business continuity standards that potential certifying bodies might use to evaluate plans. Since preparedness plans will be evaluated against standards, there is interest in having suitable evaluation tools, and even management system standards (i.e., ISO 9001), to facilitate this certification process. The fact that there “is interest” at FEMA is irrelevant to this being of an “emergency nature.” It should be of great concern to the TC that this “emergency measure” would be preferred to make FEMA happy or to get into sync with FEMA. The NFPA 1600 TC should attempt to maintain independence from federal mandates rather than unquestioningly accept what DHS and FEMA show “interest” in. The new Administration may head in another direction and hopefully the NFPA 1600 TC will not make a corresponding “U-turn” in order to remain in sync with the new administration.

Finally, the substantiation, “This application of NFPA 1600 was not contemplated during the previous revision cycle. The 2010 edition of NFPA 1600 is expected to have an Annex with a checklist for reviewing the completeness of the elements of a preparedness plan. During their ROP meeting in Mystic, CT last August, the TC discussed processing a TIA to put this new Annex material in the current (2007) edition of NFPA 1600 to meet the new application needs identified by the DHS-FEMA certification program. This TIA is that Annex material.” Once more, the substantiation offered is one of meeting DHS-FEMA’s needs as opposed to meeting the needs of the TC or of the constituency that the NFPA 1600 TC is intended to serve. The standard does not review “the completeness of the elements of a preparedness plan” as the substantiation suggests, but offers standards for a “program.”

In summary, the desire by ANSI or NFPA to promote the NFPA 1600 Standard as “the National Preparedness Standard” for the private sector should not influence the objectivity of the Technical Committee in writing a standard that works for every “entity.” The NFPA 1600 TC did not title the standard “The National Preparedness Standard.” That title was coined by the 911 Commission. The NFPA 1600 Standard represents more than the 911 Commission’s need to find a convenient standard for national preparedness and should serve more than the private sector, by definition. The TC should not be disproportionately influenced by DHS/FEMA or by any external commission nor should it be used as a platform to advance the agenda of any individual member. The standard should stand on its own merits. It will only survive if it adheres to these principles.
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new CA, Checklist for Compliance with the 2007 and Proposed 2010 Editions of
NFPA 1600.

Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new CA,
Checklist for Compliance with NFPA 1600, please record me as voting:

________ AFFIRMATIVE  X   NEGATIVE*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

The NFPA 1600 standard provides common criteria to develop/enhance the entities' comprehensive program. Within the program, various strategies, including plans, ops, checklists, etc. are developed. But I vote against amending 1600 into an annex checklist. I am concerned by amending 600 as an annex checklist, it overly simplifies the planning process, and the smaller or less sophisticated entity will incorrectly use this checklist as a tool that reduces their planning efforts and ultimately reduces the effectiveness of their plan. And for the larger or more sophisticated entities, the annex (even if it does not enhance the details of their program) implies it should be also be completed and maintained. If the committee feels checklists are needed, I would recommend we develop example checklists that are more focused to specific areas/items within the program.

________

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

________ AGREEMENT  X   DISAGREEMENT*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

I do not feel this proposal satisfies the definition of emergency nature.

[Signature]

Robert Gazdik

Name (Please Print)

3/11/09

Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new C4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of
NFPAs 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C4,
Checklist for Compliance with NFPA 1600, please record me as voting:

   X AFFIRMATIVE       NEUTRAL       NEGATIVE*       ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

   AGREEMENT        X DISAGREEMENT*       ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

[Signature]

[Name (Please Print)]

[Date]

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7056
E-mail: svanzandt@nfpa.org

TO TIA Ballot Sheet - February 6, 2009
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new C.4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of
NFPA 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C.4,
Checklist for Compliance with NFPA 1600, please record me as voting:

[ ] AFFIRMATIVE [ ] NEGATIVE* [ ] ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

CHECKLIST HELPS TO FUNCTION AS AN EVALUATION TOOL. HELPS ANR
NFPA STANDARDS COMES TO 8L 110-53.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

[ ] AGREEMENT [ ] DISAGREEMENT* [ ] ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Although 2010 Version will Follow
With updated Checklist soon needed
Once In 2007 Version new to
Promote Clarity

Signature

MICHAEL W. JANKO
Name (Please Print)
02/27/2009
Date

PLEASE RETURN the ballot on or before Thursday, March

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056

E-mail: svanzandt@nfpa.org

Standards Council Agenda - August 4-6, 2009 Page 1514 of 2106
Van Zandt, Stacey

From: Dean R. Larson [drlarson@jorsm.com]
Sent: Monday, March 23, 2009 3:24 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Stacey,
The intent of providing a self-assessment/assessment tool will be adequately addressed in the Annex material of NFPA 1600 2010 Edition. The other reason that I have changed my vote is that I do not see this TIA as truly "emergency" in nature to correct a previous error. I initially made the recommendation to officially bring forth the checklist concept for official discussion. That was accomplished and approved last week during the ROC meeting in St. Louis.
Please let me know if you would like me to elaborate further.
Thank you
Dean

-----Original Message-----
From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Saturday, March 21, 2009 8:33 AM
To: drlarson@jorsm.com
Cc: Trebisacci, Dave
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Dean: I will need a reason for your negative vote. Thank you.

-----Original Message-----
From: Dean R. Larson [mailto:drlarson@jorsm.com]
Sent: Fri 3/20/2009 9:13 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Please change my ballot to "Negative."

Dean Larson

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Friday, March 20, 2009 2:07 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

To Technical Committee on Emergency Management and Business Continuity:
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT NO. 948
To Add a new CA, Checklist for Compliance with the 2007 and Proposed 2010 Editions of
NFPA 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new CA,
Checklist for Compliance with NFPA 1600, please record me as voting:

     AFFIRMATIVE     X     NEGATIVE*     ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Assessing Compliance of an organization is not an
appraisal or measurement of "Either Compliant or Not
Compliant" or Yes or No. This is the wrong message to
speak. We recommend including a forth column = Partially
Compliant. Therefore, showing Room for Improvement. See Attached.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

     X     AGREEMENT     DISAGREEMENT*     ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

_________________________________________________________________

Signature
Ashley B. Moore
Name (Please Print)
March 6, 2009
Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van-Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7656
E-mail: svanzandt@nfpa.org

TC TIA Ballot Sheet - February 6, 2009
Standards Council Agenda - August 4-6, 2009

Standard on Disaster/Emergency Management and Business Continuity Programs
TIA Log No.: 948
References Annex C
Comment Closing Date: April 17, 2009
Submitter: Charles P. Adams, Medina County Emergency Management Agency and Dean R. Larson, Purdue University Calumet

1. Add a new C.4, Checklist for Compliance with NFPA 1600:

<table>
<thead>
<tr>
<th>NEPA 1600 Program Elements</th>
<th>Yes- compliant</th>
<th>Partially Compliant</th>
<th>No - not compliant</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Program Administration</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The entity has a documented program that includes the following:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(1) Executive policy including vision, mission statement, roles and responsibilities, and enabling authority</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(2) Program goals, objectives, and method of program evaluation</td>
<td></td>
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<tr>
<td>(3) Program plan and procedures</td>
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<tr>
<td>(4) Applicable authorities, legislation, regulations, and/or industry codes of practice</td>
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<tr>
<td>(5) Program budget and project schedule</td>
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<tr>
<td>(6) Records management practices</td>
<td></td>
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<tr>
<td>4.2 Program Coordinator. The program coordinator has been appointed by the entity and authorized to administer and keep current the program.</td>
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<tr>
<td>4.3 Advisory Committees</td>
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</tr>
<tr>
<td>4.3.1 An advisory committee is established by the entity in accordance with its policy.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3.2 The advisory committee provides input to or assist in the coordination of the preparation, implementation, evaluation, and revision of the program.</td>
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</tr>
<tr>
<td>4.3.3 The committee includes the program coordinator and others who have the appropriate expertise and knowledge of the entity and the capability to identify resources from all key functional areas within the entity and shall solicit applicable external representation.</td>
<td></td>
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</table>
TECHNICAL COMMITTEE LETTER BALLOT  
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948  
To Add a new C.4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of  
NFPA 1600,  
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C.4,  
Checklist for Compliance with NFPA 1600, please record me as voting:

________________________ AFFIRMATIVE  ____________ NEGATIVE* ______________ ABSTAIN*  

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

The checklist is incomplete, has not been vetted  
by BCP professionals to my knowledge, and may  
not be consistent with other NFPA BCP initiatives

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please  
record me as voting:

________________________ AGREEMENT  ____________ DISAGREEMENT* ______________ ABSTAIN*  

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Until the proposed checklist is complete, vetted  
and vetted it should not be included in  
the current standard

Signature: [Signature]  
Name (Please Print): [Name]  
Date: [Date]

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:  
Stacey Van Zandt, Project Administrator Supervisor  
NFPA  
1 Batterymarch Park  
Quincy, MA 02169  
FAX: (617) 984-7056  
E-mail: svanzandt@nfpa.org

TO TIA Ballot Sheet - February 6, 2009
Technical Committee Letter Ballot
Proposed Tentative Interim Amendment Log No. 948
To Add a new C.4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of NFPA 1600,

Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C.4, Checklist for Compliance with NFPA 1600, please record me as voting:

X AFFIRMATIVE _______NEGATIVE* _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

AGREEMENT X DISAGREEMENT* ______ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

THIS IS NOT AN EMERGENCY. IT CAN BE HANDLED IN THE 2010 EDITION

______________________________
Signature
MELVYN MUSON

Name (Please Print)

3/26/09
Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA. 02169

FAX: (617) 984-7056 E-mail: svanzandt@nfpa.org

TC TIA Ballot Sheet - February 6, 2009
Van Zandt, Stacey

From: Lee Newsome [LNewsome@ERECinc.com]
Sent: Monday, March 30, 2009 11:08 AM
To: Van Zandt, Stacey
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Stacey,

In the recirculation of NFPA 1600, 2007 and proposed 2010 Editions proposed TIA No. 948 Circulation of Ballots I would like to rescind my AGREEMENT with comment vote to a DISAGREEMENT vote for both Technical Merit and Emergency Nature.

After committee review and discussion of the TIA to add a new Annex C C.4. Checklist for Compliance with NFPA 1600 during the Technical Committee on Emergency Management and Business Continuity meeting in St. Louis, I am compelled to rescind my original agreement vote and issue a disagreement vote.

Question 1: Technical Merits – DISAGREEMENT as the TAC took actions on the proposal’s public comment in preparation of NFPA 1600 ROC draft. The actions taken by the TAC have revised my views on technical merits and feel the committee actions will better serve the end user.

Question 2. Emergency Nature - DISAGREEMENT as the normal standards making process of the 2010 revisions cycle of NFPA 1600 will be completed equal to or before the Tentative Interim Amendment (TIA) can be finalized by the Standards Council. With a full understanding of the TIA process this request does not meet the definition of emergency nature.

Ashley E. "Lee" Newsome

Lee Newsome, CEM, MEP, CHS-V
EREC, Inc. CEO
233 NE 58th Avenue
Ocala, Florida 34470
(352) 236-5548 Office
(352) 572-2656 Cell
(352) 236-5428 Fax
162*27*14900
lee.newsome@att.net
www.errecinc.com

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Friday, March 20, 2009 3:07 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Deve; Walker, Nancy
Subject: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

To Technical Committee on Emergency Management and Business Continuity:

Please find attached balloting circulation package on proposed TIA No.948 to NFPA 1600. This information has also been posted on your ECommittee Page under the “Ballot Information Heading” and within the “TIA Ballots” folder.
If you wish to submit your ballot or change your vote, please do so no later than Friday, March 27. Ballots or changes may be submitted to me either via email at svanzandt@nfpa.org, fax to 617-984-7056, or mail to my attention at NFPA, 1 Batterymarch Park, Quincy, MA 02169. If you do not wish to change your vote, no response is necessary.

If you have any questions, please don’t hesitate to contact me.

Thank you.

Project Administrative Supervisor
Public Fire Protection
Telephone – 617-984-7481
Fax – 617-984-7056
Email – svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new C.4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of
NFPA 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C.4,
Checklist for Compliance with NFPA 1600, please record me as voting:

X  AFFIRMATIVE  _______  NEGATIVE*  _______  ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

THE TECHNICAL MERITS ARE STRONG. HOWEVER
I BELIEVE THAT WE SIGNIFICANTLY IMPROVED
THE FORMAT IN THE RECENT T.C.O.P. MEETING.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

_______  AGREEMENT  X  DISAGREEMENT*  _______  ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

FOR THE CONSENSUS OF THE T.C MEMBERS
AT THE LAST T.C.O.P. MEETING, IT IS MOST
APPROPRIATE IF WE REFLECT THIS LIST IN
THE 2010 REVISION.

W. RAISCH
Signature
WILLIAM G. RAISCH
Name (Please Print)
3/21/09
Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org

TC TIA Ballot Sheet - February 9, 2009
Van Zandt, Stacey

From: Don Schmidt [DLS@PreparednessLLC.com]
Sent: Friday, March 27, 2009 12:23 PM
To: Van Zandt, Stacey
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Yes, that is correct. No on both items.

Regards,
Don

---

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Friday, March 27, 2009 10:36 AM
To: Don Schmidt
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

Don: As point of clarification you are voting no on both questions? Correct?

---

From: Don Schmidt [mailto:DLS@PreparednessLLC.com]
Sent: Thursday, March 26, 2009 3:31 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave
Subject: RE: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION
Importance: High

Stacey,

After further consideration during the TC meeting last week in St. Louis, I have decided to vote “NO” on the recirculation of TIA 948 to NFPA 1600 - 2007 edition.

Please advise if you need anything further from me to substantiate my voting in the negative.

Regards,
Don

---

From: Van Zandt, Stacey [mailto:svanzandt@NFPA.org]
Sent: Friday, March 20, 2009 3:07 PM
To: Van Zandt, Stacey
Cc: Trebisacci, Dave; Walker, Nancy
Subject: NFPA 1600 TIA LOG 948 BALLOT RECIRCULATION

To Technical Committee on Emergency Management and Business Continuity:

Please find attached ballotng circulation package on proposed TIA No.948 to NFPA 1600. This information has also been posted on your ECommittee Page under the “Ballot Information Heading” and within the “TIA Ballots” folder.

If you wish to submit your ballot or change your vote, please do so no later than Friday, March 27. Ballots or changes may be submitted to me either via email at ssvanzandt@nfpa.org, fax to 617-984-7056, or mail to my attention at NFPA, 1 Batterymarch Park, Quincy, MA 02169. If you do not wish to change your vote, no response is necessary.

If you have any questions, please don‘t hesitate to contact me.

Thank you.

Standards Council Agenda - August 4-6, 2009 Page 1523 of 2106
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 948
To Add a new C4, Checklist for Compliance with the 2007 and Proposed 2010 Editions of NFPA 1600,
Standard on Emergency Management and Business Continuity Programs

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new C4, Checklist for Compliance with NFPA 1600, please record me as voting:

× AFFIRMATIVE  NEGATIVE*  ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

AGREEMENT  × DISAGREEMENT*  ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

While I support the checklist to aid in quantifying compliance with the standard, I do not believe its inclusion is of an "emergency nature." The desire of one organization to have it included constitutes "capturing" of the TC by that organization and sets a bad precedent for future actions.

Signature

Marilyn Tierney

Name (Please Print)

3/23/09

Date

Please return the ballot on or before Thursday, March 12, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrator Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org

TC TIA Ballot Sheet - February 6, 2009
MEMORANDUM

TO: Technical Committee on Emergency Management and Business Continuity

FROM: Stacey Van Zandt, Project Administrative Supervisor

DATE: March 20, 2009

SUBJ: NFPA 1600, 2007 and proposed 2010 Editions proposed TIA No. 948 Circulation of Ballots

_____________________________________________________________________

The preliminary ballot results on proposed TIA No. 948 are as follows:

Technical Merit
33 Eligible to Vote
6 Not Returned (Halstead, Kuepper, Musson, Raisch, Stronach, Tierney)
23 Affirmative (Brewster, Janko, Newsome - Affirmative with comments)
4 Negative (Fletcher, Gazdik, A. Moore, Morganti)

Emergency Nature:
33 Eligible to Vote
6 Not Returned (Halstead, Kuepper, Musson, Raisch, Stronach, Tierney)
23 Agreement (Brewster, Janko, Newsome - Agreement with comments)
4 Disagreement (Fletcher, Gazdik, Hiscott, Morganti)

The number of affirmative votes necessary for Question 1 (Technical Merit) and Question 2 (Emergency Nature) to pass balloting is 21. Therefore, the preliminary results show that this TIA IS achieving the necessary ¾ majority needed to pass ballot.
(33 eligible to vote - 6 not returned - 0 abstentions × 0.75 = 20.25)

Explanation of votes received from principal members are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received. If you wish to submit your ballot or change your vote, please do so no later than Friday, March 27, 2009. Ballots or changes may be submitted to Stacey Van Zandt via email to svanzandt@nfpa.org or fax to 617-984-7056. If you do not wish to change your vote, no response is necessary.

Attachments
MEMORANDUM

To: Technical Committee on Emergency Management and Business Continuity

From: Stacey Van Zandt

Date: February 18, 2009

Subject: NFPA 1600 Proposed Tentative Interim Amendment (TIA) No.948

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by TC Members Charles Adams and Dean Larson.

This proposed TIA is being published for public comment in the March 6th issue of NFPA News with a Public Comment Closing Date of April 17, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 4-6, 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. **Ballots are due on March 12, 2009.**

Note: **Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.**

Attachments

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TC Cover memo - February 12, 2009

Standards Council Agenda - August 4-6, 2009  Page 1526 of 2106
Item 09-8-31
NFPA 1901-2009
Standard for Automotive Fire Apparatus
TIA Log No.: 954
Reference: 19.6.4.6 (New)
Comment Closing Date: June 12, 2009
Submitter: Kenneth Koch, Sutphen Corporation

1. Add a new section 19.6.4.6 to read as follows:

19.6.4.6 For ladders that have a waterway design that allows the monitor to be connected to different ladder sections, a secondary means, not requiring operator intervention, shall be provided to prevent the monitor from being ejected from the ladder.

Submitter’s Substantiation for Technical and Emergency Nature: In May 2008 NIOSH published a safety advisory regarding the improper set-up of an aerial ladder with a locking pin-anchored waterway resulting in a fire fighter fatality. In the advisory NIOSH recommended aerial ladder manufacturers retrofit existing aerial ladder trucks with secondary stops or other engineering controls to prevent a waterway launch in the event the waterway is improperly anchored. NIOSH also recommended that standards setting organizations should establish standards that include engineering safeguards to prevent inadvertent waterway separation.

The Fire Department Apparatus Technical Committee Task Group met to address the issue of locking pin-anchored waterways and monitors and decided a TIA was appropriate to add to NFPA 1901, 2009 edition. After the NIOSH safety advisory was published, the committee discovered multiple reports of similar circumstances not involving injury. A task group developed text in June of 2008 and was later approved by the full committee at their meeting in January 2009.
According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21 \[27 \text{ (eligible to vote)} - 0 \text{ (abstentions)} = 27 \times 0.75 = 20.25\]

**27 Eligible to Vote**

**Technical Merit**

- 27 Affirmative
- 0 Negative
- 0 Abstentions

PASS

**Emergency Nature**

- 27 Affirmative
- 0 Disagreement
- 0 Abstentions

PASS
MEMORANDUM

TO: Technical Committee on Fire Department Apparatus
FROM: Stacey Van Zandt, Project Administrative Supervisor
SUBJ: NFPA 1901 proposed TIA No. 954 FINAL BALLOT RESULTS
DATE: May 21, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes need to obtain a recommendation to issue the TIA is 21. (27 eligible to vote - 0 not returned - 0 abstentions × 0.75 = 20.25)

Technical Merit:
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Affirmative
0 Negative

Emergency Nature:
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Agreement
0 Disagreement
MEMORANDUM

To: Technical Committee on Fire Department Apparatus
From: Stacey Van Zandt, Project Administrative Supervisor
Date: May 4, 2009
Subject: NFPA 1901 Proposed Tentative Interim Amendment (TIA) No. 954

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by Kenneth Koch and endorsed by Robert Barraclough.

This proposed TIA is being published for public comment in the May 1, 2009 issue of NFPA News with a Public Comment Closing Date of June 12, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 4-6, 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. Ballots are due on May 20, 2009.

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.

Attachments
Item 09-8-32
1. Add a new subsection to read as follows:

**19.24.2.5.1** For aerial devices that have computer controlled, or electronically controlled, limitations to the range of aerial movement, a test as defined by the manufacturer, shall be performed to validate the proper operation of the control system.

**Submitters Substantiation:** In the 2009 NFPA 1901 standard, a significant change was made to the sections of the standard that establishes the rated capacity for aerial ladders and platforms.

The new standard allows for essentially two types of rating systems, the first being a relatively simple method of rating the ladder in the worst case position. This requires the ladder to be fully extended, in a horizontal position and sustain a minimum rated capacity of 250 pounds for aerial ladders and 750 pounds for elevating platforms. In this position structural safety factors and vehicle stability factors are established. Since 1991, this has been the rating systems for aerials in the United States.

The second aerial rating method is called an envelope control system. These systems utilize electronic control technologies to determine the safe working capacity and range of motion of the aerial device. These systems are widely used in many parts of the world and are derived largely from the German DIN standards and are also reflected in the current EN 14043 standards for aerial ladders.

In response to committee requests, aerial task group meetings were held to better understand the differences in two rating systems. As a result of these meetings and in committee discussions with Fire Apparatus Manufacturer’s Association members this TIA was developed.

**Justification:**

Due to the design of the envelope control systems, the range of operation of the aerial device is determined by the electronic control systems and these need to be verified by the manufacturer. The 1901 technical committee feels that the addition of the tests in the new vehicle standard (NFPA 1901) and the testing standard (NFPA 1911) is an important validation of the envelope control systems.
According to 5.4 in the NFPA (RGCP), the final results show this TIA achieving the necessary \( \frac{3}{4} \) majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is \( 21 \) \( [27 \text{ (eligible to vote)} - 0 \text{ (abstentions)} = 27 \times 0.75 = 20.25] \)

27 Eligible to Vote
0 Not Returned

TC FINAL Ballot results for Technical Merit are as follows:
27 Affirmative (Lackore, Mettler w/comments)
0 Negative
0 Abstentions
PASS

TC FINAL Ballot results for Emergency Nature are as follows:
27 Affirmative
0 Disagreement
0 Abstentions
PASS
TO: Technical Committee on Fire Department Apparatus
FROM: Stacey Van Zandt
DATE: July 17, 2009
SUBJ: NFPA 1901 proposed TIA No. 958 Circulation of Ballots

The preliminary ballot results on proposed TIA No. 958 are as follows:

**Technical Merit**
- 27 Eligible to Vote
- 0 Not Returned
- 0 Abstentions
- 27 Affirmative (Affirmative with comment – Lackore and Mettler)
- 0 Negative

**Emergency Nature:**
- 27 Eligible to Vote
- 0 Not Returned
- 0 Abstentions
- 0 Agreement
- 0 Disagreement

The number of affirmative votes necessary for Question 1 (Technical Merit) and Question 2 (Emergency Nature) to pass balloting is based on the number eligible to vote, minus the not returned and abstentions. Therefore, based on the responses received to date the preliminary results show that this TIA is achieving the necessary ¾ majority needed to pass ballot. (27 eligible to vote - 0 not returned - 0 abstentions × 0.75 = 20.25). The number is then rounded up to 21 needed to pass ballot.

Explanation of affirmative with comments votes received from principal members are attached for your review along with the public comment that was received. Ballots received from alternate members are not included, unless the ballot from the principal member was not received. If you wish to change your vote, please do so no later than **Wednesday, July 22, 2009**. Ballots or changes may be submitted to Stacey Van Zandt via email to svanzandt@nfpa.org or fax to 617-984-7056. If you do not wish to change your vote, no response is necessary.

Attachments
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 958
To add a new subsection 19.24.2.5.1
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new subsection
19.24.2.5.1 please record me as voting:

X AFFIRMATIVE* __________ NEGATIVE* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

AFFIRMATIVE VOTE IS BASED ON FIXING THE PARAGRAPH NUMBER.
SUGGEST USING 19.24.2.10, THE PROPOSED NUMBER MAKES
THE NEW SECTION PART OF THE 1.5 TIMES FATSIM TEST AND IMPLIES
THAT THE CONTROLS ONLY NEED TO BE CHECKED IN THE POSITION OF LEAST
STABILITY.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please
record me as voting:

X AGREEMENT __________ DISAGREEMENT* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

_____________________________________________________________________
_____________________________________________________________________

Signature

Name (Please Print) D. James Royce Lackors

Date JUNE 9, 2009

Please return the ballot on or before Tuesday, June 16, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056 E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 958
To add a new subsection 19.24.2.5.1
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to add a new subsection 19.24.2.5.1 please record me as voting:

X AFFIRMATIVE __________ NEGATIVE* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

See attached comment regarding placement location of this new subsection in chapter 19 of NFPA 1901.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

X AGREEMENT __________ DISAGREEMENT* __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

__________________________
Signature
Tom Mettler

__________________________
Name (Please Print) June 9, 2009

Date

Please return the ballot on or before Tuesday, June 16, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org

Standards Council Agenda - August 4-6, 2009  Page 1537 of 2106
June 9, 2009

Comment on TIA Log 958 - New Subsection 19.24.2.5.1 in Aerial Devices

Voting affirmative but wish to note that there may be confusion to readers with this new requirement inserted as subsection 19.24.2.5.1 under existing section 19.24.2.5. Existing section 19.24.2.5 addresses a stability test with a load of 1-1/2 times the rated capacity. By placing the new requirement as a subsection to this 1-1/2 times rated capacity test, a reader may assume that the test in the new subsection is also performed with a 1-1/2 times load. I believe the intent of the new requirement is for a separate test, as defined by the manufacturer, which perhaps may include loads other than 1-1/2 times the rated capacity in order to validate proper operation under various operating conditions.

If the intent of the new requirement is for a separate test, I suggest that it be inserted as a new section 19.24.2.5.10 at the end of the major section 19.24.2 Stability Test.

Tom Mettler
Waterous Company
MEMORANDUM

To: Technical Committee on Fire Department Apparatus

From: Stacey Van Zandt

Date: May 26, 2009

Subject: NFPA 1901 Proposed Tentative Interim Amendment (TIA) No.958

____________________________________________________________________

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by Robert J. Barraclough and endorsed by David White.

This proposed TIA is being published for public comment in the June 5, 2009 issue of NFPA News with a Public Comment Closing Date of July 17, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. Ballots are due on Tuesday, June 16, 2009.

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.

Attachments
Carl E. Peterson  
4 Stanford Drive  
Hingham, MA 02043  
781-740-1670  
cepeterson@verizon.net

Secretary  
NFPA Standards Council  
1 Batterymarch Park  
Quincy, MA 02169-7471

Subject: Comment on TIA Log No. 958 to NFPA 1901

Gentlemen:

This proposed TIA is not needed to accomplish what the submitter is trying to achieve if wording is added to NFPA 1911 covering the testing for aerial devices designed with computer controlled or electronically controlled limitations to the range of aerial movement.

Paragraph 19.24.1 of NFPA 1901 states: “The aerial device shall be inspected and tested in accordance with the requirements of Chapter 19, Performance Testing of Aerial Devices, of NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, including all NDT, prior to being subjected to the tests defined in 19.24.2 through 19.24.4.” NFPA 1901 applies to new fire apparatus and 19.24.1 ensures that new aerial devices are tested to the same procedures required for in-service aerial devices without repeating all the testing procedures in NFPA 1901.

NFPA 1901 further states:

“4.20.1 Fire Apparatus Documentation. The contractor shall deliver with the fire apparatus at least one copy of the following documents:

(16) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus.”

Proposed TIA Log No. 959 to NFPA 1911 recommends adding wording to that document on the same subject as this proposed TIA. That is the appropriate document to define a test procedure as it then applies to both new aerial devices and aerial devices already in service. Putting the requirements in NFPA 1911 and just using Paragraph 19.24.1 in NFPA 1901 to require the testing of new aerial devices ensures that the test procedure will remain consistent. NFPA 1901 and NFPA 1911 are on different revision cycles and that can lead to inconsistent requirements for testing between documents if the wording is in both documents.

The wording of this proposed TIA lets the manufacturer define the test, which does not insure a rigorous or complete test. A test procedure with pass/fail criteria should be specified in the standards and those procedures not left to the manufacturer to define.

I recommend the Standards Council not issue this TIA.

Sincerely,

Carl E. Peterson
Item 09-8-33
1. Revise 4.11.1 to read as follows:

4.11.1 Where apparatus shall be equipped with an on-board vehicle data recorder (VDR), it shall meet the requirements of 4.11.2 through 4.11.8.

1. Revise 14.1.3.10 through 14.1.3.10.5 to read as follows:

14.1.3.10 Where a seat belt warning system shall be provided, it shall consist of an audible warning device that can be heard at all seating positions designed to be occupied while the vehicle is in motion and a visual display visible to the driver or the officer showing the condition of each seating position.

14.1.3.10.2 The warning shall be activated anytime the parking brake is released or the automatic transmission is not in park.

14.1.3.10.3 The seat position display shall indicate conditions in accordance with Table 14.1.3.10.3.

Table 14.1.3.10.3 Display for Seating System

<table>
<thead>
<tr>
<th>Display Indication</th>
<th>Seat Belt</th>
<th>Seat Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affirmative indication</td>
<td>Buckled</td>
<td>Senses occupant</td>
</tr>
<tr>
<td>Negative indication</td>
<td>Buckled</td>
<td>No occupant</td>
</tr>
<tr>
<td>Negative indication</td>
<td>Unbuckled</td>
<td>Senses occupant</td>
</tr>
<tr>
<td>Dark Unbuckled</td>
<td>buckled</td>
<td>No occupant</td>
</tr>
</tbody>
</table>

14.1.3.10.4 The display indication shall be permitted to consist of lights, text, graphical indicators, digital displays, or other methods.

14.1.3.10.5 The warning system shall not show an affirmative indication unless it has determined that the seat was occupied before the seat belt was buckled.

Emergency Nature of Request: The Class 4 and Class 5 commercial chassis are very popular for light duty rescues and special service vehicles because of their physical size and cost of acquisition. In some cases, the commercial chassis mentioned above are the only ones available in a given GVW rating. Lack of access to these chassis for NFPA 1901, 2009 edition compliant apparatus would invoke a real hardship on many fire and rescue departments across the U.S. Ford, GMC, Chevrolet, Dodge, and perhaps other chassis manufacturers do not allow any access to their electrical systems for addition of such a device without voiding the OEM chassis warranty.

In that the NFPA 1901, 2009 edition, Standard for Automotive Fire Apparatus, has just been implemented and the next version is not expected to be implemented for five (5) years, this would mean that most Class 4 and Class 5 commercial chassis would be unavailable for use as special service and rescue vehicles because of non-compliance with NFPA 1901, as currently written.

On another note, some of these chassis are also popular for use as wildland fire fighting vehicles, which I believe come under the jurisdiction of NFPA 1906. That committee may wish to revisit the requirement for VDR and Seat Belt Indicator as well if it is indeed to be included in the next revision.
Agenda Item: TIA 1901-2009
Document: NFPA 1901, Standard for Automotive Fire Apparatus
Reference: 4.11.1, 14.1.3.10 through 14.1.3.15 (TIA Log 967)

Comment Closing: 7/17/2009
0 Public Comments Received

TIA FINAL TC BALLOT RESULTS

According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS NOT achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21 [27 (eligible to vote) – 0 (abstentions) = 27 × 0.75 = 20.25]

27 Eligible to Vote
0 Not Returned

TC FINAL Ballot results for Technical Merit are as follows:
12 Affirmative
15 Negative (Barraclough, Dorio, Frazeur, Hillenbrand, Juneau, Lackore, McCombs, McCullough, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutteow, Wilde)
0 Abstentions
FAIL

TC FINAL Ballot results for Emergency Nature are as follows:
14 Affirmative
13 Disagreement (Dorio, Frazeur, Hillenbrand, Juneau, Lackore, McCombs, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutteow, Wilde)
0 Abstentions
FAIL
MEMORANDUM

TO: Technical Committee on Fire Department Apparatus

FROM: Stacey Van Zandt

SUBJ: NFPA 1901 proposed TIA No. 967 FINAL BALLOT RESULTS

DATE: July 7, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA HAS NOT achieved the ¾ majority vote needed on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21. (27 eligible to vote - 0 not returned - 0 abstentions = 27 × 0.75 = 20.25)

Technical Merit
27 Eligible to Vote
0 Not Returned
0 Abstentions
12 Affirmative
15 Negative (Frazeur, Barraclough, Dorio, Hillenbrand, Juneau, Lackore, McCombs, McCullough, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutterow, and Wilde)

Emergency Nature:
27 Eligible to Vote
0 Not Returned
0 Abstentions
14 Agreement
13 Disagreement (Frazeur, Dorio, Hillenbrand, Juneau, Lackore, McCombs, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutterow, and Wilde)

Copies of principal members’ final ballots are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received.

Attachments
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_________ AFFIRMATIVE  _______ NEGATIVE*  ________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

Agree with change to 4.11.1. Paragraph 14.1.3.10, 10.1, 10.2 should be retained as written in current (1901), 14.1.3.10.3, 4 and 5 should be eliminated to allow the use of standard OEM seat belt warning systems at least in the front seats.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_________ AGREEMENT  _______ DISAGREEMENT*  ________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

______________________________

Name (Please Print)

Date 6/24/09

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

   ______ AFFIRMATIVE  X   NEGATIVE*  ______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

The technical committee debated this issue. The committee understood that there could be an issue with some manufacturers not allowing access to their on board computer. However, the committee did not want to weaken this important safety feature to accommodate those manufacturers. The TIA proponent has not presented any new information.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

   ______ AGREEMENT  X   DISAGREEMENT*  ______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Not seeing the merit in the TIA necessitates disagreement with the emergency nature of it.

Signature  Ralph Dario
Name (Please Print)  6/18/09
Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
TIA Log No. 967

Question 1: Negative

The 1901 Committee's intent when it adopted the VDR was that it apply to all apparatus. Making the requirement an elective undermines the Committee's intent. The issue should be discussed in full committee to determine if any apparatus should be required to have a VDR, given that some manufacturer's refuse to grant access to their electrical system.

Question 2: Negative

The 1906 document covers most apparatus that have a problem with commercial chassis. There are manufacturer's whose product comply with chassis commonly used for 1901 apparatus. Therefore, the issue can wait and be fully discussed in the 1906 process.

Don Frazeur
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10
through 14.1.3.15, please record me as voting:

- AFFIRMATIVE
- NEGATIVE* 
- ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

The VDR and seat belt indicator is a key safety enhancement and is or can be made readily available by chassis mfgs.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

- AGREEMENT
- DISAGREEMENT* 
- ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

Deleting these devices does not improve safety.
In fact it diminishes fire apparatus safety.

Signature
Tom Hilderbrand

Name (Please Print)
Tom Hilderbrand

Date
June 25, 2009

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056
E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

____________ AFFIRMATIVE  __________ NEGATIVE*  __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

See attached explanation.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

____________ AGREEMENT  __________ DISAGREEMENT*  __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

See attached explanation.

Signature
JAMES J. JUNEAU
Name (Please Print)  15 JUNE 2009  Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
EXPLANATION FOR NEGATIVE VOTE:

I believe that the EDR and seat-belt annunciator requirements are important safety improvements in the 2009 Standard, which should remain in the main body of the standard as a requirement – not as an option. The technology problem that gives rise to this proposed TIA only affects some of the required data, and only that on a few commercial chassis apparatus (e.g. Ford F-550, GMC 5500). I am informed that most of the compliance problems either have been resolved, or will be resolved in the very near future for those affected units. While I do have a real problem with having the current standard require something that is not currently technologically achievable on at least a few of the apparatus types affected by the standard, this problem is one of limited duration, on a limited number of vehicles, and does not justify erasing the safety benefit provided for the vast majority of affected apparatus. The Committee should discuss this issue at length during the July meeting, in hopes of finding an agreeable short-term solution, until the specific problems can be overcome by more advanced technology. For these reasons, I believe that this proposed TIA is much broader than it needs to be, and is also premature.

James J. Juneau
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

X NEUTRAL*   AFFIRMATIVE*   ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

THE COMMITTEE UNDERSTOOD WHEN VOTING ORIGINALLY THAT NOT ALL COMMERCIAL CHASSIS WOULD BE CAPABLE OF MEETING THE SAFETY STANDARDS. WHY DENY SAFETY TO ALL FOR THE CONVENIENCE OF A FEW?

FIRE DEPARTMENTS CAN STILL OBTAIN THE NON-COMPLIANT PRODUCTS WITH THE UNDERSTANDING THAT THEY MUST TOLERATE CERTAIN ASPECTS OF THE PRODUCT THAT DO NOT COMPLY.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

X DISAGREEMENT*   AGREEMENT*   ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

REMOVING THE VDR AND SEAT REST INDICATOR FROM THE 2009 STANDARD DOES NOT MAKE A NON-COMPLIANT APPARATUS MORE SAFE. AN APPARATUS THAT IS non-compliant to the 2009 standard is NOT LESS SAFE THAN IT WAS IN 2008. THIS PROPOSED TIA WOULD HAVE A NEGATIVE IMPACT ON FIREFIGHTER SAFETY.

Signature
JAMES ROGER LACKORE JR.
Name (Please Print)
June 17, 2009
Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_______ AFFIRMATIVE  X  NEGATIVE*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

THE CURRENT WORLING OF THE TIA WAS VOTED ON NUMEROUS OCCASIONS OVER THE PAST TWO YEARS. THE COMMITTEE WAS AWARE OF THE CHASSIS SITUATION AND FELT SAFETY WAS A CONCERN CONSIDERATION.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_______ AGREEMENT  X  DISAGREEMENT*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

THE STANDARD IS NON-CHASSIS SPECIFIC, ALTIMATE CHASSIS AND AVAILABLE.

__________________________________________________________
Signature
William F. McComb

Name (Please Print)
E-One

Date
6-15-2009

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

___ AFFIRMATIVE  X ___ NEGATIVE*  ___ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

I oppose moving the requirement from the document as proposed. I would support moving it to the Annex and styling it to language making VDRs and seatbelt warning systems a recommended item.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

X ___ AGREEMENT  ___ DISAGREEMENT*  ___ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.


Signature
Thomas H. McCullough

Name (Please Print)
6-25-09

Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_________ AFFIRMATIVE   X  NEGATIVE*   _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

[Signature]
Name (Please Print)   John McDonald
Date   6-19-09

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7056
E-mail: svanzandt@nfpa.org
John McDonald, Negative Vote narrative on TIA 967

I voted negative on Questions 1 & 2 because the proposed text would effectively eliminate VDRs as a minimum requirement. This issue was discussed in committee and it was decided that VDRs should be required. If there is a specific data collection element that is not obtainable, that data element could be eliminated for vehicles under 26,000 GVWR, as we already do with some of our other requirements.

We should also consider just specifying the VDR output data and let the industry figure out the best way to obtain the input data. As we have all seen in several of the recent emails, there are vendors working on data acquisition methods that will gather the necessary information.

VDRs are not a new technology; they have been around for years and are being used in the transit industry and ambulances on class 4 & 5 chassis without voiding the OEM warranties.

[Handwritten signature]
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_____ AFFIRMATIVE  _____ NEGATIVE*  _____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

SINCE LACK OF SEAT BELT USAGE IS THE LEADING CAUSE OF F/E VEHICLE DEATHS, I BELIEVE PEOPLING VEHICLES ARE ESSENTIAL TO LOWERING F/E DEATHS DURING ACCIDENTS. COMMERCIAL CHASSIS MANUFACTURERS NEED TO UTILIZE THE TECHNOLOGY THAT IS AVAILABLE.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_____ AGREEMENT  _____ DISAGREEMENT*  _____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

I DO NOT BELIEVE THIS TO BE AN EMERGENCY FOR THE SAME REASONS AS CITED ABOVE.

__________________________
Signature

__________
Name (Please Print)

6-18-09
Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169   FAX: (617) 984-7056   E-mail: ssvanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

________ AFFIRMATIVE  
X  NEGATIVE*  
________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

The Committee had discussed this very topic in depth. The Committee voted to mandate the Recorder. There is no new information that requires the TIA.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

________ AGREEMENT  
X  DISAGREEMENT*  
________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

please see above

___________________________
Signature

S. Jeff Piechura

Name (Please Print)

6/12/09

Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7056
E-mail: svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

________ AFFIRMATIVE  X   NEGATIVE*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

See attachment

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

________ AGREEMENT  X   DISAGREEMENT*  _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

______________________________
Gary R. Pope
Signature

______________________________
6/9/2009
Name (Please Print)
Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169   FAX: (617) 984-7056   E-mail: svanzandt@nfpa.org
Explanation of vote: (attachment)

I understand the problem and the issue. However, this change puts us back to “ground 0”. With this change it results with no requirement for a data recorder or seatbelt indicators, which means they will not be, installed even when it is plausible and feasible. We would be better off exempting Class 4 and 5 chassis. At least we would be able to get them in the larger vehicles. Every week I read of accidents resulting in injuries and death due to lack of use of seatbelts and improper driving attributes. We need to keep trying to fix this problem. Also, the way this proposal is worded, it is still a problem. In section 14.1.3.10 it says, “Where a seatbelt warning system is provided…” All vehicles including Class 4 and 5 vehicles have seat belt indicators and from what I understand it is a problem tying into the systems to meet the requirements of section 14.1.3.10.2.

The proposal does not appear to totally fix the problem; therefore I cannot support the proposed changes.

Gary Pope
Van Zandt, Stacey

From: Tom Stalnaker [Tom@Stalnaker.com]
Sent: Thursday, June 18, 2009 2:57 PM
To: Van Zandt, Stacey
Subject: Re: Reminder NFPA 1901 TIA LOG 967 BALLOT

Stacy
Please record my vote as follows:
On Technical Merit-Negative

The proposer of the TIA presents the problem as purely political issue. They present no documentation that there is an official statement from any manufacturer to back up their claim. It is my understanding, backed up by agreement from legal counsel, that such a statement would be unenforceable, if in fact any chassis manufacturer were to make such an official statement. The warranty could only be voided if the chassis manufacturer could demonstrate that the apparatus manufacturer's action caused the problem being warranted. Since listening on a data bus is exactly what a data bus is designed for, there should be no claim for such a causal issue.

There was extensive discussion about these two items at several meetings before they were included in the current standard. They were both added to enhance the safety of firefighters. There are now several third party vendors who are making vehicle data recorders that provide all the necessary recording capabilities. I have spoken with several of them about the problems with commercial chassis and they report that significant progress is being made with Ford, GM, and others. There are also third party vendors working with the chassis manufacturers to provide just an interface to make data available. I think it is too early to give up on these efforts, which is what this TIA will do.

It may be that we will need to eventually make some modification to the list of required data. If we need to modify the required data list in some way, making some items optional or recommended, I might be able to support such a change. Also, by still requiring the basic system with some changes to the specific data items, the cost differential between the full "recommended" system and a lesser "minimal" system would be lessened, reducing the financial incentive to skimp on this safety item.

There are a number of chassis and third party vendors that have put significant effort, and invested significant money, to produce products that are complaint with our requirements. There are others who have chosen to resist, obstruct, or ignore the requirements. If we respond to this by changing the rules at this point, we reward those who chose not to comply and punish those who invested in compliance. Such practices on our part will encourage lack of compliance in the future and lead to a further reduction of our credibility and influence on the marketplace in the future.

The equipment to satisfy this requirement was developed at significant cost. This development cost must be amortized over the units sold. If we change the rules now to make it optional, many fewer units will be sold, significantly raising the cost for each unit, further raising the cost and reducing the usage and the development of new and improved equipment.

The proposed TIA throws out an entire safety requirement (making it optional and thus much less used) while the problem could be addressed in other ways that are better from a safety and an economic standpoint.

On Emergency Nature-Negative

The problems are already being addressed in the marketplace to provide compliant equipment. While there are still some issues to be worked out, each week brings significant progress. The proposed change does not solve a safety issue, it removes a safety feature requirement. The data provided to the committee at this point is not complete and until we know the full details of both the political and the technical issues, we should not
make a change in the approved standard. Several of the VDR manufacturer's are planning to be in attendance at our meeting in July and will be prepared to provide more up to date and accurate information at that time.

Thomas A. Stalnaker

Van Zandt, Stacey wrote:
To Technical Committee on Fire Department Apparatus:

This is a reminder that this ballot is due June 25 and according to my records you still have not returned your ballot. Please do so ASAP.

Thank you.

**From:** Van Zandt, Stacey  
**Sent:** Monday, June 08, 2009 11:58 AM  
**To:** Van Zandt, Stacey  
**Cc:** Stewart, Larry; Walker, Nancy  
**Subject:** NFPA 1901 TIA LOG 967 BALLOT

To Technical Committee on Fire Department Apparatus:

Attached is the initial TC ballot package on proposed TIA No. 967 to NFPA 1901, 2009 Edition. Please complete and return your ballot to Stacey Van Zandt either via email at svanzandt@nfpa.org, fax to 617-984-7056, or mail to NFPA, 1 Batterymarch Park, Quincy, MA 02169.

Ballots are due back no later than **Thursday, June 25, 2009**.

This information has also been posted on your ECommittee Page under the “Ballot Information Heading” and within the “TIA Ballots” folder.

If you have any questions, please don’t hesitate to contact me.

Thank you.

---

**Project Administrative Supervisor**  
Public Fire Protection  
Telephone – 617-984-7481  
Fax – 617-984-7056  
Email – svanzandt@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 967
To revise 4.11.1, 14.1.3.10 through 14.1.3.15
2009 Edition of NFPA 1901,
Standard for Automotive Fire Apparatus

Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_____ AFFIRMATIVE   ✓ NEGATIVE*   _____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a negative or abstaining position.

see attached

---

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_____ AGREEMENT   ✓ DISAGREEMENT*   _____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation must accompany a disagreement or abstaining position.

see attached

---

Signature  Robert Titherow
Name (Please Print)  Robert Titherow
Date  18 - June - 2009

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO:
Stacey Van Zandt, Project Administrative Supervisor
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
PROPOSED TIA to Log No. 967


Robert Tutterow: EXPLANATION OF NEGATIVE VOTE on TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15:

Because a few commercial chassis manufacturers will not allow access to a small portion of their electronic data, this TIA will make both seat belt warning devices and Vehicle Data Recorders (VDR's) optional for ALL apparatus. However, the Emergency Nature of the Request of the proposed TIA, it is evident that the problem is with only a few of the commercial chassis manufacturers.

I vote negative on this TIA for many reasons:

(NOTE: Attachments are slides from a PowerPoint presentation by Rita Fahy, Research Analyst with NFPA's Fire Analysis and Research Division, at both the 2008 and 2009 NFPA Conference & Expos.)

1. Based on NFPA's data, there were 103 firefighter line-of-duty deaths in 2008. "Responding to and Returning from Alarms” accounted for 38% of these deaths. This was the largest category with the second highest category being “Fire Ground” at 28%. The fact that more firefighters are killed while traveling to and from an incident than at an incident is totally unacceptable. (see attachment A from the 2009 NFPA Annual Conference & Expo)

2. The seatbelt warning device and the Vehicle Data Recorder (VDR) provide a means to correct this problem better than any other requirement in any standard.

3. Around 20 years ago, NFPA Standards (especially NFPA 1901), proved it could make a positive impact on reducing firefighter line-of-duty deaths. In 1987, when the NFPA 1500 standard required that firefighters be seated and belted, the Apparatus Technical Committee immediately issued a TIA requiring seats and seatbelts for the maximum number of riders. In 1991, it required that all cabs be fully enclosed. (see attachment B from the 2008 NFPA Annual Conference & Expo)

4. The 1991 requirement for fully enclosed cabs, combined with the previous requirement for seatbelts, clearly reduced the line of duty deaths. Though there was a slight increase in the following years, firefighter line-of-duty deaths have consistently remained 15-20%
lower than pre-1991. (see attachment C from the 2008 NFPA Annual Conference & Expo)

5. The Apparatus Technical Committee showed that apparatus design requirements can have a direct, immediate, and positive impact on reducing firefighter line of duty deaths. The 1901 requirement for fully enclosed cabs made a marked impact on the firefighters dying from falling off the apparatus. It almost eliminated the cause completely. (see attachment D from the 2008 NFPA Annual Conference & Expo)

6. Some may oppose the seat belt warning devices and VDR’s by claiming it is a fire department management issue, or a personal accountability, or a training issue, or a combination of any of these attributes. While that may be true, the fact remains that NFPA has had a requirement in NFPA 1500 for over 22 years. There have been major initiatives by fire service organizations and safety advocates during this time to improve seatbelt usage. However, there is no indication of improved compliance. Failure to comply is common for all size departments, ranging from large metro departments to small rural volunteer departments.

7. Failure to use seat belts is a human behavior issue. Often, technology and design have impacted human behavior in a positive way. Seat belt warning systems and VDR’s will cause the appropriate change in behavior. These two systems will have a similar impact that fully enclosed cabs had on reducing the number of firefighters killed from falling off of apparatus.

8. There are unique dynamics in driving emergency vehicles during an emergency response that are not present during normal driving. This is illustrated in the higher number of fatalities during the “response” mode versus the “return” mode. These dynamics cannot be managed unless they are monitored, measured, and recorded. The seat belt warning system and VDR provide the means of addressing these dynamics. (see attachment E from the 2008 NFPA Annual Conference & Expo)

9. Over 2/3 of firefighters killed when “responding to or returning from incidents” are not buckled!! If the TIA is approved and issued, this will continue. It can correct by allowing the seatbelt warning system and the VDR to remain a requirement in NFPA 1901. (see attachment F from the 2008 NFPA Annual Conference & Expo)

10. There are arguments that the majority of the firefighters killed while responding/returning are killed while driving their personal vehicles in their role as volunteer firefighters. Actually, this only happens 37.6% of the time. (see attachment G from the 2008 NFPA Annual Conference & Expo)
11. The primary concern with the seat belt warning system and VDR is that some of the commercial apparatus manufacturers (such as Ford, Chevrolet, Dodge) refuse to allow apparatus manufacturers and component manufacturers to access a small portion of their needed electronic data. Unless I have been misinformed, there were several obstacles to overcome in developing VDR’s and seat belt warning systems. However, at least three manufacturers have overcome almost all of them. There remains considerable confusion as to exactly what is left to overcome—if much at all. It must be noted that other commercial manufacturers (such as International and Freightliner) have worked hard to successfully comply with requirement. The proposed TIA, in effect, makes seat belt warning devices and VDR’s optional for both commercial and custom manufacturers. This is unacceptable as it is “throwing the baby out with the bath water”.

12. The Apparatus Technical Committee has always been limited in standards development by the commercial chassis industry. As emergency services only provide a small percentage of the market for commercial chassis, it is believed that many of the mass producers will not make modifications to comply for emergency services standards. In the past five years, there has been considerable discussion (with consensus opinion) to no longer feel constrained by the limitations of the commercial chassis industry. If portions of the commercial chassis business will not make modifications to be compliant, then the product will be non-compliant.

13. If the seat belt warning device and VDR become optional equipment, only a very few departments will specify them. Though this is sad, it is the true. The committee must consider the following: What percentage of automobiles would be without seatbelts and airbags if they were always a buyer’s option? Now that they are standard, they are accepted and desired.

14. If it can be verified that a small portion of the commercial chassis data cannot be accessed, for the foreseeable future, then a TIA that addresses that particular issue is far more appropriate than this TIA.

15. Actually, this is NOT a requirement that cannot be met because of design or technology. This appears to be an issue of a few manufacturers in the supply chain refusing to share or modify existing technology so the manufacturer can make a compliant product. There does not appear to be an explanation as to why. I do not think this is a valid reason for a TIA.
16. The commercial chassis manufacturers have yet to advise the technical committee as to why they refuse to comply. The technical committee should seek a written notice explaining why they are unwilling to address the number one “type of duty” (as defined by NFPA) for firefighting line of duty deaths.

17. If approved and issued, this TIA sets a precedent for future TIA’s anytime a small group of manufacturers or supply chain manufacturers refuse to comply.

18. There is a variation of seat belt warning systems and black boxes (VDR’s) on almost all other licensed motor vehicles manufactured today. Seat belt warning systems have been required for decades. For the technical committee to seek an exemption for fire apparatus, with the history of firefighter failing to use seat belts, is beyond comprehension. If approved by the Technical Committee, I cannot believe the Standards Council would issue the TIA. This would be a public embarrassment!

EXPLANATION OF NEGATIVE VOTE on the EMERGENCY NATURE of this proposed TIA:

Being strongly opposed to this TIA, I see no emergency in its approval or issuance. If it can be determined that there is an item or two that cannot be accessed in commercial chassis, then a TIA that addresses that item(s) would be more appropriate.

Respectfully submitted,

Robert Tutterow
2008 Firefighter Deaths by Type of Duty

- Responding to or Returning from Alarms (38%)
- Fire Ground (28%)
- Other on-duty (17%)
- Non-fire Emergencies (11%)
- Training (7%)
Changes in NFPA standards

- 1987 – first edition of NFPA 1500 requires all firefighters to be seated and belted
- 1987 – TIA to NFPA 1901 requires seats and seatbelts for the maximum number of riders
- 1991 – NFPA 1901 revised to require total enclosure of driver and crew areas on apparatus
Since that time, there have been four fatal falls from apparatus while responding to or returning from alarms.
Type of Duty for Road Vehicle Crash Deaths
1998 - 2007

- Responding to alarms
- Returning from alarms
- Fire ground
- EMS
- Training
- Other
Findings from crash reports

- 67 percent of the victims were not wearing seatbelts or using restraints

Factors cited in crashes included:

- excessive speed for road conditions
- operator error, including failure to observe traffic signals and failure to stop at train tracks
- poor vehicle maintenance
<table>
<thead>
<tr>
<th>Vehicles involved in crash deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Firefighters' own vehicles (37.6%)</td>
</tr>
<tr>
<td>♦ Tankers/tenders (21.0%)</td>
</tr>
<tr>
<td>♦ Pumpers (21.0%)</td>
</tr>
<tr>
<td>♦ Ambulances/rescues (4.5%)</td>
</tr>
<tr>
<td>♦ Ladders (2.3%)</td>
</tr>
<tr>
<td>♦ Other public safety vehicles (13.5%)</td>
</tr>
</tbody>
</table>
Question 1: With respect to the TECHNICAL MERITS of the Proposed TIA to revise 4.11.1, 14.1.3.10 through 14.1.3.15, please record me as voting:

_________ AFFIRMATIVE _______ X _______ NEGATIVE* _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:
*An explanation must accompany a negative or abstaining position.

I have voted negatively, because the technical merits of this TIA would effectively eliminate the requirement of either system should a manufacturer choose not to do them. After reading the proposed TIA I can not help but wonder if these changes would allow the total elimination of the VDR and seat belt indicators from all apparatus. The way I read the new text, all the chassis manufacturer, custom or commercial, would have to do to eliminate these two requirements would be to simply not offer them as standard features. If they make them an option then your apparatus would not normally come equipped with them, so they would not be required. If we were to make this change, wouldn’t it be the same as removing the requirement entirely? The main points of the TIA were already discussed and voted on during the ROP and ROC meetings. The vote was to require VDR systems and seat belt indicator systems, I do not see that anything has changed since the vote.

Question 2: With respect to the judgment that the subject is of an EMERGENCY NATURE, please record me as voting:

_________ AFFIRMATIVE _______ X _______ NEGATIVE* _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:
*An explanation must accompany a disagreement or abstaining position.

I have voted negatively on the emergency nature of the TIA, as we have installed VDR systems in Ford E350, F350 and larger ambulances for at least 5 years. The VDR systems available do not void warranties or change anything on the chassis, they just pull data from the Powertrain control modules. As far as the seat belt indicator goes for those chassis, why would it void warranties? Ambulance manufacturers already tie into the chassis wiring for brake lights, starting, door locks, lights, headlights and other circuits and systems. Why would a seat belt indicator system be any different? Let’s face the facts, the class 4 and 5 chassis are the same for ambulances or fire apparatus, so why can’t we install these systems on fire apparatus?

_________________________
Signature

_________________________
Name (Please Print)

_________________________
Date

Please return the ballot on or before Thursday, June 25, 2009.

PLEASE RETURN TO: Stacey Van Zandt, Project Administrative Supervisor NFPA
1 Batterymarch Park  Quincy, MA 02169  FAX: (617) 984-7056  E-mail: svanzandt@nfpa.org
MEMORANDUM

TO:          Technical Committee on Fire Department Apparatus
FROM:    Stacey Van Zandt
DATE:     June 26, 2009
SUBJ:      NFPA 1901 proposed TIA No. 967 Circulation of Ballots

The *preliminary ballot results* on proposed TIA No. 967 are as follows:

**Technical Merit**
27 Eligible to Vote
0 Not Returned
0 Abstentions
12 Affirmative
15 Negative (Frazeur, Barraclough, Dorio, Hillenbrand, Juneau, Lackore, McCombs, McCullough, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutterow, and Wilde)

**Emergency Nature:**
27 Eligible to Vote
0 Not Returned
0 Abstentions
14 Agreement
13 Disagreement (Frazeur, Dorio, Hillenbrand, Juneau, Lackore, McCombs, McDonald, Metheny, Piechura, Pope, Stalnaker, Tutterow, and Wilde)

The number of affirmative votes necessary for Question 1 (*Technical Merit*) and Question 2 (*Emergency Nature*) to pass balloting is based on the number eligible to vote, minus the not returned and abstentions. Therefore, based on the responses received to date the preliminary results show that this TIA is NOT achieving the necessary ¾ majority needed to pass ballot. (27 eligible to vote - 0 not returned - 0 abstentions × 0.75 = 21)

Explanation of votes received from principal members are attached for your review. Ballots received from alternate members are not included, unless the ballot from the principal member was not received.

If you wish to submit your ballot or change your vote, please do so no later than Monday, July 6, 2009. Ballots or changes may be submitted to Stacey Van Zandt via email to svanzandt@nfpa.org or fax to 617-984-7056. If you do not wish to change your vote, no response is necessary.

Attachments
MEMORANDUM

To: Technical Committee on Fire Department Apparatus
From: Stacey Van Zandt
Date: June 8, 2009
Subject: NFPA 1901 Proposed Tentative Interim Amendment (TIA) No.967

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by Kenneth Koch and endorsed by Peter Darley.

This proposed TIA is being published for public comment in the June 5, 2009 issue of NFPA News with a Public Comment Closing Date of July 17, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. Ballots are due on Thursday, June 25, 2009.

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.

Attachments
July 8, 2009

NFPA
Standard’s Administration
Attention: Ms. Nancy Walker
1 Batterymarch Park
Quincy, MA 02169-7471

Re: NFPA 1901 Proposed Tentative Interim Amendment # 967

The purpose of this letter is to advise the Standards Council that we currently have, or are in the process of developing, products that would allow a Ford F-Series truck to meet NFPA 1901 requirements. We are working with Ford Motor Company, several fire truck builders, and component suppliers to develop the CAN data transceiver for the Vehicle Data Recorder (VDR).

If the Interim Amendment becomes the “rule” for the next 5 years and the VDR and seat belt warning system are made optional, then we have concerns that they will not be ordered once they are available. That would make the business case for completing the development of some of our products very weak and probably not worth completing.

If the intent is for the original requirements to be re-instated once a viable product is on the market, then we would continue on with our development.

Products that are currently being developed, already exist, or we have been asked to develop include...

Seat Belt Monitor (sec. 4.11.2)
We are working on a method to capture seat occupancy and provide a warning if a seat is occupied and the seat belt is not fastened.

Vehicle Data Recorder (sec. 4.11.1)
We are working on a CAN data transceiver that would provide the required chassis data to fire vehicle manufacturers. We have been reading Ford and GM CAN data since 2004 and many of our current products connect to the OBD II port for the purpose of reading CAN data.

Governor (sec. 12.2.1.1)
We have a programmable road speed limiter, Speed Sentinel II, which limits road speed, not engine output and works on 2008 and 2009 F-series (among other applications). The system also has a forced idle mode that deactivates the throttle pedal — used to deter theft of the vehicle — as well as passing mode and an over-ride function (turn on lights or siren and the system is deactivated).
**Fast Idle** (sec. 12.2.1.2)
We have a fast idle system, AFIS II VS, which works on 2008 and 2009 F-series (among other applications). The plug & play system has a charge protect option based on a low VBAT.

**Low VBAT** (sec. 13.3.4)
We have a low battery voltage LED indicator that is incorporated into our fast idle system.

InterMotive would welcome an opportunity to review these products (or the status of the products) in person or via a conference call with the Standards Council.

Regards,

**Gregory E. Schafer, P.E.**
President
Item 09-8-34
1. Add a new subsection to read as follows:

19.8.4.10 (7) For aerial devices that have computer controlled, or electronically controlled, limitations to the range of aerial movement, a test shall be performed to validate the proper operation of the control system, as defined by the manufacturer.

Submitter's Substantiation: In the 2009 edition of the NFPA 1901 standard, a significant change was made to the sections of the standard that establishes the rated capacity for aerial ladders and platforms.

The new standard allows for essentially two types of rating systems, the first being a relatively simple method of rating the ladder in the worst case position. This requires the ladder to be fully extended, in a horizontal position and sustain a minimum rated capacity of 250 pounds for aerial ladders and 750 pounds for elevating platforms. In this position structural safety factors and vehicle stability factors are established. Since 1991, this has been the rating systems for aerials in the United States.

The second aerial rating method is called an envelope control system. These systems utilize electronic control technologies to determine the safe working capacity and range of motion of the aerial device. These systems are widely used in many parts of the world and are derived largely from the German DIN standards and are also reflected in the current EN 14043 standards for aerial ladders.

In response to committee requests, aerial task group meetings were held to better understand the differences in two rating systems. As a result of these meetings and in committee discussions with Fire Apparatus Manufacturer’s Association members this TIA was developed.

Justification:

Due to the design of the envelope control systems, the range of operation of the aerial device is determined by the electronic control systems and these need to be verified by the manufacturer. The NFPA 1901 technical committee feels that the addition of the tests in the new vehicle standard (NFPA 1901) and the testing standard (NFPA 1911) is an important validation of the envelope control systems.
Agenda Item: TIA 1911-2007
Document: NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus
Reference: 19.8.4.10(7) (New)
(TIA Log 959)

Comment Closing: 7/17/2009
1 Public Comment Received as of 7/14/09

TIA PRELIMINARY TC BALLOT RESULTS (Comment Circulation is due 7/22/09)

According to 5.4 in the NFPA (RGCP), the final results show this TIA IS achieving the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21 [27 (eligible to vote) – 0 (abstentions) = 27 × 0.75 = 20.25]

27 Eligible to Vote
0 Not Returned

TC FINAL Ballot results for Technical Merit are as follows:
27 Affirmative
0 Negative
0 Abstentions
PASS

TC FINAL Ballot results for Emergency Nature are as follows:
27 Affirmative
0 Disagreement
0 Abstentions
PASS
MEMORANDUM

TO: Technical Committee on Fire Department Apparatus

FROM: Stacey Van Zandt

DATE: July 17, 2009

SUBJ: NFPA 1911 proposed TIA No. 959 Circulation of Ballots

The preliminary ballot results on proposed TIA No. 959 are as follows:

**Technical Merit**
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Affirmative
0 Negative

**Emergency Nature:**
27 Eligible to Vote
0 Not Returned
0 Abstentions
0 Agreement
0 Disagreement

The number of affirmative votes necessary for Question 1 (**Technical Merit**) and Question 2 (**Emergency Nature**) to pass balloting is based on the number eligible to vote, minus the not returned and abstentions. Therefore, based on the responses received to date the preliminary results show that this TIA is achieving the necessary ¾ majority needed to pass ballot. (27 eligible to vote - 0 not returned - 0 abstentions × 0.75 = 20.25). The number is then rounded up to 21 needed to pass ballot.

For your review, is a public comment that was received. Ballots received from alternate members are not included, unless the ballot from the principal member was not received. If you wish to change your vote, please do so no later than **Wednesday, July 22, 2009**. Ballots or changes may be submitted to Stacey Van Zandt via email to svanzandt@nfpa.org or fax to 617-984-7056. If you do not wish to change your vote, no response is necessary.

Attachment
Proposed wording for the Fire Department Apparatus Committee to consider as a TIA for NFPA 1911.


19.8.10 Test of Electronic Envelope Controls. If the aerial ladder is designed with computer-controlled or electronically-controlled limitations to the range of aerial movement, the tests as defined in 19.8.10.1 through 19.8.10.3.10 shall be performed.

19.8.10.1 The aerial apparatus shall be on a hard, level surface with the stabilizers deployed in accordance with the manufacturer's instructions, and with the turntable level.

19.8.10.2 The aerial device shall be raised from the bed, rotated to 90 degrees to the longitudinal axis of the chassis and positioned at 0 degrees elevation.

19.8.10.2.1 The aerial device shall be extended until the electronics stop further extension.

19.8.10.2.2 If the electronics allow extension of the aerial device beyond the extension allowed by the manufacturer, the aerial device shall be taken out of service until the problem has been corrected and the aerial device retested.

19.8.10.2.3 If the aerial device fails to extend to within 2 feet of the length allowed by the manufacturer, the deficiency shall be reported to the AHJ in writing.

19.8.10.2.4 The aerial device shall be retracted, rotated 180 degrees so it is positioned 90 degrees to the longitudinal axis of the chassis on the opposite side and positioned at 0 degrees elevation.

19.8.10.2.5 The aerial device shall be extended until the electronics stop further extension.

19.8.10.2.6 If the electronics allow extension of the aerial device beyond the extension allowed by the manufacturer, the aerial device shall be taken out of service until the problem has been corrected and the aerial device retested.

19.8.10.2.7 If the aerial device fails to extend to within 2 feet of the length allowed by the manufacturer, the deficiency shall be reported to the AHJ in writing.

19.8.10.3 The aerial device, while fully retracted, shall be elevated to a position 20 degree less than the elevation at which the aerial device can be fully extended and positioned 45 degrees to the longitudinal axis of the chassis.

19.8.10.3.1 The aerial device shall be extended until the electronics stop further extension.

19.8.10.3.2 With the aerial device extended, an attempt shall be made to move the aerial device in a direction toward a position 90 degrees to the longitudinal axis of the chassis.

19.8.10.3.3 If the electronics allow extension of the aerial device beyond the extension allowed by the manufacturer, or the electronics allow rotation into a position outside the envelop allowed by the manufacturer, the aerial device shall be taken out of service until the problem has been corrected and the aerial device retested.

19.8.10.3.4 If the aerial device fails to extend to within 2 feet of the length allowed by the manufacturer, the deficiency shall be reported to the AHJ in writing.
19.8.10.3.5 The aerial device shall be fully retracted but left in the same elevated position and rotated 180 degrees.

19.8.10.3.6 The aerial device shall be extended until the electronics stop further extension.

19.8.10.3.7 With the aerial device extended, an attempt shall be made to move the aerial device in a direction toward a position 90 degrees to the longitudinal axis of the chassis.

19.8.10.3.8 If the electronics allow extension of the aerial device beyond the extension allowed by the manufacturer, or the electronics allow rotation into a position outside the envelop allowed by the manufacturer, the aerial device shall be taken out of service until the problem has been corrected and the aerial device retested.

19.8.10.3.9 If the aerial device fails to extend to within 2 feet of the length allowed by the manufacturer, the deficiency shall be reported to the AHJ in writing.

19.8.10.3.10 The aerial device shall be returned to its travel position.

Add a new 19.9.15 and renumber existing 19.9.15 through 19.9.17 as 19.9.16 through 19.9.18. The new 19.9.15 to read:

19.9.15 **Test of Electronic Envelope Controls.** If the elevating platform is designed with computer-controlled or electronically-controlled limitations to the range of aerial platform movement, the tests as defined in 19.8.10.1 through 19.8.10.3.10 shall be performed.

Add a new 19.10.12 and renumber existing 19.10.12 through 19.10.14 as 19.10.13 through 19.10.15. The new 19.10.12 to read:

19.10.12 **Test of Electronic Envelope Controls.** If the water tower is designed with computer-controlled or electronically-controlled limitations to the range of water tower movement, the tests as defined in 19.8.10.1 through 19.8.10.3.10 shall be performed.
MEMORANDUM

To: Technical Committee on Fire Department Apparatus
From: Stacey Van Zandt
Date: May 26, 2009
Subject: NFPA 1911 Proposed Tentative Interim Amendment (TIA) No.959

The attached proposed Tentative Interim Amendment (TIA) is being submitted to you for letter ballot. This proposed TIA was submitted by Robert J. Barraclough and endorsed by David White.

This proposed TIA is being published for public comment in the June 5, 2009 issue of NFPA News with a Public Comment Closing Date of July 17, 2009. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA at their August 2009 meeting.

In addition to being balloted on the technical merits of the proposed TIA, the Committee is also being balloted on whether or not this matter is of an emergency nature. Please see the attached information regarding the processing of TIAs from the NFPA Regulations Governing Committee Projects.

Please complete and return the attached letter ballot to Stacey Van Zandt either via email to svanzandt@nfpa.org or via fax to 617-984-7056. **Ballots are due on Tuesday, June 16, 2009.**

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the NFPA Regulations Governing Committee Projects.

Attachments
Secretary
NFPA Standards Council
1 Batterymarch Park
Quincy, MA 02169-7471

Subject: Comment on TIA Log No. 959 to NFPA 1911

Gentlemen:

I support the need for a TIA in NFPA 1911 covering the testing of aerial devices designed with computer-controlled or electronically-controlled limitations to the range of aerial movement. However, I do not support adding the specific wording of this proposed TIA.

The wording of the proposed TIA is confusing. Does “as defined by the manufacturer” apply to the range of aerial movement or a test method? If it applies to the range of aerial movement, then there is no test method defined. If the intent is that the manufacturer define the test, it does not insure a rigorous or complete test. It also can leave aerial devices currently in service without any test if the original manufacturer of the aerial device did not define a test. A test method with pass/fail criteria should be defined in the TIA and not left to the manufacturer.

I also question whether 19.8.4.10 is the correct place to add wording for testing electronic envelop controls. Section 19.8.4 is titled “Turntable, Torque Box, Suspension, and Tractor-Drawn Components Inspection and Test.” It would be more appropriate to include the testing requirements with the other testing of aerial devices. Testing for aerial ladders is in 19.8.7, 19.8.8, and 19.8.9; testing for aerial platforms is in 19.9.12, 19.9.13, and 19.9.14; and testing for water towers is in 19.10.10 and 19.10.11.

I recommend the Standards Council not issue this TIA but direct the Fire Department Apparatus Committee to develop wording for a test procedure for aerial devices designed with computer-controlled or electronically-controlled limitations to the range of aerial movement and submit such wording as a proposed TIA to NFPA 1911. I have attached suggested wording as a starting point for the committee.

Sincerely,

[Signature]

Carl E. Peterson
Item 09-8-35
June 10, 2009

Mary J. Maynard  
NFPA  
Codes and Standards Administration  
1 Batterymarch Park  
Quincy, MA 02169

RE: New Project Initiation Request

Dear Mary:

Enclosed you will find the following:

- New Project Initiation Form
- Testimonial Letters
- FotoLum High Grade Photo Luminescent Vinyl Illumination Characteristics
- Two (2) trapezoid fire helmet patches with tread-plate reflective overlay (Style currently utilized by fire departments across the country)
- Two (2) trapezoid fire helmet patches with new reflective design that will comply with NFPA 1971-2008 rainfall reflective requirements
- One (1) trapezoid patch without any reflective overlay
- One (1) fire hose coupler photo luminescent and reflective directional arrow
- Two (2) fire ladder markers with tread-plate reflective
- One (1) strip of plain photo luminescent vinyl without any reflective overlay

Please expose the photo luminescent samples to sunlight for 5 minutes to fully charge the vinyl and then take them into a dark area to experience the level of illumination the products produce. To test the reflective overlay, hold a pen light at eye level and shine it at the reflective overlay. You will see the bright white flash from the reflective overlay.

Tim LeMaster will contact you after you have received this package to answer any questions you may have about this request.

Regards,

Nancy Kepko  
President

11600 W. 85th Street – Lenexa, KS 66214  
(913) 888-0870 (Telephone) – (913) 599-4412 (Fax) – Info@FotoLum.com  
Standards Council Agenda - August 4-6, 2009  Page 1588 of 2106
### New Project Initiation Form
(To be completed by proponent of new project/document)

*Additional pages may be attached if necessary.*

<p>| | |</p>
<table>
<thead>
<tr>
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| a. | Provide an explanation and any evidence of the need for the new project/document:  
See Attached |
| b. | Identify intended users of the new document:  
See Attached |
| c. | Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:  
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| d. | Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:  
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| e. | Identify other related documents and projects on the subject both within NFPA and external to NFPA:  
See Attached |
| f. | Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:  
See Attached |
| g. | Provide an estimate on the amount of time needed to develop the new document:  
See Attached |
| h. | Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:  
See Attached |

**Please send your request to:**
Mary J. Maynard  
NFPA  
Codes and Standards Administration  
1 Batterymarch Park  
Quincy, MA 02169  
Stds admin@nfpa.org

Standards Council Agenda - August 4-6, 2009  Page 1589 of 2106
New Project Initiation Form
High-Grade Photo Luminescence in Conjunction with Retro Reflective Properties for Fire Fighters

a. Provide an explanation and any evidence of the need for the new project/document:

1. High grade photo luminescent technology has proven itself as the next level of safety for fire fighters in low light and smoky environments.
   i. What is high grade photo luminescence?
   1. There are a variety of photo luminescent minerals and crystals that absorb ultra violet energy and then release the energy as photons of light.
   2. The proper combination of these photo luminescent minerals and crystals will produce a bright initial illumination and maintain an acceptable level of illumination over an extended period of time, typically over 12 hours.
   3. The photons of light released from the minerals are in a wave length most readily recognized by the human brain – green/yellow spectrum.
   4. Advantage of photo luminescent/reflective combination
      a. Current retro-reflective trim specified under NFPA 1971 only provides worker visibility in low light and smoky conditions when an external light source (flashlight) strikes the trim producing the retro reflective white flash.
      b. High grade photo luminescent/reflective trim allows workers to maintain visual contact in dark smoky conditions without an external light source because of the illumination produced by the vinyl, while direct light sources will still produce the retro reflective white flash.
      c. The application of photo luminescent/reflective strips has proven to help save lives, prevent injuries and when applied onto tools, radios, thermal imaging cameras, hose couplers…. Will minimize equipment loss, speed victim ground search, and help direct firefighters out of a burning structure.

2. Recognized need for high grade photo luminescent technology
   i. World Trade Tower attack assessment by the government noted that survivors credited photo luminescent paint on the emergency egress stairs allowed them to find their way out of the towers.
   ii. The implementation of the NY City Code 26 for use in buildings over 5 stories requirements.
iii. The 2007 International Building Code Supplement, requiring any building over 75 ft to have photo luminescence exit path marking for exit doors, frame markings and obstruction markings.

iv. ASTM 2071 codes, UL 924 Codes.

v. Fire department recognition of importance of high grade photo luminescent technology.

1. Lt. Chuck Garcia – Oakland, CA Fire and Rescue
   510-238-4001 Field tested FotoLum photo luminescent products and recommended acceptance.

2. Art Nichols – Spokane, WA Fire Department
   509-625-7080 Currently using FotoLum photo luminescent products.


5. Chief Nathan Dower – Dallas, Texas Fire and Rescue
   214-670-5126 I outfitted two of our firefighters on Dallas Ladder 57 with the helmet decals. I have received nothing but positive feedback from the crews. I hope in our future budget submissions we can work these into our helmets. The decals provide enhanced visibility on the fire ground. I have enclosed a comment from one of the firefighters and will forward others as they come in.

6. ROGER JOYNER DRIVER TRUCK 57B Dallas, TX Fire and Rescue I have been using the new helmet decals you gave us for a while now. I have had a chance to observe them at 2 fires that we had. In a dark smoke filled apartment fire we had, they were the only things visible on the firefighters beside me. I have been impressed with their visibility and would recommend them to anyone interested in wearing them.

7. Capt. David Ringley - Columbus, OH Fire Department
   614-221-3132 Approved the use of FotoLum photo luminescent products by research and development but lack of funding prevented implementation.

8. Deputy Chief Donald Kuhn – Memphis, TN Fire Department 901-320-5448 “Product Great” but lack of funding.

9. Capt. Walt Lee – Minneapolis, MN Fire Department
   612-718-1859 Currently utilizing FotoLum photo luminescent products

10. Capt. Farley – Pittsburgh, PA Fire Department
    412-244-4182 Field tested FotoLum photo luminescent
products and provided contact information to their fire helmet manufacturer to include on next order.

11. Firefighter Oscar Diaz - Hialeah Fire Department
305-883-6959 Field tested and recommended by Lt. Scott Disbrow 305-842-5722

12. Chief Ernie Martinez – Madison, WI Fire Department
608-266-4886 FotoLum photo luminescent samples satisfied department’s request for high visibility identification.

213-485-6121 The Los Angeles fire department was impressed with the FotoLum photo luminescent products’ high visibility for potential use as directional patches for fire hose couplings to direct disoriented firefighters away from the fire and toward the fire truck. This is critically important in the aftermath of two firefighters perishing in a fire. The firefighters could not get to the hose line to lead them out of the fire and inadvertently went deeper into the fire instead of toward the fire truck. It is believed that photo luminescent directional arrows on the hose couplers would have prevented this tragedy.


15. Capt. John DeJulio Q54 Olathe, KS Fire Department and President IAFFD Local 2542 See attached testimonial letter.

b. Identify intended users of the document

1. Structural firefighters
2. EMS
3. Wildland firefighters
4. Technical Rescue firefighters
5. Search and Rescue Teams
6. Hazardous Materials Response Workers
7. Homeland Security Responders
8. Military Firefighters and Hazardous Material Responders

c. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:

1. Firefighters including but not limited to the contacts listed above under section “a” of this document.
2. Technical committees for the NFPA standards:
   - NFPA standards that would benefit from high grade photo luminescent
     - NFPA 1906 Standard for Wildland Fire Apparatus
     - NFPA 1925 Standard on Marine Fire-Fighting Vessels

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NFPA 1932 Standard for Manufacturer's Design of Fire Department Ground Ladders
NFPA 1951 Standard on Protective Ensembles for Technical Rescue Incidents
NFPA 1952 Standard on Surface Water Operations Protective Clothing and Equipment
NFPA 1963 Standard for Fire Hose Connections
NFPA 1971 Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting
NFPA 1991 Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies
NFPA 1994 Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents
NFPA 1999 Standard on Protective Clothing for Emergency Medical Operations

d. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:
   1. Fire departments across the country
   2. Manufacturers of firefighter protective equipment
   3. Manufacturers of fire fighting apparatus and hoses
   4. Manufacturers of SCBA cylinders
   5. Manufacturers of Thermal imaging equipment, radios, tools, ladders...

The benefit this document will offer these groups would be validation of the safety benefits provided by high grade photo luminescent/reflective technology. The NFPA validation would allow these groups and organizations to incorporate this technology, resulting in saving lives, and reducing the loss of equipment.

e. Identify other related documents and projects on the subject both within NFPA and external to NFPA:
   1. No other documents or projects utilizing high grade photo luminescent/reflective technology exist within NFPA to our knowledge.
   2. External to NFPA high grade photo luminescent technology is being recognized as an important safety factor. These are found in New York City Building Code 26, ASTM 2073, UL 904, 2007 International Building Code Supplement. While these codes require specific illumination levels for evacuation of buildings, it is highly recommended that for NFPA requirements these levels be increased and should last for a minimum of 12 hours.

f. Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:
   1. Do not currently have this information.
g. **Provide an estimate on the amount of time needed to develop the new document:**
   1. Do not have an accurate assessment of this requirement, but would estimate approximately 2 months for development.

h. **Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:**
   1. All data is available, just has to be compiled from many different sources into one structure for requirements needed.
While working in the dark at a training session, my crew and I noticed that some of our fellow firefighters had some new type of reflective materials on their helmets and radios. This literally caught our eyes, as this was just about the only thing we could see during the session. This material glows in the dark and does not need a light shined on it to show up like our old reflective type stickers.

I spoke with the Captain who was responsible for obtaining some sample pieces and he stated an area woman “stumbled” on to this material while working on another project. He and his crew had put this material through some tests, including placing it into an oven for a period of time and that it had held up well.

On subsequent emergency scenes over the past few months, this material that was placed on the helmets and radios always caught our attention. During a recent grease fire in the kitchen area at a local restaurant, my crew was assigned to bring in a back-up line. The black smoke was banked down to the floor, making it difficult to see anything but the attack crew’s hose line lying on the floor. We entered the building and were attempting to find the attack crew, using a thermal imaging camera. As I was panning with the camera to my left, my peripheral vision caught sight of this reflective material from the attack crew’s helmets. They had entered into a space where my line of sight was partly blocked by boxes and other materials on storage racks. I had missed this area when I did my initial sweep of the room with the camera due to the material on the racks, but I was able to find them due to the “Glowing” stickers on their helmets through the openings between the boxes.

My crew and I are thoroughly convinced that these stickers are a necessity for all firefighters to wear. They provide an excellent way to maintain contact with other firefighters in an emergency situation and add another safety feature that we did not have with our old reflective stickers.

Captain John DeJulio Q54
President
IAFF Local 2542
To Whom It May Concern:

The City of Olathe Fire Department has chosen to utilize the photo luminescent and reflective helmet patches developed by FotoLum, Inc.

I have participated in evaluating the effectiveness of the FotoLum product. This evaluation process has included testing the product in a Class A Burn tower, and through actual use by Olathe firefighters. During this testing we evaluated several criteria:

1. Visibility of the helmet patches in dark and smoke filled environments:

   This was tested by having three firefighters enter the burn tower to evaluate the illumination characteristics of the helmet patches. The firefighters had on the following: standard reflective helmet patches, GlowFlex helmet patches and FotoLum helmet patches. As the firefighters moved throughout the dark building, only firefighters wearing the FotoLum patches were visible.

2. Will the helmet patches stand up to elevated temperatures:

   A fire helmet with a combination of standard reflective patches, GlowFlex patches and the FotoLum patches was placed in the burn room and exposed to fire conditions. The helmet was removed after an approximate temperature exposure of 400 F. Inspection of the patches did not show any visible alteration. The helmet was then returned to the fire room and was exposed to approximately 750 F. At this temperature the structural integrity of the helmet had been affected. All the helmet patches had been charred through resulting in the loss of illuminating characteristics. However, the FotoLum brand helmet patch was the only helmet patch that maintained its reflective characteristics.

During actual field testing of the product, several firefighters were outfitted with the FotoLum helmet patches. We also applied the photo luminescent vinyl to one of our thermal imaging cameras. The advantage of this product became evident during a fire involving a victim search. As our team entered the home we began a search using our thermal imaging cameras. Each time we set the cameras down to perform a ground search, the thermal imaging camera with the photo luminescent vinyl was readily visible to the firefighter. This helped speed the search effort.

As a result of the product testing and personal experience with the FotoLum brand photo luminescent helmet patches and vinyl, I would highly recommend the use of this product. The safety advantages offered by this product exceeds anything currently available.

[Signature]

Jack Holcom
Fire Captain/BMT
Photo luminescent ladder markers with tread-plate reflective and one strip without reflective overlay

Photo luminescent fire hose directional arrow

Photo luminescent trapezoid without reflective overlay

Fire Helmet Trapezoid with New Reflective Overlay Design

Fire Helmet Trapezoid with Tread-Plate Reflective Overlay
Photoluminescence Standards for Fire Service Applications

Design Requirements:

- Minimum recommended size: 1 continuous square inch of photo luminescent material
- Photo luminescent material must comply with the convective heat requirements for trim material as specified in NFPA 1971-2007
- All reflective overlay applied to the photo luminescent material should not impinge into the minimum recommended continuous photo luminescent area
- All reflective overlay must comply with the NFPA 1971-2007 requirements for retro-reflectivity and rainfall retro reflective requirements for trim material
- There is no fluorescent requirement

Test Methods:

There are two recognized standards for photo luminescent emergency signage and markings. These are the ASTM 2073 and the New York City Code 26. Both of these standards were developed for emergency egress for buildings. The standards require the following minimum illumination levels:

<table>
<thead>
<tr>
<th>ASTM 2073</th>
<th>New York Code 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mcd/m² - 10 min post exposure</td>
<td>30 mcd/m² - 10 min post exposure</td>
</tr>
<tr>
<td>2.8 mcd/m² - 60 min post exposure</td>
<td>7 mcd/m² - 60 min post exposure</td>
</tr>
<tr>
<td></td>
<td>5 mcd/m² - 90 minutes post exposure</td>
</tr>
</tbody>
</table>

The illumination levels previously established are adequate for emergency egress from a structure requiring a short period of time to exit, they are not appropriate for firefighters that may be involved in fire responses lasting for hours.

Recommended illumination levels for firefighters:

- 350 mcd/m² - 10 minutes post exposure
- 110 mcd/m² - 30 minutes post exposure
- 55 mcd/m² - 60 minutes post exposure
- 25 mcd/m² - 120 minutes post exposure
- 5 mcd/m² - 360 minutes post exposure
Test Protocol:

Photoluminescence
- Photo luminescent sample size 12" x 12"
- Precondition samples by placing them in complete darkness until their residual luminance has fallen to 0.3 mcd/m² or less
- Light source xenon-arc
- Luminance measured at the plane of the sample 1000 LUX
- Irradiation time 30 minutes
- Distance between illumination source and test material 3 feet
- Spectral radiometer to measure photometric measurements
- Measure the photopic luminance of specimen after initial, 1 minute, 10 minutes, 30 minutes, 60 minutes, 120 minutes, 360 minutes, and 720 minutes post exposure

Convective Heat Requirements
- Refer to NFPA 1971-2007 Test Method paragraph 6-46.4.3

Reflective overlay utilized with the photo luminescent material
- Refer to NFPA 1971-2007 Test Method paragraph 6-46.4.1
- Refer to NFPA 1971-2007 Test Method paragraph 6-46.4.3

We do not recommend a fluorescence requirement as all fluorescent pigments degrade over time.
Good Morning Mary,

Hope all is well. I have enclosed all the up to date standards that have been set for illumination requirements which may be helpful. These tests are on the minimums, which will not make the fire fighters highly visible under the conditions they work, yet used as a guide for possible testing criteria. It has been brought to our attention by fire fighters that the adhesive properties are very important, they have informed us that some of the patches that come with the helmets are using a very cheap adhesives and are easily coming off. This does not work for them, so we are running some tests on adhesives which we will supply to you next week possibly.

Is this an open meeting to where we can attend?

Thank you for your time and assistance.
Best regards,
Tim
## Illumination Requirements in different Standards

<table>
<thead>
<tr>
<th>Standard / Code</th>
<th>Activation</th>
<th>Luminance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIN 67510</strong></td>
<td>1,000 Lux for 5 minutes Xenon Lighting (similar to daylight)</td>
<td>Laboratory: 10 minutes 20 mcd/m², 60 minutes 2.8 mcd/m²</td>
</tr>
<tr>
<td><strong>ASTM E 2073-02: OLD Test Method</strong></td>
<td>1,000 Lux for 5 minutes Xenon Lighting</td>
<td>Laboratory (per ASTM Standard E2072-04): 10 minutes 20 mcd/m², 60 minutes 2.8 mcd/m²</td>
</tr>
<tr>
<td><strong>ASTM E 2073-07: NEW Test Method</strong></td>
<td>2 fc = 21.6 lux fluorescent illumination for 120 minutes at 4000-4500 K</td>
<td>Laboratory (per ASTM Standard E2072-04): 10 minutes 20 mcd/m², 60 minutes 2.8 mcd/m²</td>
</tr>
<tr>
<td><strong>NYC RS6-1 and NRC Guide Canada</strong></td>
<td>2 fc = 21.6 lux fluorescent illumination for 120 minutes at 4000-4500 K</td>
<td>10 minutes 30 mcd/m², 60 minutes 7 mcd/m², 90 minutes 5 mcd/m²</td>
</tr>
<tr>
<td><strong>UL924-9th edition for EXIT Signs</strong></td>
<td>5 fc = 54 lux for 60 minutes, typically fluorescent illumination</td>
<td>80% by formula of 8 observers have to be able to read EXIT or FYIT signs after 90 minutes in full darkness at 50-ft = 15.24 m / OR: 75-feet = 22.86 m OR: 100-ft = 30.48 m</td>
</tr>
<tr>
<td><strong>UL1994 Luminous Egress Path Marking Systems</strong></td>
<td>1 fc = 10.8 lux for 60 minutes, typically fluorescent illumination</td>
<td>3 observers have to be able to 100% read 3 identical, pre-conditioned samples after 90 minutes in full darkness at 25-feet = 7.62 meter viewing distance</td>
</tr>
<tr>
<td><strong>2008 California Building Code: Exit Access Corridors</strong></td>
<td>UL924 listed Floor Proximity EXIT Signs where High-Location Exit signs are used or UL1994 listed Floor Proximity Egress Path Markings</td>
<td>3 observers at 25 feet at 90 minutes (see above UL1994 details) or 90 minutes 5 mcd/m²</td>
</tr>
<tr>
<td><strong>2009 Connecticut State Building Code: Exit Access Corridors</strong></td>
<td>Either UL1994 (see above) or 1 fc = 10.8 lux fluorescent lighting for 60 minutes</td>
<td>3 observers at 25 feet at 90 minutes (see above UL1994 details) or 90 minutes 5 mcd/m²</td>
</tr>
<tr>
<td><strong>2009 NFPA 101-Life Safety Code &amp; 2009 NFPA 5000- Building Construction and Safety Code</strong></td>
<td>Either UL1994 (see above) or 1 fc = 10.8 lux fluorescent lighting for 60 minutes (adjusted ASTM E2073) or alternate standard deemed equivalent &amp; approved by Authority Having Jurisdiction.</td>
<td>3 observers at 25 feet at 90 minutes (see above UL1994 details) or 90 minutes 5 mcd/m²</td>
</tr>
<tr>
<td><strong>2009 IBC-Intern. Building Code &amp; 2009 IFC-Intern. Fire Code</strong></td>
<td>Either UL1994 (see above) or 1 fc = 10.8 lux fluorescent lighting for 60 minutes (adjusted ASTM E2072)</td>
<td>3 observers at 25 feet at 90 minutes (see above UL1994 details) or 10 minutes 30 mcd/m² and 90 minutes 5 mcd/m²</td>
</tr>
<tr>
<td><strong>APTA - Railcar OLD Test Method</strong></td>
<td>5 fc = 54 lux for 60 minutes fluorescent lighting at 4000-4500 K</td>
<td>90 minutes 7.5 mcd/m²</td>
</tr>
<tr>
<td><strong>APTA - Railcar NEW Test Method</strong></td>
<td>1 fc = 10.8 lux for 60 minutes fluorescent lighting at 4000-4500 K</td>
<td>90 minutes 7.5 mcd/m²</td>
</tr>
</tbody>
</table>

As of April 2009/ American PERMALIGHT, Inc.
Item 09-8-36
14 May 2009

National Fire Protection Association
Mary J. Maynard
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169

Mary,

APEX Electrical Interconnection Consultants, LLC is a leading consulting firm specializing in electromechanical devices. We have been retained to provide advice in regards to present standards relating to residential electrical wiring and wiring devices.

APEX is familiar with standards organizations, some of which complement the NFPA mission, including NECA, IEEE, and ANSI. APEX has high regard of NFPA efforts toward fire safety and education, and supports the use of NFPA standards, publications, and other documents promoting that cause.

Our client, Plug Grip Products, provides safety tools to homeowners, electricians, and others for use when installing and servicing switches and receptacles. They do this through nationally recognized home improvement chains and other outlets. In affiliation with numerous trade schools, the NJATC, and other educational organizations, Plug Grip also makes their tools available as training aids for wiring device safety.

Our collective interests aim to decrease the incidence of residential electrical fires, prevent shocks and electrocutions, and offer a means to early warning of problematic overheating in electrical wiring devices – a significant cause of residential fires.
Although existing documents may describe certain details of wiring devices [including a new one under development, re: NECA 130], we feel that only limited coverage exists for preventing a common fire cause [loose termination screws in wiring devices], and that information is especially needed for a widely available and practical means of preemptive detection of increased temperature due to loose terminations and attendant (and normally invisible) fire risk.

Industry evidence supports the fact that many electrical fires cannot be prevented with common circuit breakers and fuses. According to various sources, one cause of device overheating – in particular glowing connections – does not in most cases induce sufficient current draw to trip a breaker or blow a fuse. The amount of heat generated by a glowing connection causes metal parts to melt, and is more than sufficient to ignite nearby combustibles. It is a leading cause of structure fires that is frequently “hidden” until it is too late.

Therefore, it is proposed that a new project be initiated to fill this information gap. In particular, a new document would not only highlight safer installation and servicing practices with commonly found ‘live’ conditions, but describes preemptive screening that is readily performed on wiring devices, enabling early detection [and remediation] of known fire risks. Importantly, this new publication would reach beyond straightforward workmanship standards for electrical wiring devices, which we feel the proposed NECA 130 document is potentially able to cover, by addressing a new means to safety, detection, and prevention.

A completed NFPA New Project Initiation Form is attached. Our view on the information it contains is that it should be adequate to initiate a new project, while additional substantiation, description, and factual evidence can be provided once the formal project is underway. We feel this new document will provide a valuable enhancement to existing NFPA publications associating fire hazards with common wiring devices.

We anticipate opening a dialogue with NFPA about the new document, and are ready to address any questions that you may have. Please email or call me at your earliest convenience.

Sincerely,

Ron Locati
Principal Consultant
APEX Electrical Interconnection Consultants, LLC

(717) 767-2547 (Direct Line)
rlocati@connectorconsultants.com
New Project Initiation Form
(To be completed by proponent of new project/document)
Additional pages may be attached if necessary.

a. **Provide an explanation and any evidence of the need for the new project/document:**

A new document is needed to address an unmet need – that of describing a readily available means to improve personal safety, enable neater workmanship, assure quality, provide early warning of fire-causing degradation, and reduce work effort when servicing and installing electrical wiring devices. This document focuses in particular on snap switches and duplex receptacles.

Despite warnings and cautionary notes to the contrary, per J. Norton some individuals, installers, and electricians elect to work on wiring devices when they are energized. A method that improves safety under such practical conditions is urgently needed. A work practice that aids an installer of switches and receptacles by simplifying common tasks, through improved ergonomics, leads directly to a safer environment and neater installations.

Many DIY-ers presently lack sufficient knowledge to properly service or install wiring devices. Tools that provide features that direct a novice improve workmanship and enhance safety. Many professional contractors and electricians install dozens to hundreds of wiring devices each day – tools that reduce installation time, that decrease work effort, and that permit increased leverage and tightening torque, enable improved productivity, increased quality of device installation, raise electrical system reliability, and enhance worker safety.

An installation tool that additionally detects a temperature increase on installed wiring devices provides early warning so that action may be taken before potential fire hazards result in a catastrophe. A significant cause of wiring related fires is poor installation practice, specifically related to loose screw / conductor terminations. According to NFPA statistics, 4,700 fires originate at switches, receptacles, and outlets, and per V. Babrauskas, a significant cause of these fires is poor connections (loose termination screws), which leads to overheating of the device and ignition of nearby combustibles.

The end objectives of a new document supporting the use of ergonomic safety tools is 1) increased worker safety, 2) a reduction in shocks and electrocutions, 3) enhanced electrical system and installed device reliability, 4) reduced incidence of fires attributed to electrical devices, and 5) decreased insurance claims.
b. **Identify intended users of the new document:**


c. **Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:**

NECA, NFPA, IEC, OSHA, CPSC, UL, NEMA, Gardner-Bender, Leviton, LeGrand, Cooper, AW Sperry, IEEE, ESFI, Home Safety Council, IFMA, IAFC, USFA, IFE, various insurance groups, among others, and individual consultancies such as V. Babrauskas [www.doctorfire.com] and J. Norton [jamesnorton@jhngroup.com].

d. **Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:**

Electrical Inspectors, Local, City, and State Governments, Electrical Contractors, Do-It-Yourself Industry, and Fire Departments are directly affected and benefit by the proposed document in terms of having a recognized and generally accepted guideline that increases safety, enables improved productivity, and that provides a means to describe safety tools used to conduct a practical inspection of installed wiring devices for the novice or professional alike. NFPA also benefits through increased publication sales because the document may be referenced in purchasing specifications for wiring devices and systems in all electrical projects.

e. **Identify other related documents and projects on the subject both within NFPA and external to NFPA:**

New Document Project: NECA 130


Various Other Published Articles and Reports [Trade Publications and Magazines, Consultancies, Others]
f. Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:

It is believed that expertise required to develop the document currently resides with committee membership. It is anticipated that input and involvement from within the existing talent base with regards to wiring devices [switches and receptacles], wiring standards, installation practices, potential hazards, and inspection requirements is all that is required.

g. Provide an estimate on the amount of time needed to develop the new document:

It is anticipated that this document will not require an inordinate amount of time to develop, and should fall within a short-to-medium term expectation for similar NFPA documents.

h. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:

Additional information is available in support of this proposed document that indicates an unmet need for, and supports the use of safety tools, during installation and servicing of wiring devices. This additional information can be supplied as required, and includes various fire statistics, incidence of electrical faults, loose terminations, heating of wiring devices, worker safety, etc. from organizations such as CPSC, NFPA, Private Consultancies, among others.

Please send your request to:

Mary J. Maynard  
NFPA  
Codes and Standards Administration  
1 Batterymarch Park  
Quincy, MA 02169  

Stds_admin@nfpa.org
Item 09-8-37
New Project Initiation Form
(To be completed by proponent of new project/document)
Additional pages may be attached if necessary.

a. Provide an explanation and any evidence of the need for the new project/document:

This proposal recommends the development of a NFPA Recommended Practice for developing and conducting after action reviews (AAR), or critiques. Approximately ten NFPA documents reference an AAR or critique process. Minimal guidance is offered to those utilizing NFPA standards on how to develop or conduct an AAR.

During the recent years, the industries and professions utilizing NFPA codes and standards in managing organizations and delivering services are increasing their reliance on “lessons learned” and/or “best practices.” A NFPA document detailing the essential considerations for an AAR process will serve to tie the outcome assessment, evaluation, or critique to the original scope, purpose, and/or intent of NFPA documents, other recognized industry standards, and adopted best practices.

An AAR document will continue to enhance a “systems” approach in utilizing the NFPA standards.

b. Identify intended users of the new document:

Intended users would be any individual or organization utilizing the NFPA codes and standards and has an interest in assessing or evaluating individual, team, or organizational performance. A standardized AAR process offers a systems-approach in evaluating the effectiveness of NFPA standards, best practices, or other recognized standards.

Any organization, those within the NFPA constituency or not, would realize benefit from a recommended practice pertaining to AARs. Creating a correlation between existing NFPA documents would serve to enhance an organization’s mission, by allowing it to take advantage of a recognized and structured assessment process.

c. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:

Representatives from the business and industry trade associations and organizations, fire service associations, allied emergency service providers, emergency preparedness management, and government agency representatives would be potential stakeholders in offering feedback, review and approval of an AAR document.

There are not necessarily any new stakeholders not already participating in the NFPA codes and standards development process. Specific contact information for stakeholders can be provided after determining the number of technical committee members required to initiate the project.

d. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:

Principal benefactors are those stakeholders currently affiliated with NFPA standards development processes, those taking advantage of the NFPA standards in managing respective operations, and those using NFPA standards as a performance benchmark to assess and evaluate operations.

Practically, all stakeholders utilizing the NFPA codes and standards will benefit from a recommended practice for conducting AARs. In developing a recommended practice, NFPA could offer a systematic process for closing the loop on the application of NFPA standards in a lessons learned approach. Use of AARs could well advance the interests of the NFPA in identifying
needed changes to existing NFPA codes and standards.

A standardized approach to conducting AARs can be aptly applicable to both emergency services and to traditional business-oriented private sector needs. From an emergency services system perspective, i.e. as detailed in NFPA 1201, in delivering fire protection services, or NFPA 450, for delivery of EMS, NFPA 1143 for wildfire management practices, or NFPA 1561 for ICS/IMS operations, the benefits of a standardized approach to AARs is easily recognized.

From a non-emergent perspective, the application of NFPA 1500 in developing S&H programs, or the use of NFPA 1 for inspection practices, NFPA 1403 & 1403 for training activities, or NFPA 1452 utilized for home safety inspections could ultimately offer greater benefit through the application of a standardized approach to utilizing more effective AARs.

From a private sector perspective, the use of the NFPA standards within the various industrial operations, such as the mandated AAR processes required by process safety management regulations, common to the chemical industry, would be improved through a streamlined evaluation and assessment process incorporated into a standardized AAR process.

Businesses applying NFPA 1600, used to evaluate and establish disaster management and business continuity plans, could benefit from an established AAR process.

In any of the above noted applications, a NFPA document providing a standardized, structured, and systematic approach would compliment the use of any recognized standard.

e. Identify other related documents and projects on the subject both within NFPA and external to NFPA:

Recent research efforts did not reveal any recognized standards or best practices that offered a standardized and programmed approach to developing and conducting AARs. There is a United States Fire Administration document, USFA-TR-159/April 2008, offering some limited guidance in developing an after-action critique from a lessons learned perspective. The U.S. Army is recognized by many organizational development and management authorities as having developed a comprehensive approach. The most recent U.S. Army document identified was Training Circular 25-20, published in 1993.

The following table offers a listing of NFPA standards and applicable section references to AARs or critiques. Quite likely, other NFPA documents can be identified representing a similar reference.

<table>
<thead>
<tr>
<th>Table 1 - National Fire Protection Association Codes, Standards and Recommended Practices with References to After Action Review Processes</th>
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<tbody>
<tr>
<td><strong>NFPA Code, Standard, or Recommended Practice</strong></td>
</tr>
<tr>
<td>450 – Emergency Medical Services and Systems – 2009 ed.</td>
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<tr>
<td>1026 – Incident Management Personnel Professional Qualifications – 2009 ed.</td>
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<td>1143 – Wildand Fire Management – 2009 ed.</td>
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<td>1403 – Live Fire Training Evolutions – 2007 ed.</td>
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<td>1500 – Fire Department Occupational Safety and Health Program – 2007 ed.</td>
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<td>1521 – Fire Department Safety Officer – 2008 ed.</td>
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<tr>
<td>1600 – Disaster/Emergency Management – 2007 ed.</td>
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<tr>
<td>1620 – Pre-Incident Planning – 2003 ed.</td>
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</table>

f. Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:
I am not aware of any committee assigned to this proposal. Any of the technical committee disciplines represented in Table 1, or through any other NFPA standards, represents the quality expertise necessary for developing a document prescribing a standardized approach to conducting AARs. There is a vast reservoir of expertise and no doubt considerable interest within the NFPA membership for a recommended practice applicable to after action reviews.

g. Provide an estimate on the amount of time needed to develop the new document:

Not fully understanding the NFPA process to get a proposal approved for standards development I propose the overall development time to be less than two years. It should take no more than one year to develop a document suitable for comment and review by the NFPA membership. As a recommend practice, this document could be guided through the standards development process and ready for publication in no more than one standards development cycles.

h. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:

The weakness of data availability for conducting AAR processes is one of the key elements in proposing this standard. A recently completed research project revealed no identifiable recognized industry standard(s) addressing the format and/or structure of an AAR process. There are several organizations utilizing an internally accepted methodology, however, recent survey results demonstrated that there is no commonly recognized standard for developing and conducting AAR processes.

Please send your request to:
Mary J. Maynard
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169
Stds_admin@nfpa.org
Item 09-8-38
May 27, 2009

Ms. Amy Spencer  
Secretary, NFPA Standards Council  
National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169

Dear Ms. Spencer:

APPA wishes to submit the enclosed standards proposal for consideration by the National Fire Protection Association (NFPA), in accordance with the NFPA Regulations Governing Committee projects procedure.

APPA is the association of choice serving educational facilities professionals. An international association dedicated to maintaining, protecting, and promoting the quality of educational facilities, APPA represents more than 1,500 learning institutions serving over 5,000 individuals. Its membership includes facilities professionals from public and private, two-year and four-year colleges and universities; medical and law schools; seminaries; public and private K-12 schools and districts; museums and parks; military installations; federal, state, and city-county governments.

In recent months, representatives of the APPA Code Advocacy Task Force (CATF), chaired by APPA Vice President of Professional Affairs (Kevin Folsom) have been engaged in discussions with NFPA Division Manager Robert Solomon regarding the feasibility of creating a national safety standard for educational facilities. Such a standard would provide the following benefits:

- Provide a compilation of existing NFPA codes and standards and to fill gaps that are not now covered by any document.
- Function as a best practice document for cost and benefit benchmarks.
- Provide a framework for the evolution of leading safety practices in much the same way that NFPA-99, Standard for Health Care Facilities, has provided a living document that is widely used within the healthcare industry.

One of the desired outcomes of this initiative would be to provide coherence to the broad subject of educational facility safety infrastructure that is unique to multi-building educational campuses. The APPA Code Advocacy Task Force anticipates that, in addition to use by educational facilities departments, an "Educational Facilities Standard" would be utilized by the U.S. Department of Education as well as individual state education agencies.

Thank you for your consideration.

Sincerely,

E. Lander Medlin  
Executive Vice President

cc: APPA President William Elvey, University of Texas -- Dallas  
APPA President-elect Polly Pinney, Arizona State University  
APPA Past President Alan S. Bigger, Earlham College  
APPA Vice President for Professional Affairs Kevin Folsom, Dallas Theological Seminary  
APPA Associate Vice President John Bernhards
### New Project Initiation Form

(To be completed by proponent of new project/document)

Additional pages may be attached if necessary.

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<th><strong>A</strong>ppa <strong>P</strong>roject</th>
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<td><strong>b.</strong> Identify intended users of the new document:</td>
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<td><strong>c.</strong> Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:</td>
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<td>Page 15</td>
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</table>

**Please send your request to:**
Mary J. Maynard
SAFETY STANDARD FOR EDUCATION FACILITIES

Application to the NFPA Standards Council for a New Committee Project

5/27/2009

Submitted by:

APPA
Leadership in Educational Facilities
Application to NFPA Standards Council for New Committee Project

Standards for Education Facilities

May 27, 2009

Provide an explanation and any evidence of the need for the new project/document.

1. **Standard of Standards.** The education facilities industry can immediately put to work an NFPA “extract” or “compilation” document that would function as a portal to the complete suite of NFPA documents. Our goal is not to replace the traditions of documents such as NFPA 1, 13, 20, 25, 70, 72 and 101, but to craft a new document that will expand upon the specifics of each as they apply to our industry. The document we visualize is similar to **NFPA 99 – Standard for Health Care**, a document that has been successful as a leading practice document for the US health care sector for many years. Educational facility safety infrastructure is growing at an accelerating rate across multiple dimensions of people, processes and technology. APPA wants to lead this trend with an industry-specific document that is grown from existing NFPA documents from the bottom up.

The presence of an industry-specific leading practice document will help education facility executives meet heightened expectations for performance and service delivery by helping them scale life safety concepts with a combination of prescriptive and performance methods that grow from proven NFPA documents. Just as our industry anticipates a step-change in federal funding for infrastructure projects, a growing body of data regarding campus safety has toughened the agenda of policy makers. This proposal is part of APPA’s mission to get out in front of imminent federal legislation. Code updates, occupancy changes, and the sheer complexity of new building systems make the case for a dedicated educational facility document an urgent reality.

2. **Living Document.** The NFPA implementation of the ANSI consensus process aligns more closely with the culture of open debate in the education industry. Points of consensus, while frequently difficult to achieve, are ultimately more credible when the competing requirements of safety and economy emerge from the crucible of informed and fair debate that is characteristic of the consensus products of NFPA.

An industry-specific living document can be changed to meet technological and legal developments faster than a federal standard. The
Application to NFPA Standards Council for New Committee Project

May 27, 2009

National Technology Transfer Act of 1996 (Public Law 104-113) promotes the development of new industrial and technology standards by requiring that all federal agencies use privately developed standards. Within the context of the NFPA’s 3-year revision cycle, the marginal cost of maintaining the living document we propose decreases over time. Other ANSI standards making bodies have participation costs which are prohibitive; well beyond the means of many university and school systems to fund expert representation at technical committee meetings.

3. **Risk Characterization.** One of the desired outcomes of this initiative would be to provide coherence to the broad subject of educational facility safety infrastructure that is unique to multi-building campuses with a variety of risk aggregations. The degree to which a living document for the education facilities industry becomes a tool of collaboration will be reflected in effective risk characterization and budgeting.

A recent Price-Waterhouse-Coopers study of business executives cited regulatory mandates and “regulatory capital adequacy” among the highest risk factors. With an industry-specific document, the existing suite of NFPA documents could be made easier to put to work. The proposed document would make it easier to convey and address critical campus safety-related matters not only with the necessary urgency but also with sensitivity and awareness for confidentiality and liability exposures unique to the education facilities industry.

Managing large, complex, capital-intensive educational facility infrastructure assets with unique architectural and social identities is different from managing other asset classes. Differences in everything from department culture to annual facility use patterns mean that facility managers cannot implement the same safety approaches in all buildings. Approaches must be scaled to the occupancy type and informed by the interconnectedness and the specifics of a given facility. Most NFPA documents are aligned with a specific safety technology, within a single-building, and crafted in prescriptive language. While this model is appropriate for a large class of safety systems in the built environment, it does not capture the nuance that emerges in groups of buildings. For example, safety systems, such as sprinkler water supply, mass notification systems and emergency power sources, are frequently shared between buildings and managed by a permanent, around-the-clock staff.

We seek to integrate the common elements of compliance tasks across our
4. **Prescriptive Versus Performance.** While the NFPA has produced several performance documents (such as NFPA 101A) that try to fit design solutions with a given code's intent, its prescriptive documents are still the documents of choice for adopting jurisdictions. Prescriptive documents are preferred by insurance companies and enforcement authorities because conformity to a prescriptive code requires fewer enforcement resources to verify. Risk baselines are easier to identify. In many cases, the cost of 100% prescriptive conformity is impossible. The inability to meet prescriptive requirements in generic safety documents results in rationing of installation, inspection, testing and maintenance resources by ad hoc methods that frequently reduce the credibility of the governing document. Our industry could reduce the use of ad hoc methods if we could scale safety concepts from existing NFPA resources on performance-based methods.

5. **Municipal-Like Safety Infrastructure.** Many universities function as full-scale towns, with permanent and transient populations that often exceed 25,000 people. For example, the University of California, Los Angeles; and the University of Maryland, College Park; are self-contained entities with large residential populations, shops, recreational facilities, and full service police and fire departments. They are a large footprint located within major metropolitan centers. Cities such as Lawrence, Kansas; Madison, Wisconsin; and Ann Arbor, Michigan; are dependent on local university campuses for their economic survival. Smaller colleges and universities, including the nation's 2-year institutions (community colleges, technical colleges, junior colleges, seminaries), serve large transient populations. It is not uncommon for four, five, or more universities and colleges—public, nonprofit, and profit—to be located in a county or city such as Boston.

Educational campuses are also large workplaces; designed for the free movement of people and materials. The “city within a city” life safety infrastructure (water, power, signaling, telecommunications, area lighting, transportation, health care, etc.) that is characteristic of campus-style
building assets does not have a model practice document that could be used by local governments and facility managers in their “town-gown” water, natural gas, sewer, energy, communication, and public safety infrastructure relationships. Infrastructure assets generally, and shared infrastructure assets in particular, differ from other assets in ways which introduce complexity and risk because these assets are often quasi-monopolies with pricing power.

Many colleges and universities have district energy systems that operate utility-like enterprises that provide heating, cooling and electric power to their campuses, to large university-based hospitals. Consortia combinations are common. In some cases these systems provide normal and standby power to their host communities. They may share underground raceway and tunnel systems with other utilities which are themselves governed by standards that may materially conflict or may fall out of step with one another due to frequent revision cycles.

The ongoing jurisdictional issue between the National Electrical Safety Code and the National Electrical Code, for example, could be resolved in this document -- at least as far as educational campuses are concerned -- possibly in the same chapter dedicated to the boundary issues in town-gown life safety infrastructure. This would clarify jurisdictional issues regarding area lighting, emergency power services and switchgear; among others.

6. Dormitories. Even as we turn to the NFPA for guidance on safety issues the common understanding of life safety infrastructure is broadening to include AEDs, water system security, premises security, metal detectors, pandemic preparedness and many other business continuity risks. This is no more evident than in the experiments in living arrangements now being undertaken in student housing facilities. A document to capture and assess mixed-occupancy safety concepts specific to this vital part of the education facilities industry does not now exist. Chapter 28 of NFPA 101, in its present form, may require a companion document that contains the results of technical committee debate and fusion points on industry-specific safety initiatives.

7. Smart Buildings. Educational facility managers are struggling with the convergence of security, critical operations, and life safety systems; sometimes called “smart buildings”. Practical implementation of smart buildings with convergent life safety infrastructure may not be as far along as the marketing campaigns of our suppliers but a vast industry process
has already booted up. There is still some anxiety in the code enforcement and fire protection community over full system integration. Once protocol issues are settled, smart buildings will track the energy, environmental and homeland security goals of various federal government agencies.

8. **Off-Campus Housing Fire Safety.** Related to the foregoing area of dormitories is the need for a model document to help fire safety professionals promote fire protection innovations; even if such innovations are only addressed in an annex or other informative text. The proposed document could supplement college town building inspection documents for off-campus student housing. Many educational institutions, working to control the living environments of its students wherever they live, could be held to a higher standard than a university that does not have on-campus housing nor provides any oversight of any other student housing. This risk must be managed. An annex dedicated to these concepts would put off-campus fire safety higher on the national agenda.

9. **Athletic and Special Event Management.** One major university, for example, sponsors more than 1,200 special events annually, not the least of which are athletic events. The concepts asserted in NFPA 101’s Life Safety Evaluation (LSE) methods are not widely known to many educational facility organizations that conform to local variants of NFPA 101. Integration of, and reference to, leading practice LSE methods would provide a consistent vocabulary for APPA facility managers, organizations such as the NCAA, and other expert agencies that support our educational mission.

Risk and vulnerability associated with sports, lectures, and graduation activities require an industry-specific document to assert model practice in planning, threat and vulnerability assessment, resource management, and inter-jurisdictional response strategies in special events management processes. Many state governments are asking educational facilities to act as “facilities of refuge” to their host communities in case of natural disasters. Athletic arenas and other places of assembly may be required to assist emergency management agencies in meeting homeland security objectives.

10. **Special Hazards.** One risk inherent in the open environment characteristic of many educational campuses is access to potentially harmful materials. In the event of a hazardous materials crisis or other catastrophe, campuses present a unique set of protection and transportation dilemmas. Because many campuses house sensitive materials and
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information and sponsor activities and events that increase their vulnerability it is common for major universities to employ people and establish facilities dedicated to research in the following areas:

- Nuclear - Engineering
- Biochemical - Communication
- Medical - Public Safety
- Defense - Transportation
- Technology - Intelligence
- International affairs – Aerospace

Major universities also serve as contractors to government agencies such as the Department of Defense, Department of Justice, National Security Agency, Federal Bureau of Investigation, Department of Energy, Centers for Disease Control, and the National Aeronautics and Space Administration, as well as to the nation’s largest corporations.

A flashpoint exists regarding the degree to which college and university campuses should sustain environments allowing unrestricted movement of people and material. For some, this issue cuts to the heart of the freedoms—movement, research and experimentation, thoughts and ideas, debate—inextricably linked to the system of higher education. For others, it is a practical matter of providing for the security of the institutions of higher learning so that they may continue to enjoy these freedoms. In any case, a document that is updated by the industry itself every three years is a more dynamic and responsive method for leading this discussion.

11. **All Hazards Approaches.** The discussion about the degree to which campus safety infrastructure should address events associated with conventional life safety hazards such as fires—or more extreme events such as hostile acts and explosions—needs a dedicated platform. The proposed document would provide that platform. If the benefits of the integration of fire alarm, security, information technology, and energy management systems are to be fully realized (e.g. shared infrastructure, common user interfaces, organizations will have to make decisions about user access, the suitability of single-vendor platforms, and staffing. Through other documents such as NFPA 72, many organizations are preparing for a broader convergence of fire protection with overall campus safety.
Application to NFPA Standards Council for New Committee Project

May 27, 2009

12. Environment, Sustainability and Energy Policy. As one of the largest components of the public sector of the US economy, the education industry is often the target of government energy and environmental security funding. Most educational facility organizations routinely deal with extensive air, water and waste issues. The document we propose could affirm the applicable ASHRAE, EPA or Department of Energy standards, or it could assert some industry-specific modifications of its own. At the very least, a dedicated chapter on this topic could provide coherence to dynamic environmental and energy policy. Debate on this issue would be lively but, within the context of the NFPA consensus document development process, it would be a debate more open and robust than any other ANSI standards development organization in the United States.

13. Homeland Security. The idea that openness can be more effective than secrecy in reducing risks is a broadening discussion. The word survivability appears with increasing frequency at facilities management conferences. In many jurisdictions threat assessments have cited colleges and universities as potential primary targets. The keynote speech at the 2006 Campus Fire Safety, Law Enforcement Conference, for example, was about adoption of the National Incident Management System and why unified command is important to educational campuses.

In general, University planners want to create communities that are resistant to disasters. To facilitate improved collaboration among educational systems within emergency management districts, standardized or model mutual aid agreements and memoranda of understanding could supplement material already present in NFPA 1600 - Standard on Disaster/Emergency Management and Business Continuity Programs. Alternatively, campus-specific information could be developed within NFPA 1600 with an advisory reference back to the proposed committee project now under consideration.

14. Administration and Enforcement. In many private colleges, and in larger public university systems, state constitutions give autonomous status to its institutions of higher education in order to preserve their political independence. With this status comes the option to select whichever consensus documents are appropriate for their way of doing business. In some of the larger APPA institutions, formal Building Code Committees are created to establish life safety policies; frequently picking and choosing from ANSI consensus documents developed by NFPA, ICC, ASHRAE, ASME, IEEE, etc.
The document we propose could have an annex, similar to Annex H of the National Electrical Code (Administration and Enforcement) which could contain model language for setting up Administrative Boards devoted to administering the full range of life safety technologies. The document we propose could offer model structures for independent university Building Code Committees that may also support their legal status. There is no such document now.

APPA member institutions will be involved in national and state policy initiatives that will ask them to confront the cost of functions and services that are very expensive relative to available resources. Our members will be under pressure to use intergovernmental collaboration to spread the cost of managing educational facilities across wider tax bases; capitalizing economies of scale or economies of skill inherent in some services. Economic silos will have to be cut-across and maps re-drawn. The presence of an industry-specific administrative and enforcement template will help both APPA and the NFPA meet common goals in managing life safety infrastructure.

Since APPA was founded in 1915, it has flourished with education institution members by recognizing that it is important not to exaggerate the difference between “educational facility practice” from the generic commercial safety practice. The document we propose is not intended to be used in isolation but rather in conjunction with the existing consensus documents. The extent to which ANSI-accreditation benefits the goals of regulatory authorities will be mirrored in bottom-line benefits for our sector.

b. Identify intended users of the new document.

Education Facilities Industry. The size of our industry – and therefore the number of users of the document -- can be understood in terms of annual facility budgets. According to APPA, the facility management organizations for K-12, higher education and private institutions within the United States is $70-100 billion annually. This includes new facility construction and rehabilitation and O&M in the US only. The average US
APPANIA facility executive manages an operations (O&M) budget of $5,000,000.

APPANIA also has international associates in Canada, The United Kingdom, Australia, New Zealand, Germany, Mexico and South Africa.

The primary users would be the education facilities management staffs of all levels: engaged in O&M, life safety, energy management and security. These central staffs need a "program" for, among other things, the inspection, testing and maintenance of life safety infrastructure. These staffs need a tool to manage growth, mitigate risk and embrace regulatory scrutiny. Having a national consensus document in which they may have a hand in writing would help get develop common goals and build a bridge between the central maintenance and distributed workgroups internal to their own organizations.

**APPANIA Business Partners.** In addition to over 1,400 U.S. educational institutions, APPANIA's membership includes representation from approximately 400 corporations that supply products and services to the education facilities community. Such products and services include code compliance agencies, building management and safety systems; building architecture firms and construction companies; building management service providers; and numerous manufacturers of safety and fire prevention equipment, among other areas. The close engagement of business partners within APPANIA's core constituency of educational institutions supports the business partners' ability to produce standardized products and services that meet the criteria of educational facilities departments as well as required codes and standards by which educational institutions must comply under local, state and federal regulations. It can be expected that the business community will be among the primary and key stakeholders seeking to engage in the development of the new document.

**U.S. Department of Justice.** The Department of Justice could identify this document as part of a "total program approach" for a national agenda for campus safety. The *National Summit on Campus Public Safety*, sponsored by the US Department of Justice in November-December 2005, called for a national agenda to affirm common principles, develop model practices, and create a road map. APPANIA has not been able to track progress on the leading practice safety document that was proposed during that conference.
Application to NFPA Standards Council for New Committee Project

U.S. Department of Homeland Security. A national agenda on campus safety, setting forth short-term and long-term direction, will eventually be developed and embraced jointly by the Department of Justice, the Department of Homeland Security, and other agencies committed to the safety and well-being of the nation's college and university campuses. The document now under consideration could create a crosswalk among the relevant DHS, FEMA and other professional practice documents.

U.S. Department of Education. Recent federal legislation the Campus Fire Safety Right-to-Know Act, requires an annual report to the Secretary of Education and to all users of campus facilities. Campus fire safety information could be made uniform across our sector if the education facilities industry can work more closely with NFPA on setting the standard for counting, analyzing and presenting it.

APPA and NFPA Continuing Education. The most surprising standard of all may not ever be written but may always lie in the public eye. Having a document like this will assist APPA in its mission to promote facility management as a profession and discipline among its front-line people. NFPA and APPA may enter into a partnership on this issue for mutual benefit.

C. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups.

APPA is the trade association of choice for all education facility managers: K-12, community colleges and technical schools; public and private universities. The concept of an ANSI-accredited leading practice document has been discussed by a focus group of APPA facility executives for nearly two years now. The most concentrated effort has taken place within the past year as its Code Advisory Task Force (CATF) began evaluating all possibilities for creating the document now under consideration. The broader context for our optimism lies in the fact that all CATF members are thought leaders in their field of expertise and fairly represent the industry as a whole. Biographical information about the CATF is attached herewith.
Application to NFPA Standards Council for New Committee Project

May 27, 2009

Concurrent with NFPA Standards Council evaluation of this proposal, APPA will engage the broader industry in a discussion of the specifics of this proposal. Press releases will be prepared and sent to the leading trade association publications such as the Chronicle of Higher Education, American School and University, and Campus Fire Watch.

There are many education facilities organizations that will have an interest in the proposed standard. Among them are the following:

1. National Association of College and University Business Officials
2. Council of Higher Education Management Associations
3. Association of American Universities
4. Association of Governing Boards of Universities and Colleges
5. U.S. Department of Education
6. National Clearinghouse for Educational Facilities
7. Association of American Colleges and Universities
8. Campus Fire Watch
9. International Association of Campus Fire Safety Officials
10. Campus Safety, Health, and Environmental Management Association
11. National Association of College and University Attorneys
12. National Association of Collegiate Directors of Athletics
13. Association of College and University Housing Officers
14. Association of University Real Estate Professionals
15. International Association of Campus Law Enforcement Administrators
17. Building Owners and Managers Association
18. Association of Public and Land-Grant Universities
19. American Association of Community Colleges
20. American Association of State Colleges and Universities
21. National Association of State Fire Marshals
22. National Intramural-Recreational Sports Association
23. Council for Christian Colleges and Universities
24. Association of Jesuit Colleges and Universities
25. Association of Catholic Colleges and Universities
26. American Indian Higher Education Consortium
27. National Institute for Occupational Safety & Health
28. Non-Profit Risk Management Center
29. Public Agency Risk Managers Association
30. Society For College and University Planning
Application to NFPA Standards Council for New Committee Project

May 27, 2009

31. Society of Certified Risk Managers, Technicians & Educational Specialists
32. National Collegiate Athletic Association
33. Women's College Coalition
34. National Association of Independent Colleges and Universities
35. Western Association of Schools and Colleges
36. Commission on Colleges of the Southern Association of Colleges and Schools
37. Northwest Commission on Colleges and Universities
38. New England Association of Schools and Colleges
39. Middle States Commission on Higher Education
40. Association of University Engineers (UK)
41. Association of University Directors of Estates (UK)
42. Institute of Engineers of Ireland (UK)
43. Association for Tertiary Education Management (AUS)
44. Australasian Association of College and University Housing Officers (AUS)
45. Facility Management Association of Australia, Ltd. (AUS)
46. Ministry of Education (NZ)
47. Standards New Zealand (NZ)
48. European Consortium of Innovative Universities (GER)
49. German Facility Management Association (GER)
50. Higher Education Facilities Management Association (South Africa)
51. Higher Education South Africa (South Africa)

Any prospect for viral, exponentially distributed adoption of the proposed document may not reside as much in its status as an extract or compilation document as it would reside in its prospect for providing a template for implementation of innovative safety concepts in the education facilities industry going forward.

Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available.

In addition to the education facility industry organizations listed in previous questions, other ANSI standards-developing organizations will be affected by this

The standards these organizations develop may refer to the industry-specific NFPA education facilities document now under consideration.

As of May 27, 2009, no standards developing organization with APPA’s support is contemplating a project of this nature. Existing NFPA documents 1, 3, 13, 25, 30, 54, 70, 70B, 70E, 72, 90A, 99, 101, 101A, 110, 111, 730, 551, 900, 1600 and 5000 contain generic provisions for a given technology or occupancy. Many state and local education departments refer to NFPA documents, or have “adaptations” of NFPA documents. Our objective would be to replace these “adaptations” with an industry-specific NFPA document that could be adopted whole cloth by any educational facility agency.

Many discussions on this proposal have taken place between APPA’s Code Advisory Task Force and its member institutions. Anecdotal evidence suggests that there will be no shortage of organizations willing to fund expert participation in technical committee meetings. Many of these organizations already have a tradition of funding participation in NFPA document development.

APPA itself has an Information and Research Committee that develops and disseminates data and information relevant to educational facilities management. Activities include APPA’s Facilities Performance Indicators Survey and its
resulting FPI reports and dashboards, the Strategic Assessment Model (SAM), and the Center for Facilities Research (CFaR).

In addition to the organizations listed in the answer to Question "c", we anticipate that the following organizations would also be willing and able to provide expertise:

1. American Fire Sprinkler Association
2. American Society of Safety Engineers
3. International Electrical and Electronic Engineers
4. American Public Transportation Association
5. American Society of Heating, Refrigeration, & Air Conditioning Engineers
6. FM Global/Swiss RE and other insurance underwriters
7. Facility condition analysts (Whitestone, ISES, etc.)
8. International Fire Marshals Association
9. National Fire Sprinkler Association
10. American Society for Healthcare Engineering
11. American Society of Safety Engineers
12. U.S. National Institute of Standards & Technology
13. American Society of Theater Consultants
14. International Association of Assembly Managers
15. Council of Educational Facility Planners, International
16. Association for Information Communications Technology Professionals in Higher Education
17. Association of Public-Safety Communications Officials
18. International Association of Campus Law Enforcement Administrators
19. International District Energy Association
20. US General Services Administration

Some expertise on NFPA 1, 13, 20, 25, 70, 72, 101, 101A, 730, and 1600 technical committees could be consulted in the preparation of this document.

Provide an estimate on the amount of time needed to develop the new document.

Assuming NFPA Standards Council approval at the August 2009 meeting, it would take about six months for a draft (pre-ROP) document to be prepared by the APPA and other stakeholders required under the NFPA process. This time
frame could be reduced if the Standards Council prefers a reduced scope, or a “lighter footprint” in the first edition.

Given the need to work quickly to get this document to market, our industry might be best served by working with NFPA to set up just enough of a committee structure to establish the core “compilation” or “extract” characteristic; while at the same time blocking out chapters for content growth in later editions. Conversely, the broad contours of the scope of this project could be established by NFPA at the outset, with several discipline-specific technical committees reporting upward to a technical correlating committee. Given the size of the stakeholders in the education facilities industry, however, there should be no delay associated with assembling a start-up roster of technical committee(s) among known APPA stakeholders.

In any case, a working document, similar to the NFPA 3 working document (now in circulation), could be ready as early as March 2010.

Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document.

Insurance industry data sheets, loss history, manufacturer product research, government and expert agencies listed in the responses to Questions c, d, and f above.

1 “Extending Enterprise Risk Management To Address Emerging Risks” Annual Meeting of the World Economic Forum in Davos-Klosters (28 January–1 February 2009), Study by Price Waterhouse Coopers.
Application to NFPA Standards Council for New Committee Project

Standard for Education Facilities

May 27, 2009
Application to NFPA Standards Council for New Committee Project

Standard for Education Facilities

May 27, 2009

APPA Code Advisory Task Force

Michael A. Anthony, P.E., Senior Electrical Engineer, University of Michigan – Ann Arbor

Brooks H. Baker, III, Associate Vice-President of Facilities, University of Alabama – Birmingham

John F. Bernhards, Associate Vice President, APPA, Arlington, Virginia (Staff Liaison to CATF)

Richard E Davis, J.D., P.E., Facilities Engineer, Evergreen State College, Washington

Kevin Folsom, Director of Facilities and Plant Operations, Dallas Theological Seminary, Dallas, Texas

David Handwork, P.E., Director of Engineering, Arkansas State University - Jonesboro, Arkansas

Terri Konchesky, Health and Safety Specialist, West Virginia University, Morgantown, West Virginia
Item 09-8-39
To: Secretary, NFPA Standards Council

From: Gregory Noll, Chairman
Technical Committee on Hazardous Materials Response Personnel

Date: June 9, 2009

Re: Request for Approval of New Recommended Practice

The Technical Committee on Hazardous Materials Response Personnel is requesting Standards Council approval of a new recommended practice that will outline the minimum requirements for the organization and management of a hazardous materials/weapons of mass destruction (WMD) emergency response program. This new recommended practice will address the assessment, development and sustainment of a response capability to hazardous materials/WMD incidents and integrate planning, prevention, response and recovery as the primary components for the management of a hazardous materials/WMD program.

Hazardous materials/WMD emergency response program management systematically organizes and controls the fundamental interest of providing response services based upon the authority having jurisdiction’s hazard and risk assessment process. This new recommended practice will also consolidate relevant regulatory requirements, occupational safety and health standards and critical components of hazard and risk analysis.

The technical committee also requests that the Standards Council approve the following Scope for the new recommended practice:

_this recommended practice establishes a common set of criteria for the organization, management and deployment of personnel, resources and programs for those public or private entities that are responsible for the hazardous materials/weapons of mass destruction emergency preparedness function._

The technical committee also requests that the number of the recommended practice be assigned NFPA 474, to follow the current hazardous materials response document numbering sequence.

Please do not hesitate to contact me if there are any questions, and thank you for your consideration of this request.
New Project Initiation Form
(To be completed by proponent of new project/document)
Additional pages may be attached if necessary.

a. Provide an explanation and any evidence of the need for the new project/document:

There is no document that provides guidance for those charged with the deployment of personnel, resources and programs for public or private entities that are responsible for hazardous materials/WMD emergency response functions. Competency documents exist to build a training program but there is no guidance on how to manage a comprehensive HM/WMD emergency response program.

A working group of the Technical Committee on Hazardous Materials Response Personnel has identified the need for a comprehensive document (recommended practice) that would address the assessment, development, and sustainment of a response capability to hazardous materials/weapons of mass destruction (WMD) incidents. This document would provide a bridge between NFPA 472, Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents, and NFPA 473, Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents and how a hazardous materials response program should be developed, managed and maintained.

The working group identified a void within the response community which looks at and guides the responder, supervisor and manager of a team or response entity. This guidance is centered on the prevention, planning, response, and recovery phases of an operation. This in turn enhances the short term and long term goals of a response entity creating a process by which the entity can use strategic and tactical goals as a template for sustainment and future development.

Based upon the authority having jurisdiction’s capability assessment, the proposed document would integrate planning, prevention, response, and recovery as primary components for the management of the hazardous materials/WMD program.

Hazardous materials/WMD program management systematically organizes and controls the fundamental interest of providing response services based upon the AHJ’s hazard assessment process. This document would also consolidate relevant regulatory requirements, occupational health and safety standards, and critical components of hazard and risk analysis.

In summary, the proposed document would establish a common set of criteria for the organization, management and deployment of personnel, resources, and programs for both public and private entities responsible for Hazardous Materials/WMD emergency response functions.

b. Identify intended users of the new document:

Intended users of this document would be those entities that are responsible for the administration and management of a hazardous materials/WMD emergency preparedness program.

c. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:

The membership of the Technical Committee on Hazardous Materials Response Personnel consists of individuals who represent the responder community and disaster and emergency management specialists.

d. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:

Any emergency services organization (public or private sector) charged with the responsibility of...
managing a HM/WMD emergency preparedness program.

e. Identify other related documents and projects on the subject both within NFPA and external to NFPA:


f. Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:

The Technical Committee membership currently contains this expertise and interest.

g. Provide an estimate on the amount of time needed to develop the new document:

Approximately two years of development, the technical committee envisions the document will enter an Annual 2012 cycle to run concurrently with NFPA 472 and 473.

h. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:

Please send your request to:
Mary J. Maynard
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169
*Stds_admin@nfpa.org*
Item 09-8-40
New Project Initiation Form
(To be completed by proponent of new project/document)
Additional pages may be attached if necessary.

a. Provide an explanation and any evidence of the need for the new project/document:

With the Global War on Terrorism fully underway, the rise of rogue nations and state sponsored terrorism, and in accordance with all tenants of the 4th generation warfare in which we now find ourselves, we must rethink our respiratory protection response from one that is exclusively civilian or industrial in nature. Extensive operations in less than IDLH operations will require a PAPR that provides sufficient respiratory protection at realistic respiratory rates that are indicative of rescue, medical triage and extended decontamination operations.

b. Identify intended users of the new document:

Fire departments, Police departments, Civil First Responders, Civil First Receivers (medical triage personnel), Department of Defense and the Department of Homeland Security.

c. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups:

DoD (TSWG, USMC, USAF, & USA), DHS (USCG), Civil Fire fighters, Police departments, FEMA, USAR teams, CDC/NIOSH & NFPA TC on respiratory protection.

d. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available:

DoD, DHS, all Civil Fire fighters and Law enforcement, Medical workers. Manufacturers of respiratory protection equipment.

Benefits would include greater general comprehension of the parameters of respiratory protection provided or not provided by APR’s in terms of defining the conditions found in the area of operations (ambient weather, relative humidity, respiratory rate and type and concentration of the contaminant(s).

The opportunities for management of the consequences of a weapons of mass destruction incident inside the continental United States will increase on a level that corresponds with the rise of state sponsored terrorism. Mitigation of these consequences and to restore continuity of government will require extended operations in contaminated areas that have atmospheres that are less than IDLH but are still hazardous to respiratory and dermal tissues.

e. Identify other related documents and projects on the subject both within NFPA and external to NFPA:

Literature on:

Human cyclic respiratory rates in PPE conducting rescue, decontamination, medical triage and or combat operations. Including work conducted by NavAir (Kaufman) and University of Waterloo. Also reference the ISO work rates which have been reestablished to include higher respiratory flow rates.
Filter and filtration dynamics. Including work conducted by ECBC and Battelle.

[Specific references can be provided upon request.]

<table>
<thead>
<tr>
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<th>Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest:</th>
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<tr>
<td></td>
<td>Expertise on human respirations and human physiology.</td>
</tr>
<tr>
<td></td>
<td>Expertise on PAPR manufacturing and filter optimization.</td>
</tr>
<tr>
<td></td>
<td>Expertise on the characterization of contamination concentrations in the field and in urban areas.</td>
</tr>
<tr>
<td></td>
<td>The committee currently has the necessary expertise in the PAPR manufacturing and optimization arena as well as the contamination concentrations in the field arena. There is a concern that there is not sufficient expertise on human respirations and physiology.</td>
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<th>g.</th>
<th>Provide an estimate on the amount of time needed to develop the new document:</th>
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<td></td>
<td>Unknown, this is a multifaceted challenge one of framing or characterizing the nature of the threat, accurately assessing the situation at the area of operations and selecting the respiratory protection that is appropriate for the situation. A minimum of one year would be recommended.</td>
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<th>Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:</th>
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<td></td>
<td>I believe that the data and information exists, the challenge is gathering it all together in one committee for one expressed purpose. Related studies are ongoing with the Technical Support Working Group, Georgia Technical Research Institute and Battelle Memorial Institute’s aerosol studies laboratory.</td>
</tr>
<tr>
<td></td>
<td>[Technical references referred to in this document can be provided upon request.]</td>
</tr>
</tbody>
</table>
Item 09-8-41
The following is a proposal that I would like to formerly request NFPA to research. I would love to be a part of this and take an active roll in the research. I believe that a standard could be drawn from this with the advocacy of providing exterior protection to the outside of residential structures in the wild land setting. The following documents are provided to show research in Canada and in Australia. I believe the two methods could be immersed to provide an acceptable level of protection. Please contact me with any further information. Our Chief is constantly asked if there is a viable protection method for these structures in regards to this type of protection. Homes have been saved by variable methods but it is not definitive on a standard approach for someone to install these type of systems. I would like to see if there is some way to have NFPA take on this task and I know with are jurisdiction constantly under threat of wildfires every year that we will provide any information necessary from our point of view to make this happen.

Todd Letterman
Fire Protection Engineer
Riverside County Fire Department
(951) 955-5273-Fax (951) 955-4886
todd.letterman@fire.ca.gov

"Life’s not about waiting for the storms to pass…
It’s about learning to dance in the rain."
a. Provide an explanation and any evidence of the need for the new project/document:

**Proposed Project: Use of sprinklers for structure protection from wildfire**

In a conversation with Nist last year it was asked if a study had been produced to show the effects of exposure protection with sprinklers with an approaching heat and flame front. The answer was no and they did not know if any study that existed. It was suggested that I use the only one they have on file which is a study created by Stew Walkinshaw, Montane Forest Management Ltd., Canmore, AB and Ray Ault, FPInnovations – Feric Division, Wildland Fire Operations Research Group, Hinton, AB Canada. We as a nation have not produced a study showing the same viability. We have reports of homes that have been saved by exterior protection of continual water application but inconsistent record keeping lack of properly written accounts and data collection have been the downfall for specific applications. There is no standard that addresses it, committee that is formed that addresses just this issue. There is even a study that was produced in Australia called the Barry Lee Fire Protection Scholarship which addresses commercial fire sprinklers for protection against approaching vegetation or “bush fire”. This standard is completely different compared to the Canadian study and there should be study that should balance the two for continual wetting.

**Introduction:**

Wildland fires are those fires that occur on lands with natural vegetation such as forest, brush, and grass. While such fires can have a beneficial effect on the natural environment, they also can be costly and destructive. Wildland fires can risk lives and property, and compromise watersheds, wildlife habitat, recreational opportunities, and local economies. Wildland fires occur in both sparsely populated and developed areas. As development continues to increase in areas with high wildfire risks, California is faced with the challenge of controlling the costs of wildland fires while reducing the losses from such fires.

Expenditures for wildland fire protection represent the largest General Fund expenditure in the Resources Agency. In recent years, the average annual General Fund costs for wildland fire protection have exceeded $400 million, or about 40 percent of General Fund expenditures for the Resources Agency. The CDFFP's budget for wildland fire protection is unusual in that the administration has the statutory authority to exceed the initial appropriation when budgeted resources are insufficient to meet emergency needs. Over the last ten years, expenditures for wildland fire have generally increased. As discussed later, there are a number of factors which have driven costs upwards—increasing labor costs, the growing population in and around wildland areas, and unhealthy forest conditions (particularly in Southern California).

When additional resources for fighting fires are needed, these resources (such as overtime costs and equipment rental) are funded from the Emergency Fund, which is referred to as the "E-Fund." Because it is not possible to know the exact amount of funds that will be needed each year, the annual budget act provides a baseline appropriation for the E-Fund that in recent years has been based roughly on a ten-year average of these expenditures. The budget act authorizes the Director of Finance to augment the baseline appropriation by an amount necessary to fund the E-Fund.

The area where human development meets and intermingles with undeveloped wildlands is commonly referred to as the wildland-urban interface or WUI. Of the approximately 8 million acres of WUI in California, about 5.5 million acres are considered at high risk of wildfire as shown...
in Figure 12. These high-risk WUI areas are characterized by a history of fire conditions that are favorable to wildland fire and the presence of structures. These areas include relatively sparsely populated areas as well as areas which may be urban in terms of density, but are also at risk of wildfire from high winds.

- Property owners can improve the probability of their homes surviving a wildfire event by developing a structure protection plan that includes an independent water supply, pump, hose and sprinklers.
- Water supply lines for sprinklers must be protected from the extreme heat of the fire front.
- Under-building and deck openings need to be protected by skirting that will prevent the fire and embers from reaching under the structure as the flame front passes.
- Set sprinkler patterns to wet as large an area around the house as possible if an adequate water supply exists, as this will substantially reduce the thermal intensity applied to the house as the fire front passes. When the water supply is limited, water application directly on the structure is preferred.

b. Identify intended users of the new document: Anyone within the Fire Protection and Building community that interfaces the wildland existing or new single or multifamily dwellings with the potential threat of fire. Also other Countries with the same opposing threat.

c. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new document; and provide contact information for these groups: National Fire Protection Association, National Institute of Science and Technology and Insurance Jurisdictions. Other Countries with same opposing threat.

d. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new document, and what benefit they will receive by having this new document available: National Associations of Manufactures, Underwriters Laboratories, National Fire Protection Association Insurance organizations, State and Local Jurisdictional Planning communities, Fire Wise, Federal Emergency Management. If there were established protocol with proven documentation and engineering to justify a standard created or implemented it would benefit every community with the viable threat of fire from wild land interface.

e. Identify other related documents and projects on the subject both within NFPA and external to NFPA: FPInnovations

f. Identify the technical expertise and interest necessary to develop the document, and if the committee membership currently contains this expertise and interest: This would need to be conducted by a qualified lab to conduct field studies of different habitats terrain mock experimentation as FPI conducted and Modeling to be performed.

g. Provide an estimate on the amount of time needed to develop the new document: I would say do...
to the complexity about 24 months.

h. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new document:


Please send your request to:
Mary J. Maynard
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169
Stds_admin@nfpa.org
Use of sprinklers and aqueous gel for structure protection from wildfire

Stew Walkinshaw, Montane Forest Management Ltd., Canmore, AB

Ray Ault, FPInnovations – Feric Division, Wildland Fire Operations Research Group, Hinton, AB

Video list

Video 1. Sprinkler Water Application
Video 2. Aqueous Gel Application
Video 3. Plot 1 Fire Behaviour
Video 4. Sprinkler Cabin Front Right
Video 5. Sprinkler Cabin Back Left
Video 6. Aqueous Gel Cabin Front Left
Video 7. Aqueous Gel Cabin Back Right

Abstract

FPInnovations studied the effectiveness of sprinkler systems and aqueous gel for the protection of structures from wildfire. The study results may assist fire suppression personnel when making strategic decisions on wildland–urban interface fires. The time and resources required to set up the systems, water volumes used, structural damage, and structure temperatures were investigated.

Keywords

Structure protection, Fire suppression, Sprinklers, Aqueous gel, Wildfires, Wildland - urban interface.

Introduction

Structure protection in the wildland–urban interface involves the use of many different strategies and tactics with the overall goal of protecting the greatest number of structures with the resources and time available. Several wildfire agencies in Canada have successfully used sprinkler systems for structure protection during wildland–urban interface fires. However, sprinklers are not always available on short notice or in adequate numbers, they require adequate lead time for proper setup, and they may cause structural damage depending on setup procedures. Aqueous gel products have been used by some Canadian wildfire agencies and structural suppression agencies during fires with some success. Issues noted with aqueous gel products include product cost and difficulty in cleaning the structure after gel application.

With the help of the Northwest Territories government, FPInnovations–Feric Division conducted test burns near Fort Providence in June 2005 and documented the setup and application, resources required to operate, and success of structure protection for both sprinkler and aqueous gel systems on test cabins. This report presents results from the first of the test burns; the other burns will be documented in future reports.

Objectives

This study had the following objectives:

- Determine the effectiveness of structure protection equipment that is readily available to homeowners.
- Evaluate the effectiveness of sprinklers and aqueous gel in structure protection under extreme fire behaviour conditions and determine the conditions that influence success.
• Evaluate the time and resources required to treat structures with sprinklers or aqueous gel.
• Evaluate the temperatures at critical points on each structure during and after wildfire passage.
• Evaluate the effect of exterior structural materials to structure survival.
• Test the FireSmart-recommended guidelines for using asphalt-shingle roofing and double-glazed windows, and the recommended practice of skirting decks and open spaces (Partners in Protection 2003).

Methods

Cabins

Cabin dimensions were 2.4 m × 3 m with a 1.2 m × 2.4 m deck on the back (Figures 1 and 2). The cabins were pre-assembled in sections in Alberta and transported to the Northwest Territories site by trailer. Each cabin was then re-assembled onsite.

Figure 1. Front view of cabin

Figure 2. Side and rear view of cabin

Cabins were wood-frame construction with the following exterior materials:

- roofing – asphalt shingle
- siding – vinyl (50%) and cedar (50%)
- windows – double-glazed
- soffit – aluminum
- door – hollow-core metal
- fascia – aluminum
Cabin locations were chosen based on the need for extreme fire behaviour to approach and surround the cabin with ease. The only trees removed were those necessary to site the cabin. No modifications were made to the stand or the fuels surrounding the cabins other than erecting the cabins. Cabins were placed within approximately 20 m of each other to ensure each experienced similar fire behaviour, while not influencing each other (Figures 3 and 4).

Each cabin was pre-wired with 20 temperature sensors to record temperatures before, during, and after the fire. The sensors were placed at the following locations:

- under cedar siding (4 locations) – right rear and side, left front and side
- outside window (2 locations) – right and left sides
- inside window (2 locations) – right and left sides
- under vinyl siding (4 locations) – right front and side, left rear and side
- in soffit (4 locations) – 1 m from right and left front and 1 m from right and left rear
- in peak (2 locations) – 1 m from rear and 1 m from front
- interior of cabin (2 locations) – centre 1 m and 2 m above ground

Each cabin site had four radiant cubes to record radiant heat flux (kW/m²) in the wildfire environment and in-fire video cameras to record the sequence of events before, during, and after the fire.

Sprinkler installation

Four impact-style garden sprinklers, each with a 3 mm nozzle orifice, were installed an average of 4.2 m from each corner of the cabin (Figure 3). Two were installed at ground level at the southeast and northwest corners, and two were elevated 1.2 m off the ground on wooden poles at the northeast and southwest corners. The sprinkler arc was set for 90° to wet only the cabin area. Two people installed the sprinklers.

Water supply was provided from an 11,000 L relay tank and pumped with a Honda pump through 38 mm lined fire hoses. Water supply volume and pressure was 68 L/min at 364 kPa. The main supply line was buried 15 cm below ground to avoid burning the hose and losing water supply. Water was supplied to the sprinklers with a 16 mm Wildfire Econoflo® hose, in a closed-loop circuit, from a wye off the northwest corner of the cabin (Figure 5). Following installation, the system was tested and pressures and volumes were recorded. Sprinklers were operated for 22 minutes prior to wildfire impingement (Figure 4).
Aqueous gel application

A homeowner application package consisting of a one-gallon plastic jug of gel and a brass eductor nozzle was used to apply aqueous gel. The same relay tank, Honda pump, and hose as used in the sprinkler system were used for water supply. One 15 m length of 16 mm Econoflo hose supplied water to the eductor nozzle for gel application (Figure 6).

Gel was applied by two people—one operating the nozzle and one pulling the hose. Gel was applied to all exterior cabin surfaces (Figure 7) except the exposed underside of the back deck. A gel layer was applied on the wildland surface fuels within 25 cm around the cabin’s perimeter. Application was complete approximately 53 minutes prior to wildfire encroachment.
Vegetation

The vegetation consisted of C3 (jack pine) fuel type with a moderate black spruce understory and Cladonia ground cover (Figure 8). Ladder fuels and ground fuels were light to moderate.

Fire weather and ignition technique

Wildfire ignition was accomplished with two people using an all-terrain vehicle and flamethrower (McCulloch 2006). Ignition commenced in the northwest corner and proceeded around the perimeter in a counterclockwise direction.

The fire was ignited under the Canadian Forest Fire Danger Rating System (CFFDRS) fire weather indices shown in Table 1 (Turner and Lawson 1978). Intense wildfire was anticipated as a result of igniting under these weather conditions and indices.

Table 1. CFFDRS weather and fire indices at time of ignition

<table>
<thead>
<tr>
<th>Plot</th>
<th>Date</th>
<th>Temp (°C)</th>
<th>RH (%)</th>
<th>Wind (kmh)</th>
<th>FFMC</th>
<th>DMC</th>
<th>DC</th>
<th>ISI</th>
<th>BUI</th>
<th>FWI</th>
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<tr>
<td>1</td>
<td>June 28/05</td>
<td>25.4</td>
<td>24</td>
<td>E @ 6</td>
<td>93</td>
<td>46</td>
<td>385</td>
<td>10</td>
<td>71</td>
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</table>

Results and discussion

Structure protection strategies - time and resources

Sprinkler cabin
Two people each spent 45 minutes to install the sprinkler for a total installation time of 1.5 person-hours (Table 2).

Sprinklers operated for 22 minutes prior to wildfire impingement for a total of 2000 l of water applied.

Video 1. Sprinkler Water Application. (Click on it to start)

**Gel cabin**

Two people each spent 12 minutes on the gel system setup and application for a total setup and application time of 0.4 person-hours (Table 2). Gel application time was approximately 6.5 minutes.

A total of 5.7 l of aqueous gel was applied at the recommended application rate of 2% resulting in a total of 335 l of water usage. Application was complete approximately 53 minutes prior to wildfire encroachment.

Video 2. Aqueous Gel Application. (Click on it to start)

**Table 2. Installation and application details – sprinkler and aqueous gel systems**

<table>
<thead>
<tr>
<th></th>
<th>Sprinkler</th>
<th>Aqueous Gel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation/Application Manpower</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Installation/Application Time</td>
<td>1.5 person hours</td>
<td>0.4 person hours</td>
</tr>
<tr>
<td>Application Water Volume</td>
<td>2000 litres</td>
<td>335 litres</td>
</tr>
</tbody>
</table>

Less time and water were required to set up and apply the aqueous gel than to install and operate the sprinkler system. This may be a benefit where manpower, time, or water supplies are limited for structure protection.

**Wildfire passage**

The wildfire approached both cabins as an active crown fire with significant airborne firebrand transport landing on the structures ahead of the fire. The sprinkler cabin survived wildfire passage with significant damage and the aqueous gel cabin was destroyed (Figure 9).
Sprinkler cabin

In-fire video of the event indicates that water application from sprinklers reduced the combustibility of the structural fuels and reduced the fire intensity in the wildland fuels immediately adjacent to the cabin. As a result, the structure survived and surface fuels were unburned for 2 m surrounding the cabin within the sprinkler arc. The cabin exterior was ignited by the initial passage of the flame front but did not sustain combustion once the flame front had passed. Damage to the sprinkler cabin included the following:

- Asphalt roofing shingles severely melted but not burned (Figure 10).
- All vinyl siding melted and burned (Figure 11).
- Cedar siding scorched on front and sides, no damage on back (Figure 11).
- Deck surface and legs were undamaged (Figure 11).
- Aluminum soffit materials on the front melted (Figure 12).
- Metal hollow-core front door severely warped.
- Double-glazed windows cracked on left- and right-side exterior panes only (Figure 13).

The sprinkler arc was set at 90° because water was limited and it was determined more important to wet the structural fuels than to wet forest fuels.

Above-ground sprinkler equipment was damaged and ceased operation upon flame-front passage (Figures 14 and 15). The 16 mm Econoline hose melted or cracked in several locations and water flow to the sprinkler loop ceased. The sprinkler heads were undamaged because the areas surrounding them were moist. The buried 38 mm mainline was not damaged.
The sprinkler system was operational up to the point of wildfire passage, which appeared to be an extremely important factor in structure survival. Past Feric case studies have shown that if water supply is lost prior to the arrival of the flame front, the probability of structure survival is significantly reduced. Therefore, structure protection personnel should install the water supply, pump, and supply hose in non-combustible areas to ensure that water supply is maintained during flame front passage.

Video 4. Sprinkler Cabin Front Right. (Click to start)
Video 5. Sprinkler Cabin Back Left. (Click to start)

Figure 12. Post-fire soffit material.

Figure 13. Post-fire window.
In-fire video indicates that the flame front completely enveloped the gel cabin and resulted in severe burning of all surface and aerial wildland fuels surrounding the cabin (Figure 16). The cabin was destroyed as a result of both wildland and structural fuels igniting under the untreated underside of the back deck. As with the sprinkler cabin, the gel cabin exterior was ignited by initial passage of the flame front but did not sustain combustion once the flame front had passed, except for the rear deck, under the eaves, and on the joint between the vinyl and cedar siding on the front side of the cabin. The main ignition point for the gel cabin was the underside of the back deck which then supported the combustion on the back wall and under the back eaves. Fire burned on the back wall for approximately 6 minutes before entering the cabin interior through the rear soffit, fracturing the windows, and resulting in cabin collapse approximately 13 minutes after flame-front passage.

**Aqueous gel cabin**

In-fire video indicates that the flame front completely enveloped the gel cabin and resulted in severe burning of all surface and aerial wildland fuels surrounding the cabin (Figure 16). The cabin was destroyed as a result of both wildland and structural fuels igniting under the untreated underside of the back deck. As with the sprinkler cabin, the gel cabin exterior was ignited by initial passage of the flame front but did not sustain combustion once the flame front had passed, except for the rear deck, under the eaves, and on the joint between the vinyl and cedar siding on the front side of the cabin. The main ignition point for the gel cabin was the underside of the back deck which then supported the combustion on the back wall and under the back eaves. Fire burned on the back wall for approximately 6 minutes before entering the cabin interior through the rear soffit, fracturing the windows, and resulting in cabin collapse approximately 13 minutes after flame-front passage.
The asphalt-shingle roofing material was ignited by the flame front but did not sustain combustion once the flame front had passed. Airborne firebrands ahead of the main flame front did not ignite the roofing material or the deck surface; however, they did ignite the surrounding surface vegetation.

The double-glazed windows remained intact during flame-front passage; however, they were eventually fractured when fire entered the interior of the structure. It is unknown if one or both panes were cracked with flame-front passage.

**Temperatures**

The cabin temperature sensors provided valuable information. Table 3 presents the maximum and average temperatures at various locations for both cabins. Table 4 presents temperatures that were taken at or about the same time at various locations for both cabins. Data from the gel cabin sensors should be used with caution and may be inaccurate due to exposure and sensor damage from the structure fire.
**Table 3. Cabin temperature sensor results – maximums and averages**

<table>
<thead>
<tr>
<th>Sensor location</th>
<th>Sprinkler cabin</th>
<th>Gel cabin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. temp. (°C)</td>
<td>Time after ignition (min:sec)</td>
<td>Avg. temp. (°C)</td>
</tr>
<tr>
<td>Interior 1 m AGL</td>
<td>47</td>
<td>8:59</td>
</tr>
<tr>
<td>Interior 2 m AGL</td>
<td>80</td>
<td>8:20</td>
</tr>
<tr>
<td>Peak front 3 m AGL</td>
<td>154</td>
<td>8:03</td>
</tr>
<tr>
<td>Peak rear 3 m AGL</td>
<td>107</td>
<td>8:07</td>
</tr>
<tr>
<td>Window outside</td>
<td>354</td>
<td>7:49</td>
</tr>
<tr>
<td>Window inside</td>
<td>73</td>
<td>7:49</td>
</tr>
<tr>
<td>Front cedar</td>
<td>58</td>
<td>14:05</td>
</tr>
<tr>
<td>Rear cedar</td>
<td>53</td>
<td>15:37</td>
</tr>
<tr>
<td>Left cedar</td>
<td>56</td>
<td>16:12</td>
</tr>
<tr>
<td>Right cedar</td>
<td>59</td>
<td>12:22</td>
</tr>
<tr>
<td>Front vinyl</td>
<td>777</td>
<td>7:45</td>
</tr>
<tr>
<td>Rear vinyl</td>
<td>164</td>
<td>8:32</td>
</tr>
<tr>
<td>Left vinyl</td>
<td>220</td>
<td>8:00</td>
</tr>
<tr>
<td>Right vinyl</td>
<td>230</td>
<td>7:56</td>
</tr>
<tr>
<td>Soffit front</td>
<td>146</td>
<td>8:02</td>
</tr>
<tr>
<td>Soffit back</td>
<td>100</td>
<td>8:07</td>
</tr>
</tbody>
</table>

* AGL – above ground level.
* Gel cabin data may be affected by cabin combustion and should be used with caution.

**Table 4. Cabin temperature sensor results – comparison of corresponding times**

<table>
<thead>
<tr>
<th>Sensor location</th>
<th>Sprinkler cabin</th>
<th>Gel cabin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>Time after ignition (min:sec)</td>
<td>Temperature (°C)</td>
</tr>
<tr>
<td>Window outside</td>
<td>353</td>
<td>7:40</td>
</tr>
<tr>
<td>Window inside</td>
<td>73</td>
<td>7:49</td>
</tr>
<tr>
<td>Interior 1 m AGL</td>
<td>42</td>
<td>8:29</td>
</tr>
<tr>
<td>Interior 2 m AGL</td>
<td>80</td>
<td>8:29</td>
</tr>
<tr>
<td>Front cedar</td>
<td>13</td>
<td>7:45</td>
</tr>
<tr>
<td>Front vinyl</td>
<td>777</td>
<td>7:45</td>
</tr>
<tr>
<td>Left cedar</td>
<td>17</td>
<td>8:00</td>
</tr>
<tr>
<td>Left vinyl</td>
<td>220</td>
<td>8:00</td>
</tr>
<tr>
<td>Rear cedar</td>
<td>29</td>
<td>8:34</td>
</tr>
<tr>
<td>Rear vinyl</td>
<td>163</td>
<td>8:34</td>
</tr>
<tr>
<td>Right cedar</td>
<td>20</td>
<td>7:56</td>
</tr>
<tr>
<td>Right vinyl</td>
<td>280</td>
<td>7:56</td>
</tr>
</tbody>
</table>

**Window temperatures**

*FireSmart – Protecting Your Community from Wildfire* (Partners in Protection 2003) recommends that a minimum of double-glazed windows are used for interface structures. The maximum temperature on the outside pane of the sprinkler cabin was 354°C compared to 73°C on the inside pane recorded at the same time. The maximum temperature on the outside pane of the gel cabin was 969°C compared to 188°C on the inside pane at the same time (Figure 18). The data for both cabins indicate that double-glazed windows significantly reduce radiant heat transfer to the interior of the structure.
Interior cabin temperatures

The maximum temperature in the sprinkler cabin at 1 m above ground level (AGL) was 47°C compared to 80°C at 2 m AGL and 154°C at 3 m AGL (Figure 18). The maximum temperature in the gel cabin at 1 m AGL was 162°C compared to 170°C at 2 m AGL and 358°C at 3 m AGL. The results confirm that interior structure temperatures are significantly lower than exterior temperatures during flame front passage but they increase with distance from the ground.

Comparison of interior temperatures between the sprinkler and gel cabins indicates significantly lower temperatures in the sprinkler cabin, which may be attributed to the flame front being much closer to the gel cabin and the cooling effect of the water on the sprinkler cabin.

Under-siding temperatures

The average temperature under the cedar siding of the gel cabin was 288°C compared to 838°C under the vinyl siding. The temperatures under the vinyl siding were significantly higher due to the early melting of the vinyl siding from the sheathing, resulting in exposure of the temperature sensors. The under-siding temperatures for the gel cabin should be used with caution as the temperature sensors lose accuracy once they are exposed to flame from the burning structure.

The average under-siding temperatures were significantly higher for the gel cabin than the sprinkler cabin. This is attributed to the flame front being much closer to the gel cabin and the continued cooling provided by the sprinklers.

Conclusions

The structure protection materials (i.e., water storage, pumps, hose, and sprinklers) that are readily available to the homeowner from local hardware stores and retail outlets can be successful in providing structure protection.

Sprinkler systems work well for structure protection under extreme fire behaviour conditions providing the water supply continues up to and during the time of fire front passage. Therefore, the water supply lines should be protected from radiant heat and direct flame impingement, and sprinkler arc patterns should be set to wet as large an area surrounding the structure as possible.

Aqueous gel systems may be effective in reducing ignition of structural fuels. However, all areas of the structure at risk to ignition must be treated. It may also be important to treat adjacent wildland fuels with gel to reduce fire intensity immediately adjacent to the structure.

Sprinkler systems require more time, manpower, and water to install and operate than aqueous gel set-up and application. Structure protection personnel must consider several factors including fire behaviour; time to arrival; and manpower, equipment, and water available to implement the appropriate strategy for the situation.

Overall, structure temperatures were significantly lower for the sprinkler cabin than for the aqueous gel cabin. This is likely due to the application of water to wildland and structural fuels and the resulting reduction in fire intensity immediately adjacent to the sprinkler structure. Interior structure temperatures were lowest at 1 m above ground level and increased significantly with distance above ground level. This supports the importance of staying as low as possible if using the structure for protection during an entrapment survival situation.

This study examined the effectiveness of certain structural materials to withstand extreme fire behaviour. The results of this study support the information presented in FireSmart – Protecting Your Community from Wildfire (Partners in Protection 2003) regarding the recommended use of asphalt shingle roofing materials and double-glazed windows, and the recommended practice of skirting decks and open spaces.

Recommendations
Property owners can improve the probability of their homes surviving a wildfire event by developing a structure protection plan that includes an independent water supply, pump, hose and sprinklers.

Water supply lines for sprinklers must be protected from the extreme heat of the fire front.

Under-building and deck openings need to be protected by skirting that will prevent the fire and embers from reaching under the structure as the flame front passes.

Set sprinkler patterns to wet as large an area around the house as possible if an adequate water supply exists, as this will substantially reduce the thermal intensity applied to the house as the fire front passes. When the water supply is limited, water application directly on the structure is preferred.

References


Acknowledgements

The author would like to thank the Northwest Territories and Alberta governments for their support of this project, and Mark Ackerman from the University of Alberta’s Faculty of Engineering for his time and effort spent working on the project and for producing the heat flux and temperature data in this report.
Barry Lee Fire Protection Scholarship

Can traditional fire sprinkler heads be used for Bushfire Spray Systems?

Mark V Potter
May 2007
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Finally, the scholarship would not have been possible without the support and understanding of my wife Teresa and children Jacinta, Aimee, Caeley and Chantal. Thank you.
Executive summary

Bushfire spray systems are increasingly being utilised as a design solution for the protection of new houses constructed in high bushfire risk areas. Evidence is increasingly becoming available both in Australia and the United States of America (USA) that demonstrates the effectiveness of bushfire spray systems. With this in mind the Barry Lee Fire Protection Scholarship has been conducted to explore the potential for using existing fire sprinkler technology to protect homes from bushfires.

Bushfire spray systems are seen by the construction industry as a solution to the perceived difficulties of complying with the passive bushfire protection requirements mandated by the Building Code of Australia and AS 3959 “Building in Bushfire Prone Areas”. The use of such systems has been made easy with the uptake of performance based legislation within the residential construction industry.

Bushfires cause significant house destruction and damage on an annual basis in many parts of the world. It is predicted that these losses will increase due to the effects of climate change on the natural environment and increased urban/rural interface development.

Traditional fire sprinklers typically include a glass bulb that when exposed to a predefined temperature will fracture and allow water to access a fire. This type of suppression system has been in place for the purpose of suppressing and/or controlling internal building fires for in excess of 100 years. These systems have proven regularly that they are an effective method of extinguishing or controlling a fire until other suppression activities are undertaken. It is these types of sprinkler heads that this project has examined to determine if they are suitable for the protection of houses from approaching bushfires.

Within USA and Australia it is evident that there are numerous methods of designing and installing bushfire spray systems. These systems vary from complex designs through to very simple self-installed systems. Regardless of the complexity of the design and the capacity of the installer there is evidence available that indicates that these systems operate effectively.

During the visit to the USA a common concern expressed when discussing the concept of using traditional closed fire sprinklers externally is that they were designed to activate under convective heat and not radiant heat. However evidence is available that supports the use of traditional fire sprinkler heads under radiant heat in lieu of convective heat. The research conclusion supports the use of these sprinkler heads when only exposed to radiant heat. However, consideration and further research needs to be given to hot glass exposed to cold water and the resulting effects. In a worst case scenario the cold water can shatter the glass and allow embers and flame to penetrate into a building.

It was found during the analysis that there are a number of advantages and disadvantages with using traditional fire sprinkler heads. In the majority of cases the disadvantages outweigh the advantages. These areas include the inability to...
manually override the system, the inability to test the system and the costs and delays associated with reinstating the system.

During the scholarship tour an alternative system was identified that utilised a glass bulb within a valve to activate the system. The difference being that this valve is located centrally with open sprinkler heads fed from a single activation point. This is known within the industry as a Multiple Jet Control (MJC) and comprises of a single glass bulb which once activated will allow water to flow into a “T” piece and distribute water in two different directions. There are a number of design considerations that are required to be considered including the placement of the MJC (and the glass bulb) as close to the area of the house that will be exposed to the radiant heat.

The use of a bushfire spray system fitted with an MJC is a valid system providing it is well designed and installed. This type of system will most likely provide a suitable level of protection to a home when under attack from a bushfire.
Definitions

Bushfire\(^1\)

A general term used to describe a fire in vegetation.

Bushfire spray system

Is a system that has been designed and installed to protect a home from the effects of a bushfire. These effects are identified prior to the design after a thorough assessment of the potential bushfire attack mechanism. The term bushfire spray system also encompasses wildfire sprinklers, external sprinklers and external spray systems.

Ordinary annealed glass\(^2\)

Glass cooled gradually during manufacture in an annealing operation to reduce residual stresses and strains that can occur during cooling.

Toughened glass\(^3\)

Glass that is subjected to special heat or chemical treatment so that the residual surface compression stress and the edge compression stress is greater than heat-strengthened glass. Toughened glass is also known as tempered glass.

Urban rural interface\(^4\)

The line, area, or zone where structures and other human development adjoins or overlaps with undeveloped bushland.

Wildfire\(^5\)

An unplanned fire. A generic term which includes grass fires, forest fires and scrub fires.

---

\(^1\) Australasian Fire Authorities Council, “Glossary of fire terminology”, published 15 December 1999

\(^2\) AS 4668 – 2000, “Glossary of terms used in the glass and glazing industry”, published by Standards Australia/Standards New Zealand

\(^3\) AS 4668 – 2000, “Glossary of terms used in the glass and glazing industry”, published by Standards Australia/Standards New Zealand

\(^4\) Australasian Fire Authorities Council, “Glossary of fire terminology”, published 15 December 1999

\(^5\) Australasian Fire Authorities Council, “Glossary of fire terminology”, published 15 December 1999
Introduction

Bushfire spray systems are increasingly being utilised as a design solution for the protection of new houses constructed in high bushfire risk areas. They may also be fitted by owners of existing houses who perceive that this type of treatment will reduce the risk from bushfires.

Evidence is increasingly becoming available both in Australia and the United States of America (USA) that demonstrates the effectiveness of bushfire spray systems. With this in mind this investigation has been conducted specifically to explore the potential for the usage of bushfire spray systems utilising existing fire sprinkler technology to provide protection from bushfire.

Bushfire spray systems are seen by the construction industry as a solution to the perceived difficulties of complying with the passive bushfire protection requirements mandated by the Building Code of Australia and in AS 3959 “Building in Bushfire Prone Areas”. The use of such systems has been made easy with the uptake of performance based legislation within the residential construction industry.

This report explores the use of a traditional fire sprinkler system that may provide a greater level of protection for the occupants of a house from a bushfire. The sprinkler system described within this report may be integrated with an internal home sprinkler system either through the combined use of water supply, pump and pipework or via a separate pump and water supply.

The use of traditional fire sprinkler systems for protecting houses from external fires has been considered in the past. However, due to the perceived issues with automatic sprinkler heads not activating, it has not been popular. This report investigates the ability of commercial fire sprinkler heads and other components to activate during a bushfire and how this water will be distributed to protect a typical house. The report will also explore other commercially available systems that may be suitable for use during a bushfire to provide additional protection to house occupants.

Available literature, meetings and discussions held during June 2006 in the USA will be relied upon together with a general literature review. For further information on the organisations and people who made available their time to discuss this concept, refer to Appendix B.
Bushfire attack mechanisms
Bushfires can spread and attack buildings in three different ways. These are:

- Embers and burning debris,
- Radiant heat from the fire, and
- Direct flame contact.

 Ember attack
The term embers is used to describe small particles of burning material. These can be driven forward in large quantities by the wind and may also be carried upwards and forward long distances ahead of the fire front.

 Radiant heat
Radiant heat is given out in all directions from a fire, drying and heating fuel around it, including buildings, to a temperature at which it either bursts into flames or is ignited by burning embers or direct contact with flames.

 Direct flame contact
Flames from the fire front may directly impact on the building and cause ignition. Wind can have a significant influence on the distance that flames can project from vegetation.

---

Figure 1 - Bushfire attack mechanisms

---

**Combination of attack mechanisms**

The three attack mechanisms will in most cases combine to attack a building simultaneously. This is a dangerous situation as radiant heat or direct flame contact can heat a combustible surface and combined with ember attack can easily ignite combustible material.

**History of bushfires**

Bushfires (wildfires) cause significant house destruction and damage on an annual basis in many parts of the world. These losses are increasing for a number of reasons including the effects of climate change on the natural environment and increased urban/rural interface development. Each year millions of hectares of land are affected by fires and according to an international disaster database, significant bushfires have occurred within Australia since 1939 on 28\(^7\) occasions. The OFDA/CRED\(^8\) International disaster database classification system requires at least one of the following to occur:

- 10 or more people reported killed
- 100 people reported affected
- a call for international assistance
- declaration of a state of emergency

In Australia, for the period 1957 to 2005\(^9\) there has been a total of 6,264 houses destroyed as a result of bushfires. Since 1957, there has been an average house loss rate of 130 houses destroyed per year. Within Victoria alone and for the same period, the house loss figure was 2,766.

Since 1900 there have been 51\(^10\) events within the USA that have met the OFDA/CRED criteria. This has resulted in a damage bill of nearly $9 billion.

Wildfires have also caused significant destruction across other parts of the world including Europe, Africa, South America and Asia. There is no doubt that wildfires will continue to affect farming land, forests, homes and lives.

Some major wildfire events are shown in the following table:

---


\(^9\) Raphaële Blanchi, Chris Lucas, Klara Finkele and Justin Leonard, Meteorological Conditions and Wildfire Related House Loss in Australia, Conference Poster - 2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Area of loss</th>
<th>Houses destroyed</th>
<th>Lives lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>Hobart, Tasmania, Australia</td>
<td>1,700</td>
<td>61</td>
</tr>
<tr>
<td>1970</td>
<td>Laguna, San Diego County, USA</td>
<td>382</td>
<td>8</td>
</tr>
<tr>
<td>1983</td>
<td>Ash Wednesday bushfires in Victoria and South Australia, Australia.</td>
<td>1,511</td>
<td>75</td>
</tr>
<tr>
<td>1991</td>
<td>Oakland Hills fire in California, USA.</td>
<td>3,469</td>
<td>25</td>
</tr>
<tr>
<td>1993</td>
<td>Ikaria Island, Greece</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>2003</td>
<td>Canberra, Australia</td>
<td>516</td>
<td>4</td>
</tr>
<tr>
<td>2003</td>
<td>Cedar fire in southern California, USA.</td>
<td>2,232</td>
<td>14</td>
</tr>
</tbody>
</table>

Within Australia, bushfires are a common part of the landscape and a large proportion of the Australian native vegetation relies on fire to regenerate. Because of the desire of more Australians to live in the urban/rural interface, the risk is continually increasing.

### Traditional fire sprinklers

Traditional fire sprinklers have been developed for the purpose of suppressing and/or controlling internal building fires for in excess of 100 years. These systems have proven regularly that they are an effective method of extinguishing or controlling a fire until other suppression activities are undertaken.

![Figure 2 - Spray pattern over a fire](image-url)

---

11 Infamous Wildland Fires around the World, Compiled by the International Association of Wildland Fire, revised edition February 24, 2006
12 Infamous Wildland Fires around the World, Compiled by the International Association of Wildland Fire, revised edition February 24, 2006
14 [http://www.sfmuseum.org/oakfire/overview.html](http://www.sfmuseum.org/oakfire/overview.html) - accessed 27/8/06
15 Infamous Wildland Fires around the World, Compiled by the International Association of Wildland Fire, revised edition February 24, 2006
17 [http://www.fire.ca.gov/cdf/incidents/Cedar%20Fire_120/incident_info.html](http://www.fire.ca.gov/cdf/incidents/Cedar%20Fire_120/incident_info.html), accessed on 29/10/06
The concept of using this technology for the purpose of protecting houses from a bushfire is something that has not been seriously considered previously. However, this concept is not new when considering fire safety systems to protect adjoining buildings from fire spread as a result of radiation. This drencher concept has been in place for some time.

Traditional fire sprinklers activate when exposed to convective heat from a fire in the vicinity of a sprinkler head. Sprinkler heads are designed with various bulb thicknesses and temperature settings which control their rate of response. The “Globe” sprinkler head shown is a residential sprinkler head and as such it has a very thin bulb. This allows the sprinkler head to activate faster than a normal response sprinkler head for a commercial application.

The sprinkler industry has evolved from a line of one to two sprinkler heads into a significant number of fire risks being able to be protected. This includes large orifice sprinkler heads designed to suppress fires in warehouses with racking to sprinkler heads that will provide glass with a fire resistance level when exposed to a fire in another building or compartment.

Sprinkler development is ongoing as the fire risks across the world become more and more varied. One of these potential areas is the concept of protection of houses from bushfires. As described previously the risk to housing and residents from bushfires in a significant part of the world is increasing.

Currently sprinkler heads are available with either of two types of operating mechanisms. These are glass bulbs or a sprinkler head that has two pieces of metal soldered together. Sprinkler heads fitted with a bulb are operated during a fire by convective heat travelling from the fire to the ceiling and in the process heating the liquid inside the bulb. As the liquid expands it compresses the bubble inside the bulb until the glass shatters. This permits the pressure of the water to push away the associated components and allows water to discharge onto the deflector and hence onto the area being protected (see Tyco sprinkler head below).
Although there is a number of different sprinkler spray patterns available the two predominant designs are the conventional and spray patterns (see below). The conventional pattern sprays water both up and down and in the process is reducing the temperature of the hot smoke layer and controlling or extinguishing the fire. The spray pattern delivers water directly onto the fire attempting to control or extinguish it.
It is these types of sprinkler heads that this project has examined to determine if they are suitable for the protection of houses from approaching bushfires.

**Current design techniques using external sprinklers**

The use of external sprinklers in bushfire risk areas is an increasingly utilised option both in Australia and the USA. This is the key reason for this research study to be developed. Any future bushfire spray systems should have supporting evidence available quantifying the benefits they will provide for the protection of life and property in order to provide a proper basis for system design and installation.

Within USA and Australia it is evident that there are numerous ways of designing and installing bushfire spray systems. These systems vary from complex designs through to very simple self-installed systems. Detailed below are three systems that were viewed in southern California. The houses that the systems were fitted to are located within the footprint of the 2003 Cedar fire which destroyed approximately 2000 homes.

All of the building occupants were of the strong opinion that these bushfire spray systems were a major contributor to the safety of their houses. In addition, in all cases the building occupants were evacuated or left the house of their own accord whilst the fire front passed. All of the building occupants were not able to return to their houses until the next day.

**External sprinkler systems within the United States of America**

As with Australia there are a number of systems that have been installed onto houses within the USA. These systems, like Australia are varied and are quite often self designed and installed. During the tour of the USA three systems were inspected.

**System 1 – Ramona**

This external sprinkler system was developed by the homeowner and consisted of open spray heads, unexposed pipework, electric pump, backup generator and a water tank. The water tank had a capacity of 19,000 litres. This system was developed by the homeowner and the concept tested prior to installation occurring. The final design was then utilised to protect the house during the Cedar fire of 2003. The system worked effectively during the fire and is credited by the homeowner to protecting the house and contents. As a result of the successful test regime and the use of the system during a fire, the homeowner has published a number of papers and presented at conferences.
The paper describes the background to the sprinkler system and provides supporting evidence to demonstrate how the system protected the timber dwelling. The sprinkler system is designed to spray water away from the house and rely on the prevailing wind to drive the water back onto the surfaces of the house. The key purpose of the system is to offset the impacts of windborne embers which are prevalent during these types of events.

The homeowner has developed a simple model to demonstrate the water distribution characteristics under differing wind conditions. This model demonstrates that efficient overlapping occurs in wind conditions up to 50 – 60 km/hr. However the author also argues that the wind speeds against the surface or within close proximity of the dwelling could be less than what is being experienced in the open.

During the Cedar fire the system was activated in the early hours of the morning before the fire arrived. This was prior to the building occupants leaving their home to seek refuge in a safer location. The sprinkler system operated for some time and is credited with saving the house from the effects of the bushfire.

**System 2 – Scripps Ranch**

In San Diego County another house which survived the Cedar fire in 2003 was inspected. The system installed on the house consisted of impact\(^\text{18}\) type sprinkler heads fitted to copper pipe and provided to one side of the house. The roof of the house was clad with wood shingles where numerous gaps were present. It was assumed that the majority of the roof would have received spray from the sprinkler

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\(^{18}\) Impact sprinklers are commonly used for irrigation. They are made of either plastic or metal and can deliver water in a full circle. They rely on a chopping action to distribute water evenly across the circle that it is protecting.
heads due to the prevailing wind direction and the penetration ability of impact sprinkler heads. The homeowner advised that she activated the system prior to evacuating.

As a result of the 2003 Cedar fire the asset losses within the Scripps Ranch area were severe. It is uncertain if the sprinkler system fitted to this house was instrumental in saving the house or if other factors may have existed such as intervention by the fire department. Regardless of this it appeared that the impact sprinkler heads could have been responsible for providing sufficient wetting of the wood shingles and vents to prevent ignition.

The predominant bushfire attack mechanism for this house would most likely have been ember attack due to there being no substantial vegetation within close proximity to the dwelling.

System 3 – Lakeside

This house also survived the 2003 Cedar fire and the homeowner credited this survival to the self installed sprinkler system. This system comprised of a mixture of plastic and copper piping with open plastic spray heads located under the veranda. No other areas of the house were protected and the system was activated by turning on a valve. The system was fed by a water supply located on a hill above the house which acted as a gravity feed system. The tank was high enough to provide sufficient pressure at the spray heads without the need for a pump. The system was activated at the same time as the building occupants were leaving the house.
The homeowner advised that there was no other form of intervention as the house is at the end of a very steep driveway and it would be difficult if not impossible to get a firefighting appliance to the house. The occupants returned to their house sometime after the fire had moved through the area to discover the house was still standing.

This type of system demonstrates the effectiveness of gravity feed systems where a pump is not required. This substantially reduces the amount of maintenance required and the costs involved with installing an external sprinkler system. Unfortunately only limited houses would be able to install a similar system but if it can be achieved, should be strongly encouraged.

**Systems within Australia**

Within Australia there is a range of bushfire spray systems installed onto houses. The majority of commercial installers advise that they follow the guidelines established by the Fire Protection Association Australia in the publication “External Water Spray Systems to Aid Building Protection from Fire”. This report was published in July 2000 as a result of funding being made available by Emergency Management Australia.

The types of systems within Australia extend from highly complex systems where they have been installed as a trade off from prescriptive requirements of either planning or building legislation through to simple sprinkler systems that have been installed to provide peace of mind for homeowners.

There are a number of examples within Victoria where external sprinkler systems have been credited with assisting or saving houses from bushfires. Again these...
systems have varied in how they have been designed, installed and the level of preparedness by the occupier.

**Anakie**

A bushfire occurred north of Anakie in early 2006. Anakie, a small rural village is located approximately 80 km west of Melbourne. This fire resulted in the loss of three houses with a significant number of houses either damaged or at some stage during the fire threatened.

One house that survived the fire was fitted with a commercially supplied external sprinkler system. The owner of the property credited the sprinkler system with saving his house and he was adamant that it would have been totally destroyed if not for the Blaze Control sprinkler system.

The fire activity within close proximity to the dwelling would have been predominantly ember attack with some levels of radiant heat being present. Prior to the fire front arriving at the dwelling the homeowner wetted down the outside areas of the home and then operated the sprinkler system. Clearly the combination of a well prepared home, well defended home and the sprinkler system contributed to the house surviving the bushfire.

**Systems designed for similar uses**

FM Global is in the process of conducting further research on external sprinklers for the protection of buildings from external fires. In this case external fires related predominantly to fires originating from rubbish bins, piles of combustible materials or closely parked vehicles or machinery. This research has resulted in FM Global releasing a data sheet to educate their clients in the most effective treatments to managing the risk to their buildings from fires originating externally.

This ongoing research and data sheet development has the ability to strongly influence how bushfire spray systems are designed and installed to protect buildings from the effects of a bushfire.

FM Global has for some time had in place a data sheet titled “Protection against exterior fire exposure”. This data sheet recognises the risks that may be posed on a building from other adjacent buildings or yard storage.

**Future of Bushfire Spray Systems**

Bushfire spray systems are an increasingly utilised option for the community to offset risks posed by bushfires. There are a range of reasons for this and they include:

- Vegetation retention and regeneration are a key government policy in most jurisdictions. A bushfire spray system may be seen as a potential trade off to
offset the increased fuel loadings that may be present around houses in the future.

- There is a greater community interest in using active protection systems rather than passive protection. The predominant reason for this is they are viewed as the panacea of protection during a bushfire event and as such it is believed that they provide a better level of protection.
- The numbers of bushfires are increasing and with that the house loss rate is rising within Australia. At the moment this is due to the drought conditions that are being experienced within south east Australia that may be linked to climate change as well as more people living in the urban/rural interface.

**Bushfire Sprinkler Research**

In 2005, the Australasian Fire Authorities Council (AFAC) in conjunction with the Bushfire CRC and Fire Protection Association of Australia (FPAA) established a project with the aim of developing guidelines for bushfire sprinklers. These guidelines would be developed after appropriate research was undertaken by CSIRO through the Bushfire CRC.

The research will include the appropriate use of water against varying building facades, water distribution under varying wind conditions and the performance of pumps under the environmental conditions expected during a bushfire.

**Analysis of traditional fire sprinkler heads used for bushfire protection**

During the visit to the USA a common concern expressed when discussing the concept of using traditional closed fire sprinklers externally is that they were designed to activate under convective heat and not radiant heat. Convective heat is the predominant heat transfer method during a compartment fire whereas radiant heat is the predominant heat transfer method during a bushfire. Therefore this section serves to explore the concept of using traditional fire sprinklers for the purpose of protecting a house during a wildfire from radiant heat and direct flame contact.

**Glass performance**

An important area of the structure that a bushfire spray system needs to protect is the windows. This is due to the presence of water on a window exposed to heat can be both an advantage and a disadvantage. Some forms of glazing when exposed to radiation can withstand significant exposures. This is the case with toughened and other forms of glazing provided the rate of heating is not too high and is reasonably uniform across the glass surface. However, if the water is not delivered onto a window early enough when exposed to radiant heat the delivery of water can cause the glass to crack and fail. Therefore, there may be situations where it may be more beneficial to leave the water off the glass.
In the early 1980’s Moulen and Grubits\(^\text{20}\) undertook research to determine if glass bulb fire sprinkler heads would activate under radiant heat conditions. This research identified that glass bulb fire sprinkler heads would activate after exposure to radiant heat at different levels and exposure periods. The research found that a fire sprinkler head with a bulb rated at 68ºC when exposed to 8 kW/m\(^2\) would activate after 6.8 minutes. The report then went on to conclude that where a sprinkler head was utilised that activated at 8.0 kW/m\(^2\) within 30 minutes, a tempered plate glass window would withstand exposure to radiant heat and the subsequent delivery of water. It is important to ensure that the temperature of a toughened glass window does not exceed 300ºC.

However, a significant number of houses are provided with annealed glass and Kim and Lougheed\(^\text{21}\) found that during testing annealed glass could only be heated to 80ºC - 90ºC prior to the delivery of water. Whereas tempered glazing when exposed to radiant heat can withstand up to 150ºC - 165ºC and toughened glazing up to 200ºC prior to the delivery of water. Therefore to use glass bulb sprinklers as an automatic activation system the use of annealed glass can not be considered. It is most likely that annealed glass would have exceeded the 80ºC - 90ºC prior to the bulb reaching its required exposure level. This would cause rapid failure of the annealed glass and allow significant ember attack within the house.

This type of failure was reported by Meehan\(^\text{22}\) in a report on the impact of the Canberra bushfire on the Mt Stromlo Observatory in 2003. In this situation a sprinkler system was installed both inside the building and along the outside of the building facing the area of significant vegetation. In the report he stated:

> “The Duffield and Woolley Buildings were saved by internal sprinklers. Several windows in these buildings shattered and the fire entered. However, the sprinklers engaged and extinguished it before it could build up any momentum.”

In this case the building would have most likely been destroyed if it had not been for the internal sprinklers activating. The external sprinklers caused failure of the annealed glass due to the glass being allowed to heat up prior to the sprinklers activating.

**Wall performance**

The use of combustible external walls is a common design method for houses located in high bushfire risk areas. This causes difficulties as combustible walls can, after exposure to sufficient radiant heat ignite easily with the introduction of an ignition source such as an ember. However, Drysdale\(^\text{23}\) states that the minimum level of radiant heat required to allow the ignition of a piece of wood is 28 kW/m\(^2\) at a critical surface temperature of 600ºC.


\(^{22}\) The Mountain’s Burning - A case study by Bart Meehan, Associate Director, Facilities and Services, http://www.anu.edu.au/facilities/fire_safety/lessons_from_mt_stromlo.html

With the knowledge (Moulen and Grubits) that a bulb sprinkler will have generally activated at approximately 10 kW/m² this is well below the level of radiant required to allow the ignition of wood panels. Therefore it can be argued that the ignition of the timber wall will occur after the activation of the sprinkler head. In the event that the wall does ignite and there is flame spread up the wall then the sprinkler head will operate as designed.

**Other building elements**

This report has not considered the impact of radiant heat on other building elements as the two predominant areas are glazing and walls. In addition the report assumes that ember attack protection is provided by passive mechanisms in accordance with AS 3959 “Building in bushfire prone areas” or other relevant publications. This protection includes as a minimum:

- Roof space protection to limit the spread of embers into roof cavities by sarking or tight fitting roof construction that does not allow gaps greater than 2mm.
- All openable doors and windows are provided with non combustible mesh screens with a minimum aperture of 2mm.
- Sub floor spaces are protected so that there are no gaps greater than 2mm.

**Advantages of traditional fire sprinkler heads**

The potential advantages of using traditional fire sprinkler heads are:

- Traditional fire sprinkler heads are fully enclosed as they are fitted with a bulb. This prevents bugs, spiders, and/or dust entering the pipework. This also eliminates any potential for obstructions within the pipework to occur which may affect the spray pattern of the sprinkler head.

- Moulen and Grubits\(^\text{24}\) found that the most effective method of delivering water onto glass when exposed to high levels of radiant heat is for the sprayers to provide the water to the tempered glass in a form that is like driving rain rather than streams flowing down the glass. Research has shown that dry streaks of only 160mm width have allowed tempered glass to fracture when exposed to a radiant heat flux of 20 kW/m². Traditional fire sprinkler heads will provide water that can be both delivered onto the glass by the pressure of the water coming from the sprinkler head and by the wind which

\(^{24}\) Moulen A. W. & Grubits S. J., Water drenching of tempered glass used to attenuate radiant heat, July 1983 – Technical Record 498
is always prevalent during bushfires. This is further supported by the analysis completed by Mitchell\textsuperscript{25} who found that the wind effect during a bushfire can be utilised to support the distribution of water onto the dwelling.

- Traditional fire sprinkler heads, provided they are installed where they are exposed to radiant heat and in that location can provide a spray pattern onto the surface of a window will operate prior to tempered glass fracturing. This is supported by research\textsuperscript{26} which states that tempered glass will not be compromised upon the delivery of water until the glass temperature reaches approximately 200$^\circ$C. This data matched with research\textsuperscript{27} findings that indicates that a tempered pane of glass while exposed to 20 kW/m$^2$ was enough to activate the sprinkler head and not fracture the glass.

- Traditional fire sprinkler heads have been tested when exposed to radiant heat. The findings from this research indicate that the bulbs will activate after the exposures outlined in the below table:

<table>
<thead>
<tr>
<th>Head type</th>
<th>Temp rating</th>
<th>Radiant Heat Intensity (Kw/m$^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>Glass bulb</td>
<td>68$^\circ$C</td>
<td>+</td>
</tr>
<tr>
<td>Glass bulb</td>
<td>79$^\circ$C</td>
<td>+</td>
</tr>
<tr>
<td>Glass bulb</td>
<td>93$^\circ$C</td>
<td>-</td>
</tr>
</tbody>
</table>

"-" signifies not tested  
"+" signifies no operation

This demonstrates that a traditional sprinkler head fitted with a bulb such as those made available by manufacturers within the domestic market appears likely to activate before toughened glass fails. These sprinkler heads are usually rated at 68$^\circ$C.

- Traditional fire sprinkler heads fitted with a bulb will activate when exposed to the required radiant heat flux. This allows an external sprinkler system for the protection from bushfires to be a fully automatic system. This means that the system, provided it is well maintained and installed correctly will activate once the required radiant heat is present regardless of whether the occupants are present or not.

- To utilise this technology it would be cost beneficial to install the system within the house in addition to the outside. This means that the house will have all-round protection from an interior fire as well as protection from a bushfire.

- The residential sprinkler head is required to have a high spray pattern so that its normal use can reduce the propensity for flashover to occur within the compartment. This design provides significant benefits for the protection of a house from a bushfire as it delivers water (provided it is installed correctly) to

\textsuperscript{25} Mitchell JW, Wind-enabled ember dousing, Fire Safety Journal 41 (2006) 444 - 458
\textsuperscript{26} Kim AK and Lougheed GD – Fire protection of windows using sprinklers, construction technology update 12 Dec 1997.
\textsuperscript{27} Moulen A.W. & Grubits S.J., Water drenching of tempered glass used to attenuate radiant heat, technical record 498
\textsuperscript{28} Grubits SJ and Moulen AW – Operation of sprinkler heads by radiant heat, technical record 491, March 1983.
all parts of windows and walls. This reduces dry spots on windows which are a major cause of window failure. These dry spots allow a temperature differential to occur on the glass which then causes significant stresses on the glass pane with the only result being glass failure. The diagram below shows the high spray pattern when compared to a normal sprinkler pattern which may be provided in a commercial or the like building.

![Diagram showing difference between residential and commercial head spray pattern]

**Disadvantages of traditional fire sprinkler heads**

- If the building is located within an area that will only be exposed to ember attack then this type of system may not be effective. It is important that this type of bushfire spray system is only utilised when radiant heat is predicted. Protection from ember attack must be provided by another bushfire spray system designed for that purpose or passive construction protection.

- A system that is fitted with traditional fire sprinkler heads with bulbs can only activate when exposed to sufficient radiant heat. There is no provision for a manual override in the event that the building occupant decides to activate the bushfire spray system prior to the radiant heat levels being experienced.

- In high wind conditions which are prevalent during bushfires the potential for adjacent sprinkler heads that have not activated to be wet by over spray and thus not get sufficiently hot enough to operate is increased. This may result in areas of the house not being sufficiently protected and exposed to high levels of radiant heat. This may be further compounded if the area not provided with sufficient water spray includes windows and combustible materials.

- There has been limited testing in relation to the performance of traditional fire sprinkler heads with bulbs. Although the testing by Moulen and Grubits was extensive, further analysis of current technology sprinkler heads would be required to demonstrate these types of sprinkler heads would be suitable.

- Traditional fire sprinkler heads are designed to deliver a minimum of 50 l/min. Depending on the required area of operation, a significant amount of water may be required.
To allow the system to activate within the required timeframes it needs to be provided with a clear line of sight to the vegetation that will provide the high levels of radiant heat. If the sprinkler head does not have sufficient exposure it may not operate and hence not provide the protection that it was designed to give.

Proposed scenarios

With the above discussions in mind the use of a sprinkler system utilising bulb fire sprinkler technology needs to be restricted. This is the case with any external sprinkler design as there would not be a system available that could adequately protect all three attack mechanisms. This system will only protect the house from radiant heat as there will not be an ability to economically provide sufficient water to protect the building from ember attack. There is also a need to conduct further research in relation to the performance of building elements above 40kW/m² which could be classified as the point where direct flame contact occurs.

The following objectives are required to be met prior to considering this type of system:

- The house is to be within close proximity to vegetation that will generate sufficient radiant heat so that the house receives at least 10kW/m². If the house is located some distance from vegetation then this system would most likely not provide any benefits to the building occupant. With this in mind a thorough analysis is required prior to making a decision on any bushfire spray system to ensure it has been designed to offset the expected attack mechanism.

![Figure 12 - Radiant heat impact onto a house](image_url)
activate unless exposed to sufficient radiant heat. This exposure could come from a range of sources in addition to vegetation and this may include adjoining houses, combustible fences and sheds.

- There are benefits of installing an external system in conjunction with an internal system. This will provide added value in that both the outside and inside of the house will be protected. The draft home sprinkler standard published by Standards Australia provides for exclusions where data has shown areas of the house do not contribute to fire fatalities. However, when designing for the protection of bushfires in addition to internal house fires consideration must be given to the protection of roof spaces, garages and other areas which lead to the outside and have combustibles in them.

- The draft home sprinkler standard requires this system to be designed for a maximum of two sprinkler heads operating at once. When providing this system to protect the house from a bushfire as well as internal fires the number of heads operating at once will need to be increased to match the longest exposed side of the house as well as still providing heads for the protection of the interior.

- The house must be provided with passive ember attack protection in accordance with AS 3959 or other recognised publication.

- A detailed assessment of the bushfire risk is required to determine the types of bushfire attack mechanisms that will be present at the building and in which direction they will come from.

**Other design considerations**

As the use of traditional fire sprinkler heads with a bulb can be considered restrictive a number other alternatives have been researched. An alternative has been identified as a result of the visit to the United States of America and discussions with industry personnel in Australia. It is important to note that no one system will protect all scenarios with influences such as occupant capability, water supply and type of bushfire attack mechanism present having a significant impact on the performance of these systems.

**Double Outlet Multiple Jet Control (MJC’s)**

The double outlet multiple jet control (MJC) is a remote sensor which has the ability to feed a number of open sprinkler heads. The MJC is fitted with a glass bulb sensor (similar to a traditional sprinkler head) and is provided with a dual outlet. The MJC is fitted with a valve plunger which is held closed against a diaphragm by a linkage which incorporates a fusible glass bulb under compression. When a fire occurs, the bulb shatters, leaving the plunger unrestrained. The water pressure then forces the valve open and allows water to flow through the outlets to the system pipework and in a bushfire scenario to the open sprinkler heads.
This valve provides flexibility in that it provides a dual outlet which allows the sensor to be located in the middle of the zone that it is protecting. This ensures the sensor is as close as possible to the area that will present the highest radiant heat and also introduces hydraulic advantages by reducing the distance from the valve to the open sprinkler head.

For an MJC to be effective it is critical for it to be exposed to the area where the radiant heat would be generated. If this is not achieved then the activation delay could have disastrous effects on the MJC’s ability to protect the house and the people within the house.

**Advantages of alternatives compared with a traditional fire sprinkler head**

The alternative design provides a number of advantages over the use of a traditional fire sprinkler head system that is fitted with a bulb. These advantages are:

- The use of this system introduces the concept of manual activation whilst maintaining an automatic function. This allows the building occupant to decide when to activate the system after assessing the risk that is posed at the time. Although this is an advantage as it allows the building occupant to have a level of control over the system it also can be a disadvantage as the homeowner may activate the system to early and as a result may prematurely exhaust their water supply.

- This type of system allows water to be delivered to all areas of the house that are exposed to high levels of radiant heat at the same time.
This type of design allows the system to be tested on a regular basis whereas the use of traditional fire sprinkler heads with bulbs does not allow this to occur apart from through an end of line test valve.

A system utilising an MJC can have other attack mechanism systems off the same water supply and pump system.

**Disadvantages of alternatives compared with a traditional fire sprinkler head**

- By providing a system that has a manual override function there is the potential for the system to be activated too early. This increases the chance that there will not be sufficient quantities of water available during the fire front which is when the system needs to be operating at maximum efficiency. In the event that a manual override is provided the installer should ensure that detailed guidance is provided to the homeowner to ensure they understand the advantages and disadvantages.

**Potential design scenario**

With the above information in mind a design scenario has been established for both a bushfire spray system designed to offset the impact of radiant heat and for a system designed to reduce the impact of both radiant heat and ember attack. These design scenarios are based on the use of open traditional fire sprinkler heads and an MJC. The potential designs have been provided based on the following assumptions:

- The vegetation has been assessed and those areas which may pose significant levels of radiant heat onto the house in excess of 8 kW/m² have been identified.
- There are no combustible materials within 6 metres of the house that when ignited may cause significant radiant heat exposure onto the house such as adjoining houses or sheds.
- The house is provided with ember attack protection through compliance with the relevant areas of AS 3959 “Building in bushfire prone areas” 1999 that are relevant to ember attack and in addition to those, toughened glass is installed.
- A firefighting pump and tank have been provided and a hydraulic analysis has been conducted to demonstrate the system will operate at the required pressure and flow.

Figure 15 details a system utilising an MJC and with a manual function included. As previously discussed this allows the building occupant to either override the
automatic system if required during a bushfire or conduct maintenance. In this scenario a number of these installations may be required depending on the design complexities of the house.

When a MJC is utilised then open sprinkler heads must be provided. These are readily available from fire sprinkler suppliers and are usually the same head as those supplied with a bulb. The sprinkler head suppliers will advise the most appropriate and safe method to remove the bulb without damaging the head.

The manual bypass valve may be a simple butterfly valve which requires the building occupant to physically locate the valve and allow the flow through the valve. The valve may also be a system where a remote button or switch can be located inside the house and electronically activate the bypass valve. This would negate the need to move about outside the house to activate the sprinkler system.

These systems must be designed to the risk and the heads located in line with the areas of the house where the radiant heat will impact. Diagram 16 demonstrates how this can be achieved in a situation where a house is only exposed to a radiant heat load from a single direction. The remaining area around the house is either grassland or adjoining structures more than six metres away.

![Diagram 16 - Spray system design using an MJC](image)

Diagram 16 shows the use of an MJC valve where a single valve can be utilised to provide water to the two pipework lengths. The system shown in figure 16 will activate when exposed to radiant heat of approximately 8 kW/m² (refer to table on page 17). Consideration needs to be given to sprinkler heads wetting down other sensors prior to them activating. This can cause unnecessary delay to an area of the house receiving water.
Diagram 18 shows a design where the entire house is required to be protected. The two MJCs that are provided would be located within an area that will be exposed to radiant heat generated by the bushfire or an adjoining combustible structure or material.

An MJC type system may allow an ember attack bushfire spray system to be interconnected. This interconnection would utilise the same pump and water supply as the radiant heat system. Figure 19 demonstrates a potential design scenario where this may occur. A significant disadvantage to this is that it is not possible to maintain the required water supply to allow the radiant heat system to operate for a period of 30 minutes. This will need to be a consideration for the designer and occupier in the initial assessment stages.
Conclusion

Bushfires within Australia and across a large part of the world are an increasing problem for both fire services and the communities they protect. Records indicate that the number and severity of bushfires is increasing. This is due to a number of reasons including climate change and a desire to live in the urban/rural interface.

Bushfire Spray Systems are a widely used tool to assist occupiers of houses and other structures to protect their home during a bushfire. It is expected that the use of bushfire spray systems will increase with the greater use of performance based building design.

With this increased usage comes a need to ensure that bushfire sprays systems are adequately designed to match the assessed risk to the house and property. This will need an approach to bushfire spray system design that identifies all risks to the house, it ensures the system components are able to operate within the potential environmental conditions present and the installation is in accordance with the original design and is adequately commissioned. When designing a bushfire spray system it is critical for the appropriate bushfire attack mechanism to be identified prior to any design taking place.

Whilst this report provides guidance in relation to bushfire spray system design considerations it only provides a design solution for a house that is exposed to radiant heat. The use of bulbs utilised by the fire sprinkler industry will not operate under ember attack only conditions until it is most likely too late.

The research scholarship has found that the use of traditional fire sprinkler heads is possible however the design considerations would need to be tight and the building occupants well aware of the system limitations. A better solution was identified using a multiple jet control which allows better flexibility for the building occupier.

Finally, the report has identified the need for further research in relation to bushfire spray systems. With these research results the use of bushfire spray systems will allow both fire services and the community to have a high level of trust in bushfire spray systems that are installed in accordance with the research outcomes. This will provide Australian communities with a much sought after treatment for reducing the impact of bushfires.

Recommendations

As a result of this report a number of recommendations are made. These recommendations, if adopted will enable further development of bushfire spray systems and increase the level of reliance on these systems by the fire services and community.

- The bushfire spray system industry is educated as to the importance of ensuring these systems are designed to offset the bushfire attack mechanism that is present. All systems must be individually designed after a thorough risk assessment has been conducted that is based on the surrounding vegetation and combustible elements.
• Research is undertaken to analyse the performance of water spray on external facades under ember attack, radiant heat and direct flame contact bushfire conditions. This research should identify the pressure and flow requirements for common types of external facades when exposed to a bushfire.
References

Mitchell, Joseph W.; Wind-enabled ember dousing; Fire Safety Journal; 41:444-458; 2006
Standards Australia, AS 3959 – Building in Bushfire Prone Areas, 1999

Fire Protection Association of Australia; Field Study: External Water Spray Systems to Aid Building Protection from Wildfire; Ref: 100-0346; 10 June 2000


SAI Global, DR 03182, Construction of buildings in bushfire-prone areas, Draft published 19 March 2003

Standards Australia, AS3959:1999 Construction of buildings in bushfire-prone areas.


Australasian Fire Authorities Council, “Glossary of fire terminology”, published 15 December 1999
## Appendix A

### Organisations visited and summary of discussions:

<table>
<thead>
<tr>
<th>Company</th>
<th>Representatives</th>
<th>Key discussion points</th>
</tr>
</thead>
</table>
| M-Bar Technologies and Consulting| Joseph Mitchell            | • Inspected the house that is occupied by Joseph Mitchell and survived the 2003 Cedar wildfire.  
• The house is fitted with an external sprinkler system and was in place during the 2003 wildfire.  
• A number of papers have been written by Joseph and the latest titled “Wind enabled ember dousing” was published in Fire Safety Journal 41 (2006). This paper explains the sprinkler system installed on the house and how it operated during the 2003 Cedar Wildfire.  
• I also visited two other properties which survived the 2003 Cedar wildfire and were fitted with external sprinklers.                                                                                                                                                  |
| Globe Sprinklers                 | Steven Worthington, John Collins, Brian Hoening | • Discussions were held in relation to spray pattern performance and options for reducing the flow through sprinkler heads.  
• It was explained that sunlight should not be an issue on an exposed sprinkler head in respect to unnecessary activations.  
• Discussed the potential use of a 1 mm bulb which may allow the sprinkler head to be more sensitive when exposed to radiant heat. However, 1 mm bulbs are extremely fragile and would be prone to damage during manufacturing or transport.  
• Globe have manufactured sprinkler heads in the past with smaller than 10 mm orifice sizes however these are an exception. These may be better suited for protection from bushfires as they will reduce the flow from the head.  
• Globe explained that a different spray pattern may be possible by altering the shape of the orifice. This could provide more water onto the vertical surfaces rather than sprayed away from the house. The shape could be similar to a teardrop. If this concept was explored manufacturing costs of the head would most likely be increased due to the non standard shape of the orifice. |
| Tyco                             | Peter Thomas, Dave Le Blanc | • Tyco proposed using a deluge type system and demonstrated how the TCV operates.  
• The TCV could be modified to activate against a different profile that further research would identify.  
• Research conducted by Tyco has identified that the flows required to extinguish fires on vertical surfaces is minimal.  
• It was agreed that once research had been conducted to identify the required flow rates, pressures and effective patterns then an engineering solution could be developed.  
• It was made clear that a prediction of the maximum radiant heat imposed on the building is imperative.  
• If a deluge system is utilised then blank caps would need to be provided over the open sprinkler heads.  
• Consideration needs to be provided to zoning and how this will be managed.                                                                                                                                                                                                 |
| FM Global                        | Bert Yu                    | • Discussed similarities between the work that FM Global is undertaking in relation to exterior building exposures and its relevance to external sprinkler protection.  
• Concern was expressed in relation to the use of bulb sprinkler heads and relying on radiant heat to activate the heads. It was explained that sprinkler heads are designed to operate under convective heat transfer.                                                                                   |
| National Institute of Standards and Technology (NIST) | Sam Manzello  
Alex Maranidges  
Ruddy Mell | • Again concern was expressed at the use of bulb sprinkler heads for external sprinkler protection from a bushfire. |
|---|---|---|
| NFPA - Firewise | Jim Smalley  
Michelle Steinberg | • NFPA provided a website that detailed the installation of wildfire sprinklers into a community.  
• Discussion also took place in relation to the amount of take up of external sprinklers as a form of treatment to reduce the risk from wildfires. |
| Worcester Polytechnic Institute | Jonathan Barnett | • Discussion occurred in relation to the use of bulb sprinkler heads for the protection from bushfires. |
Linda, at its meeting last week, the NEC Technical Correlating Committee created the NEC Code-Making Panel 5 Minute Item show below and is requesting review of this issue by the Standards Council.

I have enclosed a copy of the Panel 5 Chair’s Report that includes a copy of Proposal 5-251. This item is also related to TIA 941 that I believe is already on the Council’s Agenda.

Please place this matter on the Agenda for the August Council Meeting.

Thank you.

**NEC Panel 5 Minute Item:** It was noted that J.W. Carpenter recused himself and appointed his alternate, R.P. Owen, to act as chair during the discussion of this issue.

The Technical Correlating Committee requests that the Standards Council review the Code-Making Panel 5 Chairman’s Report and determine if there is jurisdictional responsibility that would impact the Panel Action on Proposal 5-251.

In response to the request in the Code-Making Panel 5 Chairman’s Report, it is the Technical Correlating Committee’s position that the minimum requirements associated with the connection between an electrical system and other metal piping systems with respect to the safe use of electricity, is presently addressed in NFPA 70 and, as defined in the Scope of NFPA 70, is the responsibility of NFPA 70.

The Technical Correlating Committee supports the action of Code-Making Panel 5 on Proposal 5-251 and TIA 941.

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Chairman's Report for CMP-5

Signature: Michael J. Johnston

1. List date(s) and location of meeting:

January 11 through 16, 2009 (Hilton Head, SC)

2. List names of guests in attendance:

See attached list (NFPA staff indicated they would attach the list of guests from the sign-in sheets used during each day of the meeting)

3. List names of guests addressing the Panel, the subject of their address, and the length of time they spoke:

Paul Lindemulder: Proposal 5-317 [280.5] 10 minutes addressing CMP-5
Paul Guidry: Proposals 5-139, 5-140 [250.50] 10 minutes addressing CMP-5
Robert Torbin: Proposal 5-251 [250.104(B)] 10 minutes addressing CMP-5
Christel Hunter: Proposal 5-287 [250.122(A)] 5 minutes addressing CMP-5
Bill McGovern: Proposal 5-314 [250.190] 5 minutes addressing CMP-5

4. Number of Proposals or Comments acted upon: 340

The initial CMP-5 package of proposals included 324
324-3 that were redirected to other CMPs
There were 19 CMP-5 proposals: 340 total proposals acted upon.

5. Number of Panel generated Proposals or Comments:

CMP-5 generated 19 [CP500 through CP 518] Panel proposals

6. Appointments of any Task Groups that will be working on any Panel subject, subsequent to the Panel Meeting, along with the names of members of the Task Group(s):

Editorial TG: Michael Johnston (Chair), Marty Brett (M), Charles Mello (RT), Douglas White (UT), Daleep Mohla (U), Greg Steinman (M), David Williams (E), Paul LeVasseur (L), Nathan Philips (IM), Phil Simmons, (M)Scott Harding (IM), Paul Dobrowsky (U)

Grounding and Bonding Equipment 250.8 TG: Chuck Mello (RT) (Chair), Greg Steinman (M), Paul Dobrowsky (U), Dave Williams(E), Chistine Porter (RT)

Grounding Separately Derived Systems 250.30 TG: Phil Simmons (M) (Chair), Scott Harding (IM), Paul Lavassuer (L), Paul Dobrowsky (U), Dave Williams (E)

Concrete-encased electrodes 250.52(A)(3) TG: Daleep Mohla (U)(Chair), Paul Lavassuer (L), Scott Harding (IM), Paul Dobrowsky (U), Dave Williams (E), Elliott Rappaport (U), Greg Steinman (M)

Equipment grounding conductor types 250.118 TG: Richard Loyd (M)(Chair), Richard Temblador (M), David Brender (M), Scott Harding (IM), Marty Brett (M)
***Grounding Conductor Terminology TG: Paul Dobrowsky (U) (Chair), Trevor Bowmer (U), Chuck Mello (RT), Joe DeGregoria (RT), Scott Harding (IM), Mike McNeil (U), Mike O'Meara (UT), Robert Nelson (RT), Christine Porter (RT), Richard Temblador (M), Doug White (UT)

*** See additional information under item 12 of this report.

7. List any request contained In a Panel Statement that requires Technical Correlating Committee attention: Not contained in a Panel statement but discussed with NFPA staff

Proposal 5-251: Request has been made to determine which committee has primary responsibilities for bonding of metal gas piping systems (NFPA 70 or NFPA 54) see item 11 of this report.

TIA 941: As requested by NFPA prior to the ROP meeting in Hilton Head, CMP-5 voted on whether the TIA qualifies as emergency in nature under the criteria provided in Section 5.2 of the Regulations Governing Committee Projects. CMP-5 voting was affirmative to move the TIA forward into the balloting process in accordance with Section 5.4 of the RGCP.

8. List any Panel actions that, in your opinion, need to be referred to another Panel(s) for correlation:

Proposal 5-313: referred to CMP-6 for comment [Re Medium voltage shielding as equipment grounding conductor]

9. List any Proposals or Comments that should be referred to the Toxicity Advisory Committee:

None identified

10. List all Proposals or Comments related to combustibles in plenums or other air handling spaces:

None identified

11. List any general Panel requests for information or assistance from the Technical Correlating Committee:

TIA 941 Information: CMP-5 is requesting a determination about which NFPA Document (NFPA 70 or NFPA 54) has primary responsibility for rules on bonding metal gas piping systems. [This is related to Proposal 5-251 which was rejected unanimously by CMP-5]. The substantiation indicated that the NFPA 54-2009 document did accept a similar proposal. I'm unaware of any attempt by the NFPA-54 Committee or the TCC to coordinate between the two documents and maintain consistency between the metal gas piping bonding requirements in both documents. CMP-5 is concerned that changing Code rules for bonding other metal piping systems might not be the appropriate solution to the unfortunate problems related CSST piping systems that were identified in the substantiation with the proposal.

12. List any additional information that you feel would be helpful to the Technical Correlating Committee, staff, or to the process in general:

CP 503: CMP-5 rejected Proposal 5-2 related to definitions for the terms "high voltage" and "medium voltage." CMP-5 developed a Panel proposal [CP 503] that removes the words "high voltage from the title of Part X in Article 250 and all other places it is used within that part. The term "high voltage" was replaced with the term "over 1kv" and the text was edited for clarity to resolve any potential conflicts if the proposed definitions of these terms "medium voltage" and high voltage" are accepted by CMP-1. The revisions to Part X of Article 250 will work in either case.
There were several proposals (see list below) to revise the definitions of "service cable" and service conductors by adding the word "entrance" in the title and text as they appear throughout the NEC. CMP-5 acted on 14 such proposals. The result was a rejecting all of these proposals:

5-88, 5-89, 5-90, 5-98, 5-99, 5-216, 5-217, 5-221, 5-224, 5-234, 5-236, 5-299, 5-300, 5-320

CMP-5 was informed that CMP-4 had possibly modified some of the proposed terms.

Definition of Finished Ground Level (Grade): There was a concept (possible proposal) provided to CMP-5 that would introduce a new definition of the term Finished Ground Level (Grade). CMP-5 discussed this briefly and did not support this idea at all. The assigned grounding and bonding task group in the 2008 NEC cycle dealt with grounding and bonding words and terms, and the word "ground" was included in that work that spans the entire NEC. CMP-5 strongly suggests that this type of proposal using grounding and bonding terms be considered carefully to avoid any resulting conflicts. Perhaps different terms should be used if there is interest in moving this forward and if it is really necessary.

CMP 5 deleted the term "Grounding Conductor" by accepting proposals 5-13 and 5-15. The term is essentially defined the same as "Grounding Electrode Conductor" CMP-5 also modified the definition of "Grounding Electrode Conductor" by accepting proposal 5-18 in principle. The modification now specifically includes items that apply to CMP16's articles. The Grounding Conductor Terminology TG described in Item 6 created panel proposals to address the use of this term in CMP-5's Articles. Trevor Bowne was a member of that TG and is also a member of CMP-16. Correlation is necessary to revise the term within the communications articles for consistency with CMP-5 actions. CMP-5 has primary responsibility of definitions of grounding and bonding words and terms. This issue may require TCC intervention to ensure CMP-16 actions on grounding conductor proposals to CMP-16 are consistent with the CMP-5 actions. CMP-16 appears to have rejected a proposal(s) that would have replaced the term "Grounding Conductor" in CMP-16's Articles.

In the panel statement to 5-13 CMP-5 recommends the TCC establish a TG to address replacing the term "Grounding Conductor" throughout the NEC with an appropriate different term, typically "Grounding Electrode Conductor" or Equipment Grounding Conductor"

13. Were any units of measure "Accepted" by the panel that are not listed in Annex C of the NEC Style Manual? If so, please list the section number(s) and proposal/comment number(s) below:

None identified

14. Identify any issues that should be brought to the attention of the NFPA Research Foundation for their input and assistance:

None identified
B) Other Metal Piping. Where installed in or attached to a building or structure, a metal piping system(s), including gas piping, that is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible.

(1) Other than Corrugated Stainless Steel Tubing (CSST). The bonding jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means.

(2) CSST. Corrugated stainless steel tubing gas piping systems shall be bonded by connection to a metallic piping segment or fitting, either outside or inside the building, between the individual gas meter and the first CSST fitting. The bonding jumper shall be sized in accordance with Table 250.66 based on the size of the service-entrance conductor or feeder supplying each occupancy and as permitted in 250.66(A), (B) and (C) but not smaller than 6 AWG copper (or equivalent).

Substantiation: Statement of Problem:

There have been numerous accounts of damage to corrugated stainless steel tubing (CSST) from both direct and indirect lightning strikes on or near residential structures containing this type of gas piping system. The damage is consistent: an arc-induced perforation is created through the tubing wall from a voltage imbalance between the CSST and another electrically conductive system in close proximity. Fires are often associated with this type of damage, and have resulted in partial or total losses of property.

All CSST manufacturers have subsequently revised their installation requirements to mandate the direct bonding of all CSST systems. CSST is a listed fuel gas system and is certified by CSA in accordance with a nationally recognized standard: ANSI LC-1-2005. Thus, the manufacturer’s Design and Installation Guide is considered part of the listed system. Recently, a new bonding requirement for CSST systems was added to the 2009 edition of the National Fuel Gas Code (NFPA 54).

These related changes could create potential conflicts with the NEC because it does not require this additional bonding for gas piping systems. The CSST manufacturers recognize the fact that the bonding of CSST will be installed by electrical contractors and enforced through the electrical inspectors rather than the plumbing/mechanical contractors and inspectors. However, the NEC currently does not require this additional bond to be installed, and electrical inspectors have indicated a reluctance to enforce this requirement. At the same time, mechanical/plumbing contractors and inspectors are trying to follow the manufacturer’s mandatory bonding instructions and the requirements of the National Fuel Gas Code (NFPA 54). Approval of this proposal to the National Electrical Code would clearly indicate the acceptability of such a bond connection, and clarify the responsibility of the contractors and inspectors regarding the installation of the bonding conductor.

Substantiation:

It is well known that direct bonding of metallic systems to the grounding electrode system will reduce the chances of arcing between electrically conductive pathways when energized by a high voltage source. The term "direct" bonding is intended to mean the use of a dedicated conductor and appropriately listed clamps to make an electrical connection between the piping and the grounding electrode system in the shortest and most straightforward path practical. In addition, NFPA 780 recommends "equipotential" bonding of all metallic systems to reduce the potential for damage when energized by lightning. Although Section 250.104(B) of the NEC allows the use of the equipment grounding conductor as the bonding means for a gas piping system (for personal safety purposes), it is not intended to preclude the direct bonding of the piping system. The 2008 NEC Handbook commentary supports this interpretation.

Laboratory testing and engineering analysis on the effectiveness of direct bonding have been performed. The data verify that bonding will result in a significant reduction in the potential for arc-induced damage to CSST when it is energized by any source of external energy. All CSST manufacturers now recommend the direct bonding of CSST to the grounding electrode system of the premise in which it is installed utilizing at least a 6 AWG copper wire or equivalent. The point of bonding attachment must be near the point where the gas piping enters the premise using a standard bonding clamp installed in accordance with its listing to the UL 467 standard. Generic installation instructions
for residential CSST bonding have been written to insure consistent field practices among installers, and to provide
guidance to local code enforcement officials. In addition, the ANSI standard for CSST systems is being updated to
include a requirement for bonding instructions and performance requirements to verify the electrical properties.

The NFPA 54/National Fuel Gas Code Technical Committee considered published reports of damage to the CSST
from lightning strikes and recommended new coverage for the bonding of CSST systems in the 2009 edition. The 2009
edition was approved by ANSI on September 5, 2008. That language (in part) includes the following requirement:
7.13.2 CSST. CSST gas piping systems shall be bonded to the electrical service grounding electrode system at the
point where the gas service enters the building. The bonding jumper shall not be smaller than 6 AWG copper wire or
equivalent.

Direct bonding of all metallic piping systems entering a building is an important, but often overlooked, approach when
considering protection of a building and its contents during an electrical storm. The Fine Print Note in Section
250.104(B) of the NEC supports the claim that this type of bonding is beneficial. Direct bonding (using a 6 AWG copper
wire) of piping systems to the building grounding electrode system allows these systems to be energized at (or near) the
same rate as the electrical system and in unison with the voltage wave caused or induced by a direct or indirect lightning
strike.

The National Electrical Code contains many requirements for bonding of electrically conductive materials including
wiring, piping, ducts, communications cable and structural steel. These requirements are specified throughout the NEC
and all have the common goal of protecting the public safety from electrical faults within the premise wiring system by
establishing an effective, low-impedance ground fault current path. The use of a 6 AWG copper bond wire is a well
established approach for other, similar conductive metallic systems and a 6 AWG copper wire will be an effective means
for diverting (to earth) the energy associated with a lightning strike.

The use of the equipment grounding conductor (EGC) as the bonding means will not achieve the same effect. The
EGC associated with residential gas equipment (typically a 12 or 14 AWG copper wire ) does not allow the mechanical
equipment and piping to be energized at (or near) the same rate as the electrical system following a lightning strike.
The path to ground through the EGC is typically much longer (and with greater impedance) than the direct bonding
distance (near the service entrance) between the piping system and the grounding electrode system. When energized
by lightning, this situation permits the electrical potential in the many conductive pathways to become unbalanced, and
thus arcing is more likely to occur.

Panel Meeting Action: Reject

Panel Statement: CMP-5 is not convinced that bonding to or around portions of CSST will solve the problem. No test
records were provided to substantiate the adequacy of the minimum 6 AWG conductor. The problem could be directly
related to the design and wall thickness of CSST. CMP 5 was made aware of at least one manufacturer's product that
does not require bonding beyond the requirements of Section 250.104 contrary to the information provided in the
substantiation. The mitigation of the effects of lightning is a design option. The purpose of the NEC is the practical
safeguarding of persons and property from hazards arising from the use of electricity. The recommendation is not
currently prohibited by the NEC and should be covered by product standards. NFPA 54 contains bonding requirements
specific to this product, and those requirements do not conflict with the NEC requirements in Section 250.104(B).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15 Negative: 1

Explanation of Negative:

BRENDER, D., See my statement on vote on Proposal 5-252.

Comment on Affirmative:

HARDING, G., Continue to reject the proposal. Though a difficult problem exists, not enough information was
provided to indicate that the proposed revisions would eliminate this problem.

JOHNSTON, M., I support CMP-5's action on this proposal. While I am mindful of some unfortunate failures and
events related to CSST piping, revising a long standing adequate NEC rule does not appear to be the solution for these
problems. The proposal appears to be an effort to include NEC requirements that would solve or reduce a specific
product problem related to lightning. These claims are not fully and technically substantiated, which would be difficult to
do with any protective technique for lightning. The instructions and information from CSST manufacturers relative to
bonding are inconsistent and not all CSST products require any additional bonding beyond what the NEC-2008 currently
requires. I believe that revising this section based on the substantiation provided would set the wrong precedent relative
to the NEC addressing problems or concerns of protection from lightning.
ungrounded conductor located at the point where the conductor receives its supply or at an alternative location in the circuit when designed under engineering supervision that includes but is not limited to considering the appropriate fault studies and time-current coordination analysis of the protective devices and the conductor damage curves. The overcurrent protection shall be permitted to be provided by either 240.100(A)(1) or (A)(2).

(1) Overcurrent Relays and Current Transformers. Circuit breakers used for overcurrent protection of 3-phase circuits shall have a minimum of three overcurrent relay elements operated from three current transformers. The separate overcurrent relay elements (or protective functions) shall be permitted to be part of a single electronic protective relay unit.

On 3-phase, 3-wire circuits, an overcurrent relay element in the residual circuit of the current transformers shall be permitted to replace one of the phase relay elements.

An overcurrent relay element, operated from a current transformer that links all phases of a 3-phase, 3-wire circuit, shall be permitted to replace the residual relay element and one of the phase-conductor current transformers. Where the neutral conductor is not regrounded on the load side of the circuit as permitted in 250.184(B), the current transformer shall be permitted to link all 3-phase conductors and the grounded circuit conductor (neutral).

(2) Fuses. A fuse shall be connected in series with each ungrounded conductor.

(B) Protective Devices. The protective device(s) shall be capable of detecting and interrupting all values of current that can occur at their location in excess of their trip-setting or melting point.

(C) Conductor Protection. The operating time of the protective device, the available short-circuit current, and the conductor used shall be coordinated to prevent damaging or dangerous temperatures in conductors or conductor insulation under short-circuit conditions.

240.101 Additional Requirements for Feeders.

(A) Rating or Setting of Overcurrent Protective Devices. The continuous ampere rating of a fuse shall not exceed three times the ampacity of the conductors. The long-time trip element setting of a breaker or the minimum trip setting of an electronically actuated fuse shall not exceed six times the ampacity of the conductor. For fire pumps, conductors shall be permitted to be protected for overcurrent in accordance with 695.4(B).

(B) Feeder Taps. Conductors tapped to a feeder shall be permitted to be protected by the feeder overcurrent device where that overcurrent device also protects the tap conductor.

I. General

250.1 Scope. This article covers general requirements for grounding and bonding of electrical installations, and the specific requirements in (1) through (6).

(1) Systems, circuits, and equipment required, permitted, or not permitted to be grounded

(2) Circuit conductor to be grounded on grounded systems

(3) Location of grounding connections

(4) Types and sizes of grounding and bonding conductors and electrodes

(5) Methods of grounding and bonding

(6) Conditions under which guards, isolation, or insulation may be substituted for grounding

See Table 250.240(A) for information on the organization of Article 250

Figure 250.1 Grounding and Bonding.
250.2 Definitions.

**Bonding-Jumper System.** The connection between the grounded circuit conductor and the equipment grounding conductor at a separately derived system.

**Effective Ground-Fault Current Path.** An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current under ground-fault conditions from the point of a ground fault on a wiring system to the electrical supply source that facilitates the operation of the overcurrent protective device or ground-fault detectors on high-impedance grounded systems.

**Ground Fault.** An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.

**Ground-Fault Current Path.** An electrically conductive path from the point of a ground fault on a wiring system through normally non-current-carrying conductors, equipment, or the earth to the electrical supply source.

FPN: Examples of ground-fault current paths could consist of any combination of equipment grounding conductors, metallic raceways, metallic cable sheaths, electrical equipment, and any other electrically conductive material such as metal water and gas piping, steel framing members, stucco mesh, metal ducting, reinforcing steel, shields of communications cables, and the earth itself.

250.3 Application of Other Articles. For other articles applying to particular cases of installation of conductors and equipment, the grounding and bonding requirements are identified in Table 250.3 that are in addition to, or modifications of, those of this article.

250.4 General Requirements for Grounding and Bonding. The following general requirements identify what grounding and bonding of electrical systems are required to accomplish. The prescriptive methods contained in Article 250 shall be followed to comply with the performance requirements of this section.

(A) Grounded Systems.

(1) **Electrical System Grounding.** Electrical systems that are grounded shall be connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation.

(2) **Grounding of Electrical Equipment.** Normally non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth so as to limit the voltage to ground on these materials.

(3) **Bonding of Electrical Equipment.** Normally non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path.

(4) **Bonding of Electrically Conductive Materials and Other Equipment.** Normally non-current-carrying electrically conductive materials that are likely to become energized shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path.

(5) **Effective Ground-Fault Current Path.** Electrical equipment and wiring and other electrically conductive material likely to become energized shall be installed in a manner that creates a low-impedance circuit facilitating the operation of the overcurrent device or ground detector for high-impedance grounded systems. It shall be capable of safely carrying the maximum ground-fault current likely to be imposed on it from any point on the wiring system where a ground fault may occur to the electrical supply source. The earth shall not be considered as an effective ground-fault current path.

(B) Ungrounded Systems.

(1) **Grounding Electrical Equipment.** Non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth in a manner that will limit the voltage imposed by lightning or unintentional contact with higher-voltage lines and limit the voltage to ground on these materials.

(2) **Bonding of Electrical Equipment.** Non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the supply system grounded equipment in a manner that creates a low-impedance path for ground-fault current that is capable of carrying the maximum fault current likely to be imposed on it.

(3) **Bonding of Electrically Conductive Materials and Other Equipment.** Electrically conductive materials that are likely to become energized shall be connected together and to the supply system grounded equipment in a manner that creates a low-impedance path for ground-fault current that is capable of carrying the maximum fault current likely to be imposed on it.
with concentric or eccentric knockouts is listed to provide a reliable bonding connections, the following methods shall be permitted:

1. Threadless couplings and connectors for cables with metal sheaths

2. Two locknuts, on rigid metal conduit or intermediate metal conduit, one inside and one outside of boxes and cabinets

3. Fittings with shoulders that seat firmly against the box or cabinet, such as electrical metallic tubing connectors, flexible metal conduit connectors, and cable connectors, with one locknut on the inside of boxes and cabinets

4. Listed fittings

250.98 Bonding Loosely Jointed Metal Raceways. Expansion fittings and telescoping sections of metal raceways shall be made electrically continuous by equipment bonding jumpers or other means.

250.100 Bonding in Hazardous (Classified) Locations. Regardless of the voltage of the electrical system, the electrical continuity of non-current-carrying metal parts of equipment, raceways, and other enclosures in any hazardous (classified) location as defined in 

shall be ensured by any of the bonding methods specified in 250.92(B)(2) through (B)(4). One or more of these bonding methods shall be used whether or not equipment grounding conductors are installed.

250.102 Equipment Bonding Jumpers.

(A) Material. Equipment bonding jumpers shall be of copper or other corrosion-resistant material. A bonding jumper shall be a wire, bus, screw, or similar suitable conductor.

(B) Attachment. Equipment bonding jumpers shall be attached in the manner specified by the applicable provisions of 250.8 for circuits and equipment and by 250.70 for grounding electrodes.

(C) Size — Equipment Bonding Jumper on Supply Side of Service. The bonding jumper shall not be smaller than the sizes shown in Table 250.66 for grounding electrode conductors. Where the service-entrance phase conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the bonding jumper shall have an area not less than 12½ percent of the area of the largest phase conductor except that, where the phase conductors and the bonding jumper are of different materials (copper or aluminum), the minimum size of the bonding jumper shall be based on the assumed use of phase conductors of the same material as the bonding jumper and with an ampacity equivalent to that of the installed phase conductors. Where the service-entrance conductors are paralleled in two or more raceways or cables, the equipment bonding jumper, where routed with the raceways or cables, shall be run in parallel. The size of the bonding jumper for each raceway or cable shall be based on the size of the service-entrance conductors in each raceway or cable.

(D) Size — Equipment Bonding Jumper on Load Side of Service. The equipment bonding jumper on the load side of the service overcurrent devices shall be sized, as a minimum, in accordance with the sizes listed in Table 250.122, but shall not be required to be larger than the largest ungrounded circuit conductors supplying the equipment and shall not be smaller than 14 AWG.

A single common continuous equipment bonding jumper shall be permitted to terminate two or more raceways or cables where the bonding jumper is sized in accordance with Table 250.122 for the largest overcurrent device supplying circuits therein.

(E) Installation. The equipment bonding jumper shall be permitted to be installed inside or outside of a raceway or enclosure. Where installed on the outside, the length of the equipment bonding jumper shall not exceed 1.8 m (6 ft) and shall be routed with the raceway or enclosure. Where installed inside a raceway, the equipment bonding jumper shall comply with the requirements of 250.119 and 250.148.

Exception: An equipment bonding jumper longer than 1.8 m (6 ft) shall be permitted at outside pole locations for the purpose of bonding or grounding isolated sections of metal raceways or elbows installed in exposed risers of metal conduit or other metal raceway.

250.104 Bonding of Piping Systems and Exposed Structural Steel.

(A) Metal Water Piping. The metal water piping system shall be bonded as required in (A)(1), (A)(2), or (A)(3) of this section. The bonding jumper(s) shall be installed in accordance with 250.64(A), (B), and (E). The points of attachment of the bonding jumper(s) shall be accessible.

(1) General. Metal water piping system(s) installed in or attached to a building or structure shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with Table 250.66 except as permitted in 250.104(A)(2) and (A)(3).

(2) Buildings of Multiple Occupancy. In buildings of multiple occupancy where the metal water piping system(s) installed in or attached to a building or structure for the individual occupancies is metallically isolated from all other occupancies by use of nonmetallic water piping, the
metal water piping system(s) for each occupancy shall be permitted to be bonded to the equipment grounding terminal of the panelboard or switchboard enclosure (other than service equipment) supplying that occupancy. The bonding jumper shall be sized in accordance with Table 250.122.

(3) Multiple Buildings or Structures Supplied by a Feeder(s) or Branch Circuit(s). The metal water piping system(s) installed in or attached to a building or structure shall be bonded to the building or structure disconnecting means enclosure where located at the building or structure, to the equipment grounding conductor run with the supply conductors, or to the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with 250.66, based on the size of the feeder or branch circuit conductors that supply the building. The bonding jumper shall not be required to be larger than the largest ungrounded feeder or branch circuit conductor supplying the building.

(B) Other Metal Piping. Where installed in or attached to a building or structure, a metal piping system(s), including gas piping, that is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible.

FPN: Bonding all piping and metal air ducts within the premises will provide additional safety.

(C) Structural Metal. Exposed structural metal that is interconnected to form a metal building frame and is not intentionally grounded and is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with Table 250.66 and installed in accordance with 250.64(A), (B), and (E). The points of attachment of the bonding jumper(s) shall be accessible.

(D) Separately Derived Systems. Metal water piping systems and structural metal that is interconnected to form a building frame shall be bonded to separately derived systems in accordance with (D)(1) through (D)(3).

(I) Metal Water Piping System(s). The grounded conductor of each separately derived system shall be bonded to the nearest available point of the metal water piping system(s) in the area served by each separately derived system. This connection shall be made at the same point on the separately derived system where the grounding electrode conductor is connected. Each bonding jumper shall be sized in accordance with Table 250.66 based on the largest ungrounded conductor of the separately derived system.

Exception No. 1: A separate bonding jumper to the metal water piping system shall not be required where the metal water piping system is used as the grounding electrode for the separately derived system.

Exception No. 2: A separate water piping bonding jumper shall not be required where the metal frame of a building or structure is used as the grounding electrode for a separately derived system and is bonded to the metal water piping in the area served by the separately derived system.

(2) Structural Metal. Where exposed structural metal that is interconnected to form the building frame exists in the area served by the separately derived system, it shall be bonded to the grounded conductor of each separately derived system. This connection shall be made at the same point on the separately derived system where the grounding electrode conductor is connected. Each bonding jumper shall be sized in accordance with Table 250.66 based on the largest ungrounded conductor of the separately derived system.

Exception No. 1: A separate bonding jumper to the building structural metal shall not be required where the metal frame of a building or structure is used as the grounding electrode for the separately derived system.

Exception No. 2: A separate bonding jumper to the building structural metal shall not be required where the water piping of a building or structure is used as the grounding electrode for a separately derived system and is bonded to the building structural metal in the area served by the separately derived system.

(3) Common Grounding Electrode Conductor. Where a common grounding electrode conductor is installed for multiple separately derived systems as permitted by 250.30(A)(4), and exposed structural metal that is interconnected to form the building frame or interior metal piping exists in the area served by the separately derived system, the metal piping and the structural metal member shall be bonded to the common grounding electrode conductor.

Exception: A separate bonding jumper from each derived system to metal water piping and to structural metal members shall not be required where the metal water piping and the structural metal members in the area served by the separately derived system are bonded to the common grounding electrode conductor.
NFPA 54–2009
ANSI Z223.1–2009
National Fuel Gas Code

2009 Edition

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (*) between the paragraphs that remain.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex M. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex M.

All pressures used in this code are gauge pressure unless otherwise indicated.

Chapter 1 Administration

1.1 Scope.

1.1.1 Applicability.

1.1.1.1 This code is a safety code that shall apply to the installation of fuel gas piping systems, appliances, equipment, and related accessories as shown in 1.1.1.1(A) through 1.1.1.1(D).

(A) Coverage of piping systems shall extend from the point of delivery to the appliance connections. For other than undiluted liquefied petroleum gas (LP-Gas) systems, the point of delivery shall be considered to be the outlet of the service meter assembly or the outlet of the service regulator or service shutoff valve where no meter is provided. For undiluted LP-Gas, the point of delivery shall be considered to be the outlet of the final pressure regulator, exclusive of line gas regulators, in the system.

(B) The maximum operating pressure shall be 125 psi (862 kPa).

Exception No. 1: Piping systems for gas–air mixtures within the flammable range are limited to a maximum pressure of 10 psi (69 kPa).

Exception No. 2: LP-Gas piping systems are limited to 20 psi (140 kPa), except as provided in 5.5.2.

(C) Requirements for piping systems shall include design, materials, components, fabrication, assembly, installation, testing, inspection, operation, and maintenance.

(D) Requirements for appliances, equipment, and related accessories shall include installation, combustion, and ventilation air and venting.

1.1.1.2 This code shall not apply to the following items (reference standards for some of which appear in Annex M):

1. Portable LP-Gas appliances and equipment of all types that are not connected to a fixed fuel piping system
2. Installation of farm appliances and equipment such as brooders, dehydrators, dryers, and irrigation equipment
3. Raw material (feedstock) applications except for piping to special atmosphere generators
4. Oxygen–fuel gas cutting and welding systems
5. Industrial gas applications using such gases as acetylene and acetylenic compounds, hydrogen, ammonia, carbon monoxide, oxygen, and nitrogen
6. Petroleum refineries, pipeline compressor or pumping stations, loading terminals, complicating plants, refinery tank farms, and natural gas processing plants
7. Large integrated chemical plants or portions of such plants where flammable or combustible liquids or gases are produced by chemical reactions or used in chemical reactions
8. LP-Gas installations at utility gas plants
9. Liquefied natural gas (LNG) installations
10. Fuel gas piping in electric utility power plants
11. Proprietary items of equipment, apparatus, or instruments such as gas generating sets, compressors, and calorimeters
12. LP-Gas equipment for vaporization, gas mixing, and gas manufacturing
13. LP-Gas piping for buildings under construction or renovations that is not to become part of the permanent building piping system — that is, temporary fixed piping for building heat
14. Installation of LP-Gas systems for railroad switch heating
15. Installation of LP-Gas and compressed natural gas (CNG) systems on vehicles
16. Gas piping, meters, gas pressure regulators, and other appurtenances used by the serving gas supplier in distribution of gas, other than undiluted LP-Gas
17. Building design and construction, except as specified herein
18. Fuel gas systems on recreational vehicles manufactured in accordance with NFPA 1192, Standard on Recreational Vehicles
19. Fuel gas systems using hydrogen as a fuel
20. Construction of appliances

1.1.2 Other Standards. In applying this code, reference shall also be made to the manufacturers' instructions and the serving gas supplier regulations.

1.2 Purpose. (Reserved)

1.3 Retroactivity. Unless otherwise stated, the provisions of this code shall not be applied retroactively to existing systems that were in compliance with the provisions of the code in effect at the time of installation.

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7.12.5.3 Air Intakes. Air intakes for gas-mixing machines using compressors or blowers shall be taken from outdoors whenever practical.

7.12.5.4* Controls. Controls for gas-mixing machines shall include interlocks and a safety shutoff valve of the manual reset type in the gas supply connection to each machine arranged to automatically shut off the gas supply in the event of high or low gas pressure. Except for open burner installations only, the controls shall be interlocked so that the blower or compressor stops operating following a gas supply failure. Where a system employs pressurized air, means shall be provided to shut off the gas supply in the event of air failure.

7.12.5.5 Installation in Parallel. Centrifugal gas-mixing machines in parallel shall be reviewed by the user and equipment manufacturer before installation, and means or plans for minimizing these effects of downstream pulsation and equipment overload shall be prepared and utilized as needed.

7.12.6 Use of Automatic Firechecks, Safety Blows, or Backfire Preventers. Automatic firechecks and safety blowoffs or backfire preventers shall be provided in piping systems distributing flammable air-gas mixtures from gas-mixing machines to protect the piping and the machines in the event of flashback, in accordance with the following:

1) Approved automatic firechecks shall be installed upstream as close as practicable to the burner inlets following the firecheck manufacturer's instructions.

2) A separate manually operated gas valve shall be provided at each automatic firecheck for shutting off the flow of gas-air mixture through the firecheck after a flashback has occurred. The valve shall be located upstream as close as practical to the inlet of the automatic firecheck. Caution: these valves shall not be reopened after a flashback has occurred until the firecheck has cooled sufficiently to prevent re-ignition of the flammable mixture and has been reset properly.

3) A safety blowoff or backfire preventer shall be provided in the mixture line near the outlet of each gas-mixing machine where the size of the piping is larger than 2% of NFPA, or equivalent, to protect the mixing equipment in the event of an explosion passing through an automatic firecheck. The manufacturer's instructions shall be followed when installing these devices, particularly after a disc has burst. The discharge from the safety blowout or backfire preventer shall be located or shielded so that particles from the ruptured disc cannot be directed toward personnel. Wherever there are interconnected installations of gas-mixing machines with safety blowouts or backfire preventers, provision shall be made to keep the mixture from other machines from reaching any ruptured disc opening. Check valves shall not be used for this purpose.

4) Large-capacity premix systems provided with explosion heads (rupture disc) to relieve excessive pressure in pipelines shall be located at and vented to a safe outdoor location. Provisions shall be provided for automatically shutting off the supply of the gas-air mixture in the event of rupture.

7.13 Electrical Bonding and Grounding.

7.13.1 Pipe and Tubing Other Than CSST. Each aboveground portion of a gas piping system other than CSST that is likely to become energized shall be electrically continuous and bonded to an effective ground-fault current path. Gas piping, other than CSST, shall be considered to be bonded when it is connected to appliances that are connected to the appliance grounding conductor of the circuit supplying that appliance.

7.13.2 CSST. CSST gas piping systems shall be bonded to the electrical service grounding electrode system at the point where the gas service enters the building. The bonding jumper shall not be smaller than 6 AWG copper wire or equivalent.

7.13.3 Prohibited Use. Gas piping shall not be used as a grounding conductor or electrode. This does not preclude the bonding of metallic piping to a grounding system.

7.13.4* Lightning Protection Systems. Where a lightning protection system is installed, the bonding of the gas piping shall be in accordance with NFPA 780, Standard for the Installation of Lightning Protection Systems.

7.14 Electrical Circuits. Electrical circuits shall not utilize gas piping or components as conductors.

Exception: Low-voltage (50 V or less) control circuits, ignition circuits, and electronic flame detection device circuits shall be permitted to make use of piping or components as part of an electric circuit.

7.15 Electrical Connections.

7.15.1 All electrical connections between wiring and electrically operated control devices in a piping system shall be in accordance with the requirements of NFPA 70, National Electrical Code. (See Section 7.13.)

7.15.2 Any essential safety control depending on electric current as the operating medium shall be of a type that shuts off (fail safe) the flow of gas in the event of current failure.

Chapter 8 Inspection, Testing, and Purging

8.1 Pressure Testing and Inspection.

8.1.1* General.

8.1.1.1 Prior to acceptance and initial operation, all piping installations shall be inspected and pressure tested to determine that the materials, design, fabrication, and installation practices comply with the requirements of this code.

8.1.1.2 Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly, or pressure tests as appropriate. Supplementary types of nondestructive inspection techniques, such as magnetic-particle, radiographic, and ultrasonic, shall not be required unless specifically listed herein or in the engineering design.

8.1.1.3 Where repairs or additions are made following the pressure test, the affected piping shall be tested. Minor repairs and additions are not required to be pressure tested, provided that the work is inspected and connections are tested with a noncorrosive leak-detecting fluid or other leak-detecting methods approved by the authority having jurisdiction.

8.1.1.4 Where new branches are installed to new appliance(s), only the newly installed branch(es) shall be required to be pressure tested. Connections between the new piping and the existing piping shall be tested with a noncorrosive leak-detecting fluid or approved leak-detecting methods.

8.1.1.5 A piping system shall be tested as a complete unit or in sections. Under no circumstances shall a valve in a line be used as a bulkhead between gas in one section of the piping system and test medium in an adjacent section, unless two valves are

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Item 09-8-43
From: O'Connor, Jean  
Sent: Wednesday, May 06, 2009 12:00 PM  
To: Fuller, Linda  
Cc: Earley, Mark; 'Jim Carpenter'; Burke, Bill  
Subject: Agenda Item for August Council Meeting

Linda, at its meeting last week, the NEC Technical Correlating Committee developed the following response for the Standards Council to Consider. I have included information indicating the Council’s initial question and the Technical Correlating Committee’s discussion and response to the question, along with their motion to forward it to the Council for consideration.

Please place this matter on the Agenda for the Council’s August meeting. Thank you.

- Discussion of the Standards Council’s Request of November 2008 that the Technical Correlating Committee Review the 15 Member Limitation of CMPs and Report Back as to its Rationale for this Number or to Propose a Revision to Annex 3.0 of the Current SOPs

M.W. Bunker, Jr. opened a discussion regarding the Standards Council’s request related to the limitation of the number of members on NEC Code-Making Panels. It was agreed that smaller groups functions better than larger groups for the following reasons:

NEC Technical Correlating Committee Reasoning for CMP Size Limitations – April 2009

The Technical Correlating Committee seeks to limit the size of NEC Code-Making Panels to a maximum of 15 principal members. The following reasons should be considered:

- Experience has shown that large working groups are far less focused and smaller groups work more efficiently. Large committees limit the full potential of the committee.
- Experience has shown that small groups of 12 to 15 persons are more manageable than larger groups.
- Recent research indicates that small groups of 12 to 15 are an optimal size:
  o Assuming specific voting rules, committee size is negatively correlated with decision accuracy (Gabel & Shipan, 2000).
  o Communication quality and complexity is greater in small groups than in larger groups (Fay, et al., 2000).
  o Limit to 12 – 15 members for effective functioning of the group (Shekelle, et al., 1999)
  o Larger committees take longer to achieve consensus, thereby driving away the best talent (Lang, 2001).
  o Larger committees cause its members to feel less responsible and less involved. Consequently, they become less invested in their decisions, which collectively results in weaker and slower decision-making (Lang, 2001).
- Most boards of directors of major corporations have sizes in the 10 to 15 person range. (Note: The NFPA Standards Council falls within this size range).
- The NEC is comprised of 19 Code-Making Panels. Large numbers of people are involved, which creates complexity in communications between panels and individuals.
• Maximum panel sizes of 30 principals and 30 alternates require very large meeting rooms, which can severely limit available meeting venues.
• The need to use large meeting venues can significantly increase costs to NFPA and its members.
• Large groups can have difficulty achieving consensus.
• Experience with technical committees has shown that most of the work is completed by a minority of members.
• Small groups can adequately represent the industry. All possible interest categories would be represented in Code-Making Panels that are limited to 15 principals.
• There is no need for redundancy in the interest categories that could be represented on the technical committee.

It was moved, seconded, and voted unanimously affirmative to forward the reasons for smaller sized committees, as indicated above, to the Standards Council in answer to their question related to this topic.

Jean O'Connor  
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joconnor@nfpa.org
TO: Jean O'Connor
FROM: Leona A. Nisbet
DATE: November 25, 2008
SUBJECT: National Electrical Code Operating Procedures Proposed Revisions

I am transmitting to you herewith the following action of the Standards Council (October 28, 2008):

The Council voted to approve, with revisions, the National Electrical Code Operating Procedures, as shown in the Attachment. In taking this action on the Procedures, the Council requested the NEC TCC to review Annex 3.0 regarding the 15 member limitation on CMPs, and report back as to its rationale for this number, or a proposed revision to Annex 3.0 to reflect its current position on recommended size of CMPs.

Very truly yours,

Leona Attenasio Nisbet, Recording Secretary
NFPA Standards Council

c: J. Pauley, M. Brodoff, C. Dubay, A. Spencer, M. Earley, D. Baio, L. Fuller
   TCC National Electrical Code

08-10-31
Supplemental Operating Procedures for the National Electrical Code Project

Adopted by the NEC Technical Correlating Committee on October 2, 2008.

Approved by the Standards Council on October 28, 2008

Introduction

(a) Preamble. The Operations of the National Electrical Code Project (i.e., the NEC Technical Correlating Committee and the various Technical Committees or Code-Making Panels it supervises) are governed by the NFPA Regulations Governing Committee Projects (RGCP). In addition to those Regulations, the following Supplemental Operating Procedures (SOPs) have been adopted and approved in accordance with 3.3.8 and 3.4.3(h) of the RGCP. These Supplemental Operating Procedures are intended to be consistent with and supplement the Bylaws of the Association and the RGCP and should any conflict appear either now or as the Bylaws or RGCP may be amended, the Bylaws and RGCP shall govern.

(b) The NEC Project. The organization and structure of The National Electrical Code Project, as well as the NFPA Documents for which it is currently responsible, are approved by the NFPA Standards Council and are set forth in Annex A to these SOPs, as it may be revised from time to time.

(c) Numbering system for these SOPs. Each section of these SOPs is designated as “SOP” followed by a number. The sections have been numbered so as to correspond with the section of the RGCP which they supplement. Accordingly, the numbering is not sequential.

(d) Note on Abbreviations. In the text of these SOPs, the references to “TC” include both Technical Committees and NEC Code-Making Panels. In the text where only “CMP” is referenced the text applies only to an NEC Code-Making Panel.
Supplemental Operating Procedures for the National Electrical Code Project

SOP 3.1.3.1 Committee Membership Recommendations

The following procedures shall be used for developing recommendations to the Standards Council pursuant to RGCP 3.1.3.1 for membership on a Technical Committee of the NEC Project.

1. **Application.** Upon receipt of an application, NFPA Staff shall assign a tentative membership classification and forward it to the TCC Membership Task Group. A complete application file shall be received before the application will be processed. Applications will not be processed two weeks prior to and two weeks after the ROP or ROC meeting for the involved document.

2. **TCC Membership Task Group.** The Membership Task Group shall consist of the TCC Secretary and (3) three members of the TCC as appointed by the TCC Chair. The Membership Task Group shall conduct a comprehensive review of the application including:
   - Membership Classification
   - Committee Balance
   - Applicants’ Credentials & Experience
   - Organizational Support

3. **Task Group Recommendation.** The Membership Task Group shall complete their review and make a recommendation to the TCC. Reasons for rejecting or holding the application shall be clearly stated in their recommendation. Their recommendation shall be completed and returned to NFPA staff no later than 14 days from receipt of the application.

4. **TC Chair and TCC Review.** NFPA staff shall forward the recommendation of the Membership Task Group to the appropriate TC Chair for review and recommendation. Concurrently, NFPA staff shall forward the recommendation of the Membership Task Group to the entire TCC for review and recommendation. The TC Chair and TCC members shall return a recommendation or any comments to NFPA Staff no later than 10 days from receipt of the application.

5. **TCC Chair and Secretary Review.** The recommendations of the TCC Membership Task Group and TC Chair along with any comments received from TCC members shall be submitted to the TCC Chair and Secretary. The TCC Chair and Secretary shall return a recommendation to NFPA staff no later than 10 days from receipt of the information.
Supplemental Operating Procedures for the National Electrical Code Project

6. **Recommendation to the Standards Council.** The complete record of the application, including all recommendations and comments, shall be forwarded to the TCC Secretary who will review the record and forward it to the Standards Council. The entire process from receipt of the application to submission to the Standards Council shall take no longer than 60 calendar days.

7. **Electronic Processing.** Processing an application for a Chair or Committee Member shall be done electronically. It shall be the responsibility of each Chair, or Committee Member to ensure that NFPA staff has their most current e-mail address on file for the purposes of balloting and application review.

8. **Representation on Multiple Code-Making Panels.** No CMP member is to be recommended as a Principal member on more than one CMP, or as a member (principal or alternate) on more than two CMPs. Organizations that seek representation on more than one Panel are encouraged to limit any one representative to membership on only one CMP.

9. **Member Participation.** The TCC shall review the performance and participation of each TC Chair and member at least once following each revision cycle, and make appropriate recommendations to the Standards Council regarding reappointment or replacement.

10. **Liaison members from Electrical TCs to other NFPA Committees.** Appointments of a liaison from a TC within the National Electrical Code Committee to another NFPA TC shall be recommended to the Standards Council only after approval of the TCC.

**SOP 3.2 Acting TC Chairs.** When a TC Chair becomes unavailable to continue serving as Chair, the TCC Chair may appoint a member of a TC as acting Chair. This appointment will be effective only until the Standards Council appoints a Chair. A TCC member, other than the chair, may be appointed as an acting Chair.

**SOP 3.4 Responsibilities of the TCC.** In addition to the responsibilities and authority expressly set forth in RGCP 3.4, 4.3.6 and 4.4.7, the TCC shall have the following responsibilities:

1. **Scope Approval.** The TCC is responsible for the approval of Scopes of Articles or Chapters of documents within the documents under its responsibility.
2. **Enforcement of the Style Manual.** The TCC shall be responsible for enforcement of the NEC Style Manual and the NFPA Manual of Style for other documents under their responsibility. Within this responsibility the necessary action may include: sending the issue back to the TC for revision (at the ROP stage), holding the text (at the ROC stage), or revising the text to comply with the Style Manual (at either the ROP or ROC stage).

**SOP 3.3.2 Calling Meetings.** All meetings, including Task Groups, shall have their dates and locations coordinated through the Secretary of the TCC.

**SOP 3.1.3.4 Task Groups**

1. **Ad Hoc Status.** All Task Groups shall be Ad Hoc Task Groups.

2. **Appointment of Task Groups**

   2.1 **Task Groups involving Multiple CMPs.** Task Group issues that impact the work of more than one Code-Making Panel shall be approved by the TCC Chair.

   2.2 **Task Groups of the TCC.** The TCC shall approve the formation of any task group of the TCC. The TCC Chair shall appoint task group members. The formation of such Task Groups may result from a decision by the TCC or by a request from a TC.

   2.3 **TC Task Groups.** Where the topic to be considered is wholly within the scope of a single TC, the TC Chair may appoint a Task Group or the TCC Chair may request that the TC Chair create its Task Group and appoint its members. Each Task Group must have a Scope that is approved by the TCC Chair and in consultation with the Secretary of the TCC except that task groups formed at a meeting that are to report prior to the conclusion of the meeting do not require the approval of their scope by the TCC Chair.

3. **Voting and Reporting**

   3.1 **Voting.** Task Groups shall require only a simple majority vote for agreement on a course of action or for submission of their report.

   3.2 **Reporting to the TCC.** All task groups of the TCC shall issue a report to the TCC upon conclusion of their work. Any report that asks for a proposal or comment to be submitted by the TCC shall have a ¾ affirmative vote of the TCC and, if approved, shall be submitted in the name of the TCC.
Supplemental Operating Procedures for the National Electrical Code Project

SOP 4.0 Development and Revision of Documents

1. Document Cycle. A new edition of documents shall be prepared every three years. The revision shall be upon initiation by the TCC and with the approval of the Standards Council. A shorter or longer interval may be permitted when requested by the Standards Council or when requested by the TCC and approved by the Standards Council.

2. NEC Proposal Assignment. The Secretary of the TCC should assign each Proposal received to the proper CMP in accordance with the assigned CMP scopes. If the Proposal involves a subject not previously assigned, the Chair of the TCC determines the proper assignment.

3. Committee Proposals or Comments. A Committee Proposal shall not be submitted to letter ballot unless a simple majority of the Panel has voted to accept the Proposal at a Panel Meeting.

4. Proposals Referred for Comment. Where a proposal within the jurisdiction of one CMP is sent by the TCC to another CMP for comment, the developed comment shall be balloted through the full CMP. The submission of the comment in the name of the CMP shall require a majority of those voting, less abstentions. The comment shall include, in the substantiation, any affirmative or negative comments of the CMP members.

5. Referring Public Comments to Other TCs. Because the comment stage is the last TC action during the revision cycle, TCs may not direct that comments be sent to other TCs for either information or comment.

6. Advisory Committee Requests. Either a TC or the TCC may request an advisory committee recommendation.

6.1 Proposal Stage. If a TC seeks a recommendation on a Proposal from an NFPA Advisory Committee, it shall indicate in a TC Comment on its action on the Proposal that the recommendation has been requested from the Advisory Committee. The TCC will consider the request and, if it is judged to be in order, will direct the Secretary of the TCC to send the request to the Advisory Committee.

6.2 Comment Stage. If a TC seeks a recommendation from an NFPA Advisory Committee on a Public Comment, it may, in accordance with Section 4.4.6.2.2 of the RGCP, act to Hold the Comment, with an indication in the TC Comment that a recommendation has been requested from the Advisory Committee. The TCC will consider the action and, if it is judged
Supplemental Operating Procedures for the National Electrical Code Project

to be in order, will direct the Secretary of the TCC to send the request to the Advisory Committee.

7. Development of Committee Positions and Statement at Meetings. TCs shall develop written and complete committee actions and statements during their meeting. The committee shall agree to the action and statement by a simple majority vote at the committee meeting.

8. Balloting on Actions. The TC action on each proposal and Comment shall be balloted individually.

9. Examples Contained in Annex. For Proposals and Comments on examples in the Annex of the NEC, the applicable CMP Chair and the Secretary of the TCC shall initially prepare Recommended Committee Actions.

10. TCC Disposition of Proposals and Comments. A TC action on a Proposal or Comment that would result in a change to the code or standard must maintain agreement of at least 2/3 of the TC and at least ¾ of the TCC calculated in accordance with 3.3.4.5 of the RGCP.

11. Proposals or Comments made to other NFPA Committees. Any proposal or comment made to another NFPA TC on behalf of the NEC Project, shall require at least a ¾ affirmative vote of the TCC calculated in accordance with 3.3.4.5 of the RGCP.

12. Processing of Extracts.

12.1 It shall be the responsibility of each TC to identify the specific sections, tables, etc., under its jurisdiction that include text from other NFPA documents.

12.2 The TC shall keep the extracted text updated with respect to the document from which it is extracted. If there are any changes in either the extracted material or the issue date of the document from which the material is extracted, the TC Chair shall include in the report to the TCC the specific sections, tables, etc., identified as including extracted text, and the NFPA document, issue date, and location in the document from which the text is extracted.

12.3 TCs that have responsibility for extracted text shall assign a Task Group to review extracted material during each revision cycle and keep the TCC updated as to the status of the extracted material.
Supplemental Operating Procedures for the National Electrical Code Project

SOP 5.0 Tentative Interim Amendments (TIA)

5.1 Preliminary Determination of Compliance. In order to assist the Secretary of the Standards Council in making the preliminary determination of compliance of the content of a TIA, the results of a ballot of a Special Task Group appointed by the Chair of the TCC shall be submitted to the Secretary. The Task Group shall consist of the Chair of the TCC and no less than two Members of the TCC and the Chair(s) of the TC(s) concerned with the proposed TIA. A majority vote by the Members of the Special Task Group to support the processing of the TIA results in an affirmative recommendation to the Secretary of the Standards Council.

SOP 6.0 Formal Interpretations (FI)

6.3.3 Balloting of Formal Interpretations. After balloting of a formal interpretation through a TC, the formal interpretation along with the TC ballot results shall be forwarded to the TCC for balloting. A ¾ affirmative vote of the TCC, tallied in accordance with the 6.3.4 of the RGCP, shall be required. A Formal Interpretation requires a three-quarters majority agreement in favor of either a yes or no answer to the question posed in the interpretation request. In calculating the vote, those who have expressed in writing valid reasons for abstaining, and those who after a second request, fail to return their ballots shall be omitted from the calculations. In all cases, for the Formal Interpretation to be issued, a simple majority of the committee membership eligible to vote must vote in favor of the prevailing yes or no answer.
Supplemental Operating Procedures for the National Electrical Code Project

Annex A – Organization and Structure of the National Electrical Code Project

The information contained in this Annex is current as of October 28, 2008, but may be revised by the Standards Council at any time. For any updates, please contact NFPA Standards Administration at …..

A.1 Organization. The NEC Project, as established by the NFPA Standards Council, consists of:

A.1.1 A Technical Correlating Committee (TCC), and
A.1.2 A number of Code-Making Panels (CMPs) for the NEC, and
A.1.3 Technical Committees (TCs) for other documents under the responsibility of the TCC.

A.2 Document Responsibilities. The NFPA Standards Council has given the NEC TCC the responsibility to manage and coordinate the activities of the following committees:

A.2.1 The National Electrical Code (NEC)
A.2.2 The Committee on Electrical Equipment Maintenance (NFPA 70B)
A.2.3 The Committee on Electrical Safety Requirements for Employee Workplaces (NFPA 70E)
A.2.4 The Committee on Electrical Systems Maintenance (NFPA 73)
A.2.5 The Committee on Electrical Equipment of Industrial Machinery (NFPA 79)
A.2.6 The Committee on Emergency Power Systems (NFPA 110 and 111)
A.2.7 The Committee on Electrical Equipment Evaluation (NFPA 790 and 791)

A.3 Size of NEC Code Making Panels. Because of the significant workload and timing involved in the National Electrical Code Project, CMPs should, generally, not have more than 15 Principal members. Experience has shown that a maximum of 15 Principal members represents the optimal working group to complete a thorough review of the material in the timeframe for processing of the document.

A.4 TCC Declared Structure. The TCC declares its structure in accordance with Figure A.4.
Supplemental Operating Procedures for the National Electrical Code Project

Figure A.4 – TCC Declared Structure

- TCC Chair (selected from one of the classifications)
- Informer (I)
  - IAT
  - IL
  - IT
- Research/Testing (RM)
- Installer/Maintainer (IM)
- Manufacturer (M)
- Utility (U)
  - ATC
- User (U)
  - AEC
- Labor (L)

= represents participation categories where membership could be increased to reach a max of 12 members.

- Minimum of 12 voting members
- Members must be very knowledgeable of the NEC and electrical installations
- Must have broad understanding of the NFPA process
- Must be members that have experience from within the NEC TCC covered projects

Not Represented: SE, I, C

August 4, 2008
Item 09-8-44
From: Teele, Bruce  
Sent: Friday, April 10, 2009 1:06 PM  
To: Spencer, Amy; 'Rossos, Dan (PF&R Email)'  
Subject: Wildland Expertise

Amy

In response to your request for committee member expertise in wildland fire issues, it is my opinion that the following members of the Technical Committee on Respiratory Protection Equipment have such expertise:

Dan Rossos, TC Chairman; Training Officer Portland (OR) Fire Department
Claire Austin, PhD, National Research Council of Canada; studies on wildland fire fighting environment and respiratory protection
Neal Baluha, Fire Fighter, Palm Beach (FL) Fire Department; wildland fire fighting responsibilities
Les Boord, Director, NIOSH National Personal Protection Technology Laboratory; certifying authority for all respirators in the US; studies on hazardous environmental exposures requiring respirators
Matt Chibbaro, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA); respirator and protective equipment regulations
Brian Cox, Fire Fighter, Clovis CA Fire Department; wildland fire fighting responsibilities
David Haston, U.S. Department of Agriculture, Forest Service, Technology and Development Center, Missoula, MT; wildland fire fighting safety equipment, wildland fire fighting responsibilities
Jim Johnson, Lawrence Livermore National Laboratory; wildland respiratory needs, wildland fire fighting respirator development
Clint Kaller, Fire Fighter, Los Angeles County (CA) Fire Department; wildland fire fighting responsibilities
James Olson, U.S. Department of the Interior, Bureau of Land Management, National Interagency Fire Center, Missoula, MT; wildland fire fighting safety equipment, wildland fire fighting responsibilities

Alternates
Roland Berry-Ann, NIOSH NPPTL
Dennis Davis, U.S. Department of Agriculture, Forest Service, Technology and Development Center, Missoula MT
John Steffanck, US Department of Labor, OSHA

In addition, several of the respirator manufacturers who are TC members produce air purifying respirators (APRs) and powered air purifying respirators (PAPRs) for non IDLH exposures. These respirators will probably form the basis for wildland fire fighting respirators.

Bruce
TO:        Bruce Teele
FROM:    Linda Fuller
DATE:          March 26, 2009
SUBJECT: Clarification of Technical Committee Expertise on Committee

I am transmitting to you herewith the following action of the Standards Council (March 3-4, 2009):

At the October 2007 the Council voted to proceed with the request of C. Anaya, El Dorado Hills, CA that NFPA develop a new document on Respiratory Standards for Wildland Fire Fighting. The Council requested that the Technical Correlating Committee (TCC) on Fire and Emergency Service Protective Clothing and Equipment clarify whether this topic would be assigned to an existing Technical Committee (TC) under the Project or if a new TC is being contemplated. Regardless of whether the new document will be developed by a new TC or an existing TC, the Council wanted to ensure that adequate wildland expertise will be represented on the TC assigned this new responsibility.

The TCC has assigned the development of this document to the TC on Respiratory Protection Equipment. The Council is directing the TC to review its membership and make any membership recommendations necessary to assure that the TC has appropriate wildland fire fighting expertise. Once the Council has reviewed and acted on any recommendations, and has indicated that the TC is appropriately constituted to begin processing the new standard, the TC can develop and ballot the draft document (see Regs. 4.3.1.1), then make a request to the Council to enter an appropriate revision cycle. (see Regs. 4.2.3)

The Council notes that in the record (SC Agenda Item 09-3-17) it appears that a draft document had been created and balloted. It is not appropriate for a TC to develop a draft and ballot it before the Council has approved the document.

Very truly yours,

Linda Fuller, Manager
Codes and Standards Administration

c: C. Anaya, J. Pauley, M. Brodoff, C. Dubay, A. Spencer, D. Baio, E. Carroll, Ch. Peterson, S. Van Zandt
TC Respiratory Protection Equipment (FAE-RPE)
TC Wildland Fire Fighting Protective Clothing and Equipment (FAE-WFF)
TCC Fire and Emergency Services Protective Clothing and Equipment (FAE-AAC)
Interested parties

09-3-17
PROPOSED DRAFT

OF

NFPA 1984
Standard on Respirators for Wildland Fire Fighting Operations
2011 Edition

The attached draft is a Committee working document. It is being circulated to solicit input from the public prior to publication as a Report on Proposals (ROP) (formerly TCR).

To submit a proposal, please use the proposal form that is attached to this draft. Proposals must be received by the Secretary, Standards Council, at NFPA.

Please contact the Standards Administration Department or the Staff Liaison for this document, Bruce Teele, if you have any questions on the document.
PROPOSED

NFPA 1984

STANDARD ON

RESPIRATORS FOR

WILDLAND FIRE FIGHTING OPERATIONS

2011 EDITION

CHAPTER 1 ADMINISTRATION

1.1 Scope.

1.1.1 This standard shall specify the minimum design, performance, testing, and certification requirements for respirators to provide protection from inhalation hazards for personnel conducting wildland fire fighting operations.

1.1.2 This standard shall specify respirator requirements only for use in non-IDLH (Immediate Dangerous to Life and Health) wildland environments during wildland fire fighting operations.
1.1.3 This standard shall not specify requirements for any accessories and enhancements that could be built into or attached to the certified wildland fire fighting respirator before or after purchase but that are not necessary for the wildland fire fighting respirator to meet the requirement of this standard. However, any accessories or enhancements built into, attached to, or sold with the wildland fire fighting respirator by the manufacturer for later attachment even though they are not necessary for the respirator to meet the requirements of this standard, shall be tested with the wildland fire fighting respirator and with those accessories and enhancements installed or attached, as specified in 4.3.12, 4.3.12.1, and 4.3.12.2, to assure that the performance and functions of the respirator are not reduced or otherwise negatively affected.

1.1.4 This standard shall not specify requirements for any other wildland fire fighting protective clothing and protective equipment.

1.1.5 This standard shall not specify requirements for any respirators for any other fire fighting operations, any technical rescue operation, any hazardous materials emergencies, or any CBRN incident operations.

1.1.6 Certification of respirators for wildland fire fighting operations to the requirements of this standard shall not preclude certification to additional appropriate standards where the respirator meets all the applicable requirements of each standard.

1.1.7 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant respirators. It shall be the responsibility of the persons and organizations that use compliant respirators to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.

1.1.8 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of respirators to establish safety and health practices and to determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, and testing.

1.1.9 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to establish minimum levels of respiratory protection for personnel assigned to or involved in wildland fire fighting incident operations.

1.2.2 Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which wildland fire fighting personnel might be exposed.

1.2.3 This standard is not intended as a detailed manufacturing or purchase specification, but shall be permitted to be referenced in purchase specifications as minimum requirements.

1.3 Application.

1.3.1 This standard shall apply to the design, manufacture, testing, and certification of new wildland fire fighting respirators.

1.3.2 This standard shall apply to wildland fire fighting respirators used during wildland fire fighting incident operations where respiratory protection from the environment is necessary or prudent.
1.3.3 This standard shall apply to respirator requirements only for use in non-IDLH (Immediate Dangerous to Life and Health) wildland environments during wildland fire fighting operations.

1.3.4 This standard shall apply to requirements for wildland fire fighting respirator that rely upon any accessories or enhancements or both that are necessary for the wildland fire fighting respirator to be able to meet the requirements of this standard, but are not a permanent part or component of the respirator. The requirements specified in 4.3.12, 4.3.12.1, and 4.3.12.2 of this standard shall apply.

1.3.5 This standard shall not apply to accessories and enhancements that could be built into or attached to the certified wildland fire fighting respirator before or after purchase but that are not necessary for the respirator to meet the requirement of this standard. However, any accessories or enhancements built into, attached to, or sold with the wildland fire fighting respirator by the manufacturer for later attachment even though they are not necessary for the respirator to meet the requirements of this standard, as the wildland fire fighting respirator must be tested with those accessories and enhancements installed or attached, as specified in 4.3.12, 4.3.12.1, and 4.3.12.2, to assure that the performance and functions of the respirator are not reduced or otherwise negatively affected.

1.3.6 This standard shall not apply to any wildland fire fighting respirators manufactured to the requirements of any other organization’s standards, nor shall this standard apply to any other type of respirators.

1.3.7 This standard shall not apply to the use of any wildland fire fighting respirators, as such use requirements for fire services organizations are specified in NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.

1.3.8 This standard shall not apply to any other wildland protective clothing and protective equipment for fire fighting operations.

1.3.9 This standard shall not apply to protective clothing, equipment, or respirators for any other fire fighting operations, any technical rescue operations, any hazardous materials emergencies, or any CBRN incident operations.

1.4* Units.

1.4.1 In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.4.2 Equivalent values in parentheses shall not be considered as the requirement as these values are approximate.

CHAPTER 2 REFERENCED PUBLICATIONS

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publication. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2007
2.3 Other Publications.

2.3.1 AATCC Publication. American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709

2.3.2 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th floor, New York, NY 10036.
ANSI/AIHA Z88.7, *Color Coding of Air-Purifying Respirator Canisters, Cartridges, and Filters*

2.3.3 ASTM Publications. ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

2.3.4 ISO Publications. International Standards Organization, 1 rue de Varembé, Case Postale 56 CH-1211, Genève 20, Switzerland.

2.3.5* NIOSH Publications. National Institute for Occupational Safety and Health, National Personal Protective Technology Laboratory (NIOSH NPPTL), 626 Cochrans Mill Road, P.O. Box 18070, Pittsburgh, PA 15236-0070
NIOSH Statement of Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Air Purifying Escape Respirator, 30 September 2003

NIOSH Standard Test Procedure Number RCT-APR-STP-0001, Determination of Particulate Filter Penetration Test, Powered Air Purifying Respirator Filters; Revision 1.1, 1 June 2005.

NIOSH Standard Test Procedure Number RCT-APR-STP-0034, Carbon Monoxide Service Life Test; Revision 1.1, 21 June 2005.

NIOSH Standard Test Procedure Number RCT-APR-0039, Determination of Formaldehyde Service Life Test, Air-Purifying Respirators; Revision 1.1, 26 June 2005.

NIOSH Standard Test Procedure Number TEB-APR-STP-0046A, Determination of Organic Vapor (Carbon Tetrachloride) Service Life Test, Air-Purifying Respirators with Cartridges; Revision 2.0, 19 December 2006.

NIOSH Standard Test Procedure Number TEB-APR-STP-0046C, Determination of Organic Vapor (Carbon Tetrachloride) Service Life Test, Powered Air-Purifying Respirators with Cartridges; Revision 2.0, 19 December 2006.

NIOSH Standard Test Procedure Number RCT-APR-STP-0048, Determination of Sulfur Dioxide Service Life Test, Air-Purifying Respirators; Revision 1.1, 24 August 2005.

NIOSH Standard Test Procedure Number TEB-APR-STP-0051, Determination of Particulate Filter Efficiency Level for P100 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number TEB-APR-STP-0052, Determination of Particulate Filter Efficiency Level for P99 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number TEB-APR-STP-0053, Determination of Particulate Filter Efficiency Level for P95 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number TEB-APR-STP-0054, Determination of Particulate Filter Efficiency Level for R100 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number TEB-APR-STP-0055, Determination of Particulate Filter Efficiency Level for R99 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number TEB-APR-STP-0056, Determination of Particulate Filter Efficiency Level for R95 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators; Revision 2.0, 6 August 2007.

NIOSH Standard Test Procedure Number RCT-APR-STP-0062, Determination of Nitrogen Dioxide Service Life Test; Revision 1.1, 6 September 2005.

NIOSH Standard Test Procedure Number RCT-APR-STP-0063, Determination of Facepiece Carbon-Dioxide and Oxygen Concentration Levels of Tight Fitting Powered Air-Purifying Respirators with the Blower Unit Running; Revision 1.1, 9 September 2005.

NIOSH Standard Test Procedure Number RCT-APR-STP-0064, Determination of Facepiece Carbon-Dioxide and Oxygen Concentration Levels of Tight Fitting Powered Air-Purifying Respirators with the Blower Unit Off or Non-Powered Respirators; Revision 1.1, 12 September 2005.

CHAPTER 3 DEFINITIONS

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. Merriam-Webster's Collegiate Dictionary, 11th edition, shall be the source for ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction. The organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. This term indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 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 another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

3.3.1 Accessory. An item, or items, that could be attached to a certified product, and could
be necessary for the certified product to meet the requirements of the standard.

3.3.2 Air Purifying Respirator (APR). A respirator that removes specific air contaminants by passing ambient air through one or more air purification components.

3.3.3 Air Purification Component. The air purification part of air purifying respirators (APRs) and powered air purifying respirators (PAPRs) that remove gases, vapors, and solid or liquid aerosols from the inspired air.

3.3.4 Certification Organization. An independent third-party organization that determines product compliance with the requirements of this standard with a labeling/listing/follow-up program.

3.3.5 Certification/Certified. A system whereby a certification organization determines that a manufacturer has demonstrated the ability to produce a product that complies with the requirements of this standard, authorizes the manufacturer to use a label on listed products that comply with the requirements of this standard, and establishes a follow-up program conducted by the certification organization as a check on the methods the manufacturer uses to determine continued compliance of labeled and listed products with the requirements of this standard. (See also 3.3.28, NIOSH Certified.)

3.3.6 Compliance/Compliant. Meeting or exceeding all applicable requirements of this standard.

3.3.7 Component. Any material, part, or subassembly used in the construction of the compliant product.

3.3.8 Drip. To run or fall in drops or blobs.

3.3.9 Facepiece. The tight-fitting component of a respirator; a half facepiece covers the wearer’s nose and mouth; a full facepiece covers the wearer’s nose, mouth, and eyes.

3.3.10 Follow-up Program. The sampling, inspections, tests, or other measures conducted by the certification organization on a periodic basis to determine the continued compliance of labeled and listed products that are being produced by the manufacturer to the requirements of this standard.

3.3.11 Haze. Light that is scattered as a result of passing through a transparent object.

3.3.12 Manufacturer. The entity that directs and controls any of the following: compliant product design, compliant product manufacturing, or compliant product quality assurance; or the entity that assumes the liability for the compliant product or provides the warranty for the compliant product.

3.3.13 Melt. A response to heat by a material resulting in evidence of flowing or dripping.

3.3.14 Model. The collective term used to identify a group of individual items of the same basic design and components from a single manufacturer produced by the same manufacturing and quality assurance procedures that are covered by the same certification.

3.3.15 NIOSH-Certified. Tested and certified by the National Institute for Occupational Safety and Health (NIOSH) in accordance with the requirements of 42 CFR 84.

3.3.16 Organic Vapor (OV). A chemical substance having a high enough vapor pressure to enter the ambient air.

3.3.17 P95. A filter medium that removes at least 95 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum filter degradation. P-series filters are tested with DOP until no further decrease in filter efficiency is observed. They have neither aerosol-use nor time-use limitations, but are limited by considerations of hygiene and increased breathing resistance due to filter loading.
3.3.18 **P99.** A filter medium that removes at least 99 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum filter degradation. P-series filters are tested with DOP until no further decrease in filter efficiency is observed. They have neither aerosol-use nor time-use limitations, but are limited by considerations of hygiene and increased breathing resistance due to filter loading.

3.3.19 **P100.** A filter medium that removes at least 99.97 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum filter degradation. P-series filters are tested with DOP until no further decrease in filter efficiency is observed. They have neither aerosol-use nor time-use limitations, but are limited by considerations of hygiene and increased breathing resistance due to filter loading.

3.3.20 **PAPR.** See: “Powered Air Purifying Respirator.”

3.3.21 **Particulate Matter.** Finely divided solid or liquid matter (particles).

3.3.22 **Pink Noise.** Noise that contains constant energy per octave band.

3.3.23 **Powered Air Purifying Respirator (PAPR).** An air-purifying respirator that uses a powered blower to force the ambient air through one or more air purifying components to the respiratory inlet covering.

3.3.24* **Product Label.** A label or marking provided by the manufacturer for each compliant product containing compliant statements, certification statements, manufacturer and model information, or similar data.

3.3.25 **R95.** A filter medium that removes at least 99.97 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum challenge loading of 200 mg. R-series filters might have a time limitation of one shift.

3.3.26 **R99.** A filter medium that removes at least 99.97 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum challenge loading of 200 mg. R-series filters might have a time limitation of one shift.

3.3.27 **R100.** A filter medium that removes at least 99.97 percent of a highly degrading aerosol of dioctylphthalate (DOP) having an aerodynamic diameter of 0.3 µm, at a maximum challenge loading of 200 mg. R-series filters might have a time limitation of one shift.

3.3.28 **Residence test.** Testing of chemical air purifying components at sufficiently high flows to simulate peak air velocities typical of human respiration at heavy work levels.

3.3.29 **Respirator.** The complete assembly including the respiratory inlet covering, air purification components, electronics, batteries, harness, cables, and hoses where applicable; designed to protect the wearer from inhalation of atmospheres containing harmful gases, vapors, or particulate matter.

3.3.30 **Sample.** The equipment, equipment component, ensemble, element, item, composite, or component that is conditioned for testing. (See also, “Specimen.”)

3.3.31* **Service Life.** The length of time required for an air purification component to reach a specific effluent concentration.

3.3.32 **Specimen.** The conditioned equipment, equipment component, ensemble, element, item, composite, or component that is tested. Specimens are taken from samples. (See also, “Sample.”)

3.3.33 **Wildland Fire.** Accidental or planned outdoor fires burning vegetation such as woodlands, forests, grasslands, brush, and prairies.

3.3.34 **Wildland Fire Fighting.** The activities of fire suppression and property conservation in woodlands, forests, grasslands, brush, prairies, and other such vegetation, or any combination
of vegetation, that is involved in a fire situation but is not within buildings or structures.

3.3.35 Wildland Fire Fighting Respirator. A respirator that has been certified by NIOSH under 42 CFR 84, and certified as compliant with NFPA 1984, Standard on Respirators for Wildland Fire Fighting Operations, for respiratory protection during wildland fire fighting operations.

CHAPTER 4 CERTIFICATION

4.1 General.

4.1.1 The process of certification for wildland fire fighting respirators as being compliant with NFPA 1984 shall meet the requirements of Section 4.1, General; Section 4.2, Certification Program; Section 4.3, Inspection and Testing; Section 4.4, Annual Verification of Product Compliance; Section 4.5, Manufacturers’ Quality Assurance Program; Section 4.6, Hazards Involving Compliant Product; Section 4.7, Manufacturers’ Investigation of Complaints and Returns; and Section 4.8, Manufacturers’ Safety Alert and Product Recall Systems.

4.1.2 Prior to certification of wildland fire fighting respirators to this standard, respirators shall be certified by NIOSH as an air-purifying respirator or as a powered air-purifying respirator.

4.1.2.1 APRs shall be certified by NIOSH as either a P95, R95, P99, R99, P100, or R100 particulate respirator.

4.1.2.2 PAPRs shall be certified by NIOSH as a high efficiency (HE) particulate respirator.

4.1.2.3 All respirators for wildland fire fighting operations shall be certified by NIOSH for protection at least against carbon monoxide, formaldehyde, organic vapors, and acid gases.

4.1.3 All respirators for wildland fire fighting operations that are labeled as being compliant with this standard shall meet or exceed all applicable requirements specified in this standard and shall be certified.

4.1.4 All certification shall be performed by a certification organization that meets at least the requirements specified in Section 4.2, Certification Program, and that is accredited for personal protective equipment in accordance with ISO 65, General requirements for bodies operating product certification systems. The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, General requirements for accreditation bodies accrediting conformity assessment bodies.

4.1.5 Manufacturers shall not claim compliance with portions or segments of the requirements of this standard and shall not use the NFPA name or the name or identification of this standard, NFPA 1984, in any statements about their respective wildland fire fighting respirators unless the respirator is certified as compliant to this standard.

4.1.6 All compliant wildland fire fighting respirators shall be labeled.

4.1.7 All compliant wildland fire fighting respirators shall be listed by the certification organization. This listing shall uniquely identify the certified product by style, model number, part number, or similar specific identification.

4.1.8* All compliant wildland fire fighting respirators shall also have a product label that meets the requirements specified in Section 5.1, Product Label Requirements.
4.1.9 The certification organization’s label, symbol, or identifying mark shall be attached to the product label, shall be part of the product label, or shall be immediately adjacent to the product label.

4.2 Certification Program.

4.2.1* The certification organization shall not be owned or controlled by manufacturers or vendors of the products being certified.

4.2.2 The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product’s ultimate profitability.

4.2.3 The certification organization shall be accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems*. The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.2.4 The certification organization shall refuse to certify products to this standard that do not comply with all applicable requirements of this standard.

4.2.5* The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all applicable requirements of this standard.

4.2.5.1 The certification organization shall not offer or confer any conditional, temporary, or partial certifications.

4.2.5.2 Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all applicable requirements of this standard.

4.2.6* The certification organization shall have laboratory facilities and equipment available for conducting proper tests to determine product compliance.

4.2.6.1 The certification organization laboratory facilities shall have a program in place and functioning for calibration of all instruments, and procedures shall be in use to ensure proper control of all testing.

4.2.6.2 The certification organization laboratory facilities shall follow good practice regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.

4.2.7 The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 4.5, ISO Registration for Manufacturers.

4.2.7.1* The certification organization shall require the manufacturer to have a product recall system specified in Section 4.8, Manufacturers’ Safety Alert and Product Recall Systems, as part of the manufacturer’s quality assurance program.

4.2.7.2 The certification organization shall audit the manufacturer’s quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.
4.2.8 The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.

4.2.9* The certification organization shall have a follow-up inspection program of the manufacturing facilities of the compliant product with at least two random and unannounced visits per 12-month period.

4.2.9.1 As part of the follow-up inspection program, the certification organization shall select sample compliant product at random from the manufacturer’s production line, from the manufacturer’s in-house stock, or from the open market.

4.2.9.2 Sample product shall be inspected and tested by the certification organization to verify the product’s continued compliance.

4.2.9.3 The certification organization shall be permitted to conduct specific testing to verify the product’s continued compliance.

4.2.9.4 For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown results to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of sample product, components, and materials acquired in accordance with 4.2.9.1 against the applicable requirements of this standard.

4.2.10 The certification organization shall have in place a series of procedures, as specified in Section 4.6, Hazards Involving Compliant Product, that address report(s) of situation(s) in which a compliant product is subsequently found to be hazardous.

4.2.11 The certification organization’s operating procedures shall provide a mechanism for the manufacturer to appeal decisions. The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.

4.2.12 The certification organization shall be in a position to use legal means to protect the integrity of its name and label. The name and label shall be registered and legally defended.

4.3 Inspection and Testing

4.3.1 For both initial certification and recertification of wildland fire fighting respirators, the certification organization shall conduct both inspection and testing as specified in this section.

4.3.2 All inspections, evaluations, conditioning, and testing for certification or for recertification shall be conducted by the certification organization’s testing laboratory that is accredited in accordance with the requirements of ISO 17025, General requirements for the competence of testing and calibration laboratories.

4.3.2.1 The certification organization’s testing laboratory’s scope of accreditation to ISO 17025, General requirements for the competence of testing and calibration laboratories, shall encompass testing of personal protective equipment.

4.3.2.2 The accreditation of a certification organization’s testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, General requirements for accreditation bodies accrediting conformity assessment bodies.

4.3.3 A certification organization shall be permitted to utilize conditioning and testing results conducted by a product or component manufacturer for certification or recertification provided the manufacturer’s testing laboratory meets the requirements specified in 4.3.3.1 through 4.3.3.5.
4.3.3.1 The manufacturer’s testing laboratory shall be accredited in accordance with the requirements of ISO 17025, General requirements for the competence of testing and calibration laboratories.

4.3.3.2 The manufacturer’s testing laboratory’s scope of accreditation to ISO 17025, General requirements for the competence of testing and calibration laboratories, shall encompass testing of personal protective equipment.

4.3.3.3 The accreditation of a manufacturer’s testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, General requirements for accreditation bodies accrediting conformity assessment bodies.

4.3.3.4 The certification organization shall approve the manufacturer’s testing laboratory.

4.3.3.5 The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for certification or recertification conducted at the manufacturer’s testing laboratory.

4.3.4 Sampling levels for inspection, evaluation, and testing shall be established by the certification organization and the manufacturer to ensure a reasonable and acceptable reliability at a reasonable and acceptable confidence level that products certified to this standard are compliant, unless such sampling levels are specified herein.

4.3.5 Inspection and evaluation by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information are at least as specified for the product in Section 5.1, Product Label Requirements.

4.3.6 Inspection and evaluation by the certification organization shall include an evaluation of any symbols and pictorial graphic representations used on product labels or in user information, as permitted by 5.1.5, to ensure that the symbols are clearly explained in the product’s user information package.

4.3.7 Inspection and evaluation by the certification organization shall include a review of the user information required by Section 5.2, User Information, to ensure that the information has been developed and is available.

4.3.8 Inspection and evaluation by the certification organization for determining compliance with the design requirements specified in Chapter 6 shall be performed on whole or complete wildland fire fighting respirators.

4.3.9 All wildland fire fighting respirators shall be initially tested for certification and shall meet the performance requirements specified in Chapter 7 of at least three separate test series of Categories A, B, C, D, and E, as specified in Table 4.3.9.
Table 4.3.9 Test Series

<table>
<thead>
<tr>
<th>Test Series Order</th>
<th>Category A Respirator #1</th>
<th>Category B Respirator #2</th>
<th>Category C Respirator #3</th>
<th>Category D Air Purification Component</th>
<th>Category E Component Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Breathing Resistance (Section 8.1)</td>
<td>Storage Integrity (Section 8.4)</td>
<td>Carbon Dioxide (Section 8.10)</td>
<td>Air Purification Component Capacity (Section 8.8)</td>
<td>Lens Abrasion (Section 8.5)</td>
</tr>
<tr>
<td>2</td>
<td>Communications (Section 8.7)</td>
<td>Donning (Section 8.6)</td>
<td>Corrosion Resistance (Section 8.11)</td>
<td>Filter Efficiency (Section 8.9)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Respirator Heat Resistance (Section 8.2)</td>
<td>Respirator Flammability (Section 8.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3.9.1 All tests within Categories A, B, and C shall be conducted in the order specified and are designed as cumulative damage tests.

4.3.9.2 Wildland fire fighting respirator components shall be initially tested for certification and shall meet the performance requirements of at least three separate test of Categories D and E, as specified in Table 4.3.9.

4.3.10 The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product’s submission for evaluation and testing by the certification organization.

4.3.11.1 The certification organization shall accept from the manufacturer, for evaluation and testing for certification, only product or product components that are the same in every respect to the actual final product or product component.

4.3.11.2 The certification organization shall not allow the substitution, repair, or modification, other than as specifically permitted herein, of any product or any product component during testing.

4.3.12 Where wildland fire fighting respirators are provided with any accessories or enhancements, those accessories or enhancements shall be certified by NIOSH in accordance with 42 CFR 84 for that specific respirator, and the respirator with accessories or enhancements installed shall be tested to and pass all of the performance requirements specified in Chapter 7.

4.3.12.1 Where there are any accessories, enhancements, or both that are built into, or attachable to, or detachable from the wildland fire fighting respirator, and the accessories or enhancements are necessary for the respirator to be able to meet the requirements of this standard; the manufacturer shall submit the respirator to the certification organization with all accessories and attachments installed or attached for the complete evaluation, testing, and certification process of the respirator. The certification, if achieved, shall be clearly identified to apply to the entire respirator assembly with the accessories or enhancements or both installed or attached as specified in the certification in order for the certification to be valid and to remain valid.

4.3.12.2 Where there are any accessories, enhancements, or both that are built into, or attachable to, or detachable from the wildland fire fighting respirator, but that are not necessary for the respirator to meet the requirement of this standard, the certification organization shall evaluate and inspect the respirator as specified in Chapter 6, shall test the respirator as specified in Chapter 8, and the respirator shall meet the performance requirements as
specified in Chapter 7 with those accessories and enhancements installed or attached to assure that the performance and functions of the respirator are not reduced or otherwise negatively affected.

4.3.13 After completion of these tests for a specific model wildland fire fighting respirator or its variant, only those tests on other similar respirator models or variants shall be required where, in the determination of the certification organization, the respirator’s test results can be affected by any components or NIOSH-certified accessories that are different from those on the original respirator tested.

4.3.14 Any modifications made to a wildland fire fighting respirator that is certified by NIOSH in accordance with 42 CFR 84, and also certified as compliant with this standard; or any modifications to any NIOSH-certified accessories by the respirator manufacturer after certification, shall require evaluation by NIOSH. In addition, the respirator shall be retested to determine the respirator remains compliant with performance requirements selected from Chapter 7 that the certification organization determines could be affected by such changes. This retesting shall be conducted before the modified respirator or accessories are certified as being compliant with this standard.

4.3.15 Every fifth year from the date of the initial certification, a minimum of three identical wildland fire fighting respirators that are certified as compliant with this standard shall be tested and shall meet the performance requirements of at least three separate test series of Categories A, B, C, D, and E, as specified in Table 4.3.9.

4.3.15.1 All tests within Categories A, B, and C shall be conducted in the order specified and are designed as cumulative damage tests.

4.3.15.2 Wildland fire fighting respirator components that are certified as compliant with this standard shall be tested and shall meet the performance requirements of at least three separate tests of Categories D and E, as specified in Table 4.3.9.

4.3.16 The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the certification of the manufacturer’s compliant product. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.4 Annual Verification of Product Compliance

4.4.1 All wildland fire fighting respirator models that are certified and labeled as being compliant with this standard shall undergo recertification on an annual basis.

4.4.2 Recertification shall include inspection and evaluation to all design requirements as required by this standard on all manufacturer models and components.

4.4.3 Recertification shall include testing to all performance requirements as required by this standard on all manufacturer models and components.

4.4.3.1 Where a test method incorporates testing both before and after a preconditioning and the test generates quantitative results, recertification testing shall be limited to the conditioning that yielded the worst case test result during the initial certification for the model or component.

4.4.3.2 Where a test method incorporates testing both before and after a preconditioning and the test generates nonquantitative results, recertification testing shall be limited to a single conditioning procedure in any given year. Subsequent annual recertifications shall cycle through the remaining the conditioning procedures to ensure that all required conditionings are included over time.
4.4.3.3 Where a test method requires testing on three specimens, a minimum of one specimen shall be tested for annual certification.

4.4.3.4 Where a test method requires testing of five or more specimens, a minimum of two specimens shall be tested for annual certification.

4.4.4 Samples of manufacturer models and components for recertification acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up inspection program in accordance with 4.2.9 shall be permitted to be used toward annual recertification.

4.4.5 The manufacturer shall maintain all design and performance inspection, evaluations, and test data from the certification organization used in the recertification of the manufacturer’s models and components. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.4.6 Every fifth year from the date of the initial certification, the requirements specified in Section 4.4 shall be waived when the testing required by 4.3.15 is conducted.

4.5 Manufacturers’ Quality Assurance Program.

4.5.1 The manufacturer shall provide and operate a quality assurance program that meets the requirements of this section and that includes a product recall system as specified in 4.2.7.1, and Section 4.8, Manufacturers’ Safety Alert and Product Recall Systems.

4.5.2 The operation of the quality assurance program shall evaluate and test compliant product production to the requirements of this standard to assure production remains in compliance.

4.5.3 The manufacturer shall be registered to ISO 9001, Quality management systems – Requirements.

4.5.3.1 Registration to the requirements of ISO 9001, Quality management systems – Requirements, shall be conducted by a registrar that is accredited for personal protective equipment in accordance with ISO/IEC 17021, Conformity assessment – Requirements for bodies providing audit and certification of management systems.

4.5.3.2 The scope of the ISO registration shall include at least the design and manufacturing systems management for the personal protective equipment being certified.

4.5.3.3 The registrar shall affix the accreditation mark on the ISO registration certificate.

4.5.4 Any entity that meets the definition of manufacturer specified in Section 3.3, General Definitions, and therefore is considered to be the “manufacturer” but does not manufacture or assemble the compliant product, shall meet the requirements specified in this Section 4.5.

4.5.5 Where the manufacturer uses sub-contractors in the construction or assembly of the compliant product, the locations and names of all sub-contractor facilities shall be documented and the documentation shall be provided to the manufacturer’s ISO registrar and the certification organization.

4.6 Hazards Involving Compliant Product

4.6.1* The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO Guide 27, Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity, and as modified herein.
4.6.2* Where a report of a hazard involved with a compliant product is received by the certification organization, the certification organization shall contact NIOSH National Personal Protective Technology Laboratory (NPPTL), and the validity of the report shall be investigated following the procedures established by NIOSH/NPPTL.

4.6.3 With respect to a compliant product, a hazard shall be a condition or create a situation that results in exposing life, limb, or property to an imminently dangerous or dangerous condition.

4.6.4 Where a specific hazard is identified, the determination of the appropriate action for the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.

4.6.5 Where it is established that a hazard is involved with a compliant product, the certification organization, in coordination with NIOSH/NPPTL, shall determine the scope of the hazard, including products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.

4.6.6 The investigation shall include but not be limited to the extent and scope of the problem as it might apply to other compliant product or compliant product components manufactured by other manufacturers or certified by other certification organizations.

4.6.7 The certification organization, in coordination with NIOSH/NPPTL, shall also investigate reports of a hazard where compliant product is gaining widespread use in applications not foreseen when the standard was written, such applications in turn being ones for which the product was not certified, and no specific scope of application has been provided in the standard, and no limiting scope of application was provided by the manufacturer in written material accompanying the compliant product at the point of sale.

4.6.8 The certification organization, in coordination with NIOSH/NPPTL, shall require the manufacturer of the compliant product or the manufacturer of the compliant product component, if applicable, to assist the certification organization and NIOSH/NPPTL in the investigation and to conduct its own investigation as specified in Section 4.7, Manufacturers’ Investigation of Complaints and Returns.

4.6.9 Where the facts indicating a need for corrective action are conclusive and the manufacturer has exhausted all appeal rights, the certification organization, in coordination with NIOSH/NPPTL, shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.

4.6.10 Where the facts are conclusive and corrective action is indicated, but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or the manufacturer is bankrupt, the certification organization, in coordination with NIOSH/NPPTL, shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.11* Where the facts are conclusive and corrective action is indicated, the certification organization, in coordination with NIOSH/NPPTL, shall take one or more of the following corrective actions:

(1) Parties authorized and responsible for issuing a safety alert shall be notified when, in the opinion of the certification organization and NIOSH/NPPTL, such a safety alert is necessary to inform the users.

(2) Parties authorized and responsible for issuing a product recall shall be notified when, in the opinion of the certification organization and NIOSH/NPPTL, such a recall is
necessary to protect the users.

(3) The mark of certification shall be removed from the product.

(4) Where a hazardous condition exists and it is not practical to implement 4.6.11(1), (2), or (3), or the responsible parties refuse to take corrective action, the certification organization, in coordination with NIOSH/NPPTL, shall notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.12 The certification organization, in coordination with NIOSH/NPPTL, shall provide a report to the organization or individual identifying the reported hazardous condition and notify them of the corrective action indicated or that no corrective action is indicated.

4.6.13* Where a change to an NFPA standard(s) is felt necessary, the certification organization, in coordination with NIOSH/NPPTL, shall also provide a copy of the report and indicated corrective actions to the NFPA and shall also submit either a Public Proposal for a proposed change to the next revision of the applicable standard or a proposed Tentative Interim Amendment (TIA) to the current edition of the applicable standard.

4.7* Manufacturers’ Investigation of Complaints and Returns

4.7.1 Manufacturers shall provide corrective action in accordance with ISO 9001, Quality management systems – Requirements, for investigating written complaints and returned products.

4.7.4 Manufacturers’ records of returns and complaints related to safety issues shall be retained for at least 5 years.

4.7.3 Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component can constitute a potential safety risk to end users and is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact NIOSH/NPPTL and the certification organization and provide all information about their review to assist NIOSH/NPPTL and the certification organization with their investigation.

4.8 Manufacturers’ Safety Alert and Product Recall Systems

4.8.1 Manufacturers shall establish a written safety alert system and a written product recall system that describe the procedures to be used in the event that it decides or is directed by the certification organization or NIOSH/NPPTL to either issue a safety alert or conduct a product recall.

4.8.2 The manufacturers’ safety alert and product recall systems shall provide the following:

(1) The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls

(2) A method of notifying all dealers, distributors, purchasers, users, and the NFPA about the safety alert or product recall that can be initiated within a 1-week period following the manufacturer’s decision to issue a safety alert or to conduct a product recall or after the manufacturer has been directed by NIOSH/NPPTL or the certification organization to issue a safety alert or conduct a product recall

(3) Techniques for communicating accurately and understandably the nature of the safety alert or product recall and, in particular, the specific hazard or safety issue found to exist

(4) Procedures for removing product that is recalled and for documenting the
effectiveness of the product recall
(5) A plan for repairing, replacing, or compensating purchasers for returned product.

CHAPTER 5 LABELING AND INFORMATION

5.1 Product Label Requirements.

5.1.1 In addition to the NIOSH certification label, each respirator shall have a product label permanently and conspicuously attached to each respirator.

5.1.2 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all product label pieces shall be located adjacent to each other.

5.1.3 The certification organization’s label, symbol, or identifying mark shall be attached to the product label or be part of the product label. All letters and numerals shall be at least 2.5 mm (3/32 in) in height. The label, symbol, or identifying mark shall be at least 6 mm (1/4 in.) in height and shall be placed in a conspicuous location.

5.1.4 All worded portions of both required product labels shall be at least in English.

5.1.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.6 The respirator product label shall bear the following compliance statement legibly printed, and all letters and numbers shall be at least 2.5 mm (3/32 in.) in height:

“CERTIFIED AS COMPLIANT WITH NFPA 1984, 2011 ED.
DO NOT REMOVE THIS LABEL!”

5.1.7 Respirators that are certified with replaceable air purification component(s) shall have a product label affixed to each air purification component. The product label shall bear the following compliance statement, legibly printed, and all letters and numbers shall be at least 2.5 mm (3/32 in.) in height:

“CERTIFIED COMPLIANT WITH NFPA 1984, 2011 ED.”

5.1.8 Respirator components listed on the NIOSH certification label, shall be marked directly on the component with the lot number, the serial number, or the year and month of manufacture.

5.1.9 All labels shall be capable of being read without breaking the manufacturer’s seal(s).

5.1.10 Where the air purification component is manufactured in a disposable protective package, the disposable protective package shall carry the same label information as the air purification component.

5.1.11 The expiration date of air purification component(s) shall be printed on the outside surface of the air purification component and shall be visible when the air purification component is attached to the respiratory inlet covering for normal use. The expiration date shall be in the form YYYY/MM.

5.1.12 Where respirators utilize a rechargeable power source as a component of the certified
respirator, the power source expiration date shall be printed on the outside surface of the power source and shall be visible when the power source is attached to the respirator for normal use. The expiration date shall be in the form YYYY/MM.

5.1.13 Where respirators utilize a power source as a component of the certified respirator, the estimated power source service life, in the fully charged condition, shall be printed on the respirator. The printing shall be visible when the respirator is assembled in the as-certified configuration.

5.2 User information.

5.2.1 The NIOSH certification document included in the respirator packaging shall bear the following compliance statement: “THIS RESPIRATOR MEETS THE REQUIREMENTS OF NFPA 1984, STANDARD ON RESPIRATORS FOR WILDLAND FIRE FIGHTING OPERATIONS, 2011 EDITION.”

5.2.2 The respirator manufacturer shall provide with each respirator at least the training material and user instructions specified within this section. The respirator manufacturer shall provide with each replaceable air purification component at least the user instructions specified within this section.

5.2.3 Upon request at the time of purchase, the respirator manufacturer shall provide to the purchaser an information sheet with each respirator that documents at least the following:
   (1) Manufacturing performance tests conducted at time of manufacture and the results
   (2) Date of manufacture
   (3) Model number
   (4) Serial number
   (5) Lot number, if applicable
   (6) Shelf life

5.2.4 Information or training materials regarding pre-use shall be provided at least on the following areas:
   (1) Safety considerations
   (2) Limitations of use
   (3) Replacing air purification components, if applicable
   (4) Service time recommendations for air purification components, batteries and any other applicable components
   (5) Air purification component service life If the respirator does not have an end of service life indicator
   (6) Marking recommendations and restrictions
   (7) Warranty information
   (8) Recommended storage practices
   (9) Carrying on belt or wildland fire fighting load carrying equipment
   (10) Mounting on/in vehicles or fire apparatus

5.2.5 Information or training materials regarding periodic inspections shall be provided at least on inspection frequency and details.

5.2.6 Information or training materials regarding donning and doffing shall be provided at least for donning and doffing procedures, adjustment procedures, and interface issues.

5.2.7 Information or training materials regarding use shall be provided at least on the following areas:
   (1) Pre-use checks
   (2) For fire departments or fire department–based emergency services, proper use
consistent with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*

(3) Replacement of air purification components, if applicable
(4) Emergency procedures to be followed in the event of damage, malfunction, or failure of the respirator

5.2.8 Where the respirator is designed for multiple use, information or training materials regarding periodic maintenance and cleaning shall be provided at least on the following areas:

1. Cleaning instructions and precautions
2. Disinfecting procedures
3. Maintenance frequency and details
4. Methods of repair, where applicable
5. Complete instructions for reporting to the manufacturer, certification authority, and NIOSH/NPPTL all returned equipment or complaints of damage, malfunction, or failure of the breathing apparatus that could present a hazard to the user.

5.2.9 Complete instructions shall be provided for reporting to the manufacturer, certification authority, and NIOSH/NPPTL all returned equipment or complaints of damage, malfunction, or failure of the respirator that could present a hazard to the user.

5.2.10 Information or training materials regarding retirements shall be provided at least on replacement/retirement considerations.

5.2.11 The respirator manufacturer shall provide the manufacturer's specified component service life for the product. This information shall be included at least in the maintenance information provided to the users.

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**CHAPTER 6 DESIGN REQUIREMENTS**

6.1 Requirements for All Wildland Fire Fighting Respirators.

6.1.1 All wildland fire fighting respirators shall have at least the applicable design requirements specified in this chapter where inspected and evaluated by the certification organization as specified in Section 4.3, Inspection and Testing.

6.1.2 Prior to certification of wildland fire fighting respirators to the requirements of this standard, all respirators shall first be certified by NIOSH as either an APR or PAPR in accordance with 42 CFR 84.

6.1.3 All wildland fire fighting respirators shall be equipped with a respiratory inlet covering that shall provide a protective covering to the nose and mouth, or to the nose, mouth, and eyes. The respiratory inlet covering shall be configured as a facepiece, facemask, faceshield, hood, helmet, or a combination of these.

6.1.3.1 Where the respiratory inlet covering is configured as a full facepiece, the full facepiece shall be tight fitting and shall cover the wearer’s eyes, nose, and mouth.

6.1.3.2 The full facepiece shall accommodate corrective eyewear.

6.1.3.3 Where the respiratory inlet covering is configured as a half facepiece, the half facepiece shall be tight fitting and shall cover the wearer’s nose and mouth.
6.1.3.4 Wildland fire fighting respirators, excluding full facepiece respirators, shall be designed to accommodate protective eyewear including but not limited to corrective eyewear, safety glasses, or gas-tight goggles.

6.1.3.5 Protective eyewear shall not interfere with the sealing surface of the wildland fire fighting respirator to the wearer’s face, shall not pass between any sealing surfaces of the respirator to the wearer’s face, shall not reduce the respiratory protective qualities of the respirator, shall not restrict the movement of the wearer, and shall not restrict the vision of the wearer.

6.1.4 Where wildland fire fighting respirators incorporate a helmet as a component of the respirator, the helmet shall meet the wildland fire fighting helmet requirements of NFPA 1977, Standard on Protective Clothing and Equipment for Wildland Fire Fighting.

6.1.5 All wildland fire fighting respirators shall be equipped with an air purification component or components.

6.1.5.1 Each air purification component shall contain the necessary media for all target substances and particulate matter.

6.1.5.2 More than one air purifying component shall be permitted to be used to meet the minimum service life requirement.

6.1.5.3 Particulate matter filters shall be located on the inlet side of the air purifying component. A secondary upstream filter shall be permitted.

6.1.5.4 All wildland fire fighting respirator air purification components shall be color coded in accordance with ANSI/AIHA Z88.7, Color Coding of Air-Purifying Respirator Canisters, Cartridges, and Filters.

6.1.6 All wildland fire fighting respirator hardware, all nonfabric components of metal or plastic, all brackets, all snaps or other fasteners, and all NIOSH-certified accessories if any, shall be free of rough spots, burrs, and sharp edges.

6.1.7 All wildland fire fighting respirators shall be designed to be carried on a belt, in a pocket, and on wildland fire fighting load carrying equipment.

6.2 Additional Requirements for PAPR Wildland Fire Fighting Respirators.

6.2.1 PAPR wildland fire fighting respirators shall be equipped with a visual power on/off indicator.

6.2.2 PAPR wildland fire fighting respirators shall be equipped with a powered blower that supplies purified air to the respiratory inlet covering.

6.2.2.1 The power source duration for powered blower shall provide at least 8 hours of continuous use without recharging or changing the power source.

6.2.2.2 Where a rechargeable power source is used, the power source shall be capable of being recharged to full capacity within 4 hours maximum.

6.2.3 PAPR wildland fire fighting respirators shall not have selectable air flow systems.

6.2.4 PAPR wildland fire fighting respirators shall have visual alert signals that shall be observable by the user when the PAPR is worn in accordance with the respirator manufacturer’s instructions.

6.2.4.1 At least one low air flow visual alert signal shall activate when air flow is less than the manufacturer’s specified requirement.

6.2.4.2 At least one visual alert signal shall be provided for each power source that is a component of the PAPR.
6.2.4.3 At least one low power source visual alert signal shall activate when power source capacity is less than the manufacturer's specified requirement.

6.2.5 Two separate and distinct actions shall be required to turn the PAPR off.

6.2.6 All PAPR wildland fire fighting respirator controls shall be operable by the wearer while wearing wildland fire fighting protective work gloves. The gloves shall certified as compliant with the requirements for wildland fire fighting protective work gloves specified in NFPA 1977, Standard on Protective Clothing and Equipment for Wildland Fire Fighting.

6.2.7 All PAPR wildland fire fighting respirator components, accessories, or enhancements shall not tangle, restrict head movement, or disturb the respiratory inlet covering.

CHAPTER 7 PERFORMANCE REQUIREMENTS

7.1 Requirements for Air Purifying Respirators (APR) for Wildland Fire Fighting.

7.1.1 APR wildland fire fighting respirators shall be tested for breathing resistance as specified in Section 8.1, Breathing Resistance Test, and the facepiece pressure shall not be less than 100 mm (4 in.) water column below ambient pressure, and shall not be greater than 25 mm (1 in.) water column above ambient pressure from the time the test begins until the time the test is concluded.

7.1.2 APR wildland fire fighting respirators shall be tested for resistance to heat as specified in Section 8.2, Respirator Heat Resistance Test, and shall not ignite, melt, drip, or separate.

7.1.3 APR wildland fire fighting respirator materials that are externally exposed when the respirator is worn in accordance with the respirator manufacturer's instructions shall be tested as specified in Section 8.3, Respirator Flammability Test, and shall not sustain combustion after removal of the heat source.

7.1.4 APR wildland fire fighting respirators shall be tested for storage integrity as specified in Section 8.4, Storage Integrity Test, and all test subjects shall pass a qualitative or quantitative fit test with all three test samples.

7.1.5 APR wildland fire fighting respirator lenses shall be tested for abrasion resistance as specified in Section 8.5, Lens Abrasion Test, and shall not exhibit a delta haze value greater than 14 percent.

7.1.6 APR wildland fire fighting respirators shall be tested for donning performance as specified in Section 8.6, Donning Performance Test, and the donning time shall not exceed 1 minute.

7.1.7 APR wildland fire fighting respirators shall be tested for communication performance as specified in Section 8.7, Communication Test, and shall have a value of 80 percent or greater.

7.1.8 APR wildland fire fighting respirator air purification components shall be tested for gas and vapor capacity as specified in the applicable test methods in Section 8.8, Air Purification Component Capacity Test, and the breakthrough concentration for each test representative agent shall not exceed the applicable values specified in Table 8.8.4a and Table 8.8.4b.

7.1.9 APR wildland fire fighting respirator air purification components shall be tested for capacity as specified in Section 8.9, Air Purification Component Filter Efficiency Test, for the specific respirator selected from 8.9.4.1, and the filter efficiency shall be equal to or greater than the values specified in the applicable test method.
7.1.10 APR wildland fire fighting respirators shall be tested for facépiece carbon dioxide concentration as specified in Section 8.10, Facepiece Carbon Dioxide Concentration Test, and the carbon dioxide concentration shall not exceed 2.5 percent.

7.1.11 APR wildland fire fighting respirators shall be tested for corrosion resistance as specified in Section 8.11, Corrosion Test, and shall have metals that are inherently resistant to corrosion show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have the use and function of controls and operating features of the respirator remain functional.

7.2 Requirements for Powered Air Purifying Respirators (PAPR) for Wildland Fire Fighting.

7.2.1 Tight-fitting PAPR wildland fire fighting respirators shall be tested for breathing resistance as specified in Section 8.1, Breathing Resistance Test, and the facepiece pressure shall not be less than 100 mm (4 in.) water column below ambient pressure, and shall not be greater than 25 mm (1 in.) water column above ambient pressure from the time the test begins until the time the test is concluded.

7.2.2 Loose-fitting PAPR wildland fire fighting respirators shall be tested for breathing resistance as specified in Section 8.1, Breathing Resistance Test, and the facepiece pressure shall not be less than 0.0 mm water column below ambient pressure and shall not be greater than 25 mm (1 in.) water column above ambient pressure from the time the test begins until the time the test is concluded.

7.2.3 PAPR wildland fire fighting respirators shall be tested for resistance to heat as specified in Section 8.2, Respirator Heat Resistance Test, and shall not ignite, melt, drip, or separate.

7.2.4 PAPR wildland fire fighting respirator materials that are externally exposed when the respirator is worn in accordance with the respirator manufacturer’s instructions shall be tested as specified in Section 8.3, Respirator Flammability Test, and shall not sustain combustion after removal of the heat source.

7.2.5 PAPR wildland fire fighting respirators shall be tested for storage integrity as specified in Section 8.4, Storage Integrity Test, and all test subjects shall pass a qualitative or quantitative fit test with all test samples.

7.2.6 PAPR wildland fire fighting respirator lenses shall be tested for abrasion resistance as specified in Section 8.5, Lens Abrasion Test, and shall not exhibit a delta haze value greater than 14 percent.

7.2.7 PAPR wildland fire fighting respirators shall be tested for donning performance as specified in Section 8.6, Donning Performance Test, and the donning time shall not exceed 5 minutes.

7.2.8 PAPR wildland fire fighting respirator shall be tested for communication performance as specified in Section 8.7, Communication Test, and shall have a value of 80 percent or greater.

7.2.9 PAPR wildland fire fighting respirator air purification components shall be tested for gas and vapor capacity as specified in the applicable test methods in Section 8.8, Air Purification Component Capacity Test, and the breakthrough concentration for each test representative agent shall not exceed the applicable values specified in Table 8.8.4a and Table 8.8.4b.

7.2.10 PAPR wildland fire fighting respirator air purification components shall be tested for capacity as specified in 8.9.4.2 and Section 8.9, Air Purification Component Filter Efficiency Test, and the filter efficiency shall be equal to or greater than the values specified in the applicable test method.
7.2.11 PAPR wildland fire fighting respirators shall be tested for facepiece carbon dioxide concentration as specified in Section 8.10, Facepiece Carbon Dioxide Concentration Test, and the carbon dioxide concentration shall not exceed 2.5 percent.

7.2.12 PAPR wildland fire fighting respirators shall be tested for corrosion resistance as specified in Section 8.11, Corrosion Resistance Test, and shall have metals that are inherently resistant to corrosion show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have the use and function of controls and operating features of the respirator remain functional.
8.1 Breathing Resistance Test.

8.1.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.1.2 Samples.

8.1.2.1 Samples shall be complete wildland fire fighting respirators.

8.1.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.1.3 Specimens.

8.1.3.1 Specimens for conditioning shall be complete respirators.

8.1.3.2 At least three specimens shall be tested.

8.1.4 Apparatus.

8.1.4.1 A test headform as specified in Figure 8.1.4.1 shall be used.

![Figure 8.1.4.1 Test Headform.](attachment:09-8-44)

8.1.4.2 A pressure probe shall be attached to the test headform to monitor facepiece pressure. The test headform shall include the pressure probe specified in Figure 8.1.4.2 when respirators that cover only the wearer’s nose and mouth are tested.

![Figure 8.1.4.2 Location for Second Pressure Probe.](attachment:09-8-44)
8.1.4.2.1 The pressure probe shall be a 6.5 mm (¼ in.) O.D. with a 1.5 mm (1/16 in.) wall thickness metal tube having one open end and one closed end.

8.1.4.2.2 The closed end of the pressure probe shall have four equally spaced holes, each 1.5 mm, ±0.1 mm (1/16 in., ±0.0 in.), and each shall be positioned 6.5 mm, ±0.4 mm (¼ in., ±0.0 in.) from the end of the pressure probe.

8.1.4.2.3 The closed end of the pressure probe shall extend through the test headform, exiting out the center of the left eye.

8.1.4.2.4 The pressure probe shall extend 13 mm, +1.5 mm/-0 mm (½ in., +1/16 in./-0 in.) outward from the surface of the center of the left eye.

8.1.4.3 A length of tubing, including connections, of a 1.5 m (5 ft) length with a nominal 5 mm (3/16 in.) I.D. flexible smooth-bore tubing with a nominal 1.5 mm (1/16 in.) wall thickness shall be permitted to be connected to the open end of the pressure probe and to the inlet of the pressure transducer.

8.1.4.4 A differential pressure transducer having the following characteristics shall be used:

1. Range: 225 mm (9 in.) of water differential
2. Linearity: ±0.5 percent full scale (FS) best straight line
3. Line pressure effect: less than 1 percent FS zero shift/1000 psig
4. Output: ±2.5 Vdc for +FS
5. Output ripple: 10 mV peak to peak
6. Regulation: FS output shall not change more than ±0.1 percent for input voltage change from 22 to 35 Vdc
7. Temperature, operating: -54°C to 121°C (-65°F to 250°F)
8. Temperature, compensated: -18°C to 71°C (0°F to 160°F)
9. Temperature effects: within 2 percent FS/55.6°C (100°F) error band

8.1.4.5 The differential pressure transducer shall be connected to a strip chart recorder having the following characteristics:

1. Chart width of 250 mm
2. Pen speed of at least 750 mm/sec
3. Accuracy of ±0.25 percent FS
4. Input voltage range of 1 V FS
5. Span set at 25 mm (1 in.) of chart per 25 mm (1 in.) water column

8.1.4.6 The test headform shall be equipped with a breathing passage.

8.1.4.6.1 The breathing passage shall lead from the mouth of the test head to the lung.

8.1.4.6.2 The sum of the volumes of the lung, when fully extended to a 3.4 L tidal volume position, and the breathing passage shall not exceed 4.0 L.

8.1.4.6.3 The breathing passage shall be located on the centerline of the mouth and shall be flush with the test headform.

8.1.4.7 The breathing passage shall extend a minimum of 200 mm (8 in.) and a maximum of 450 mm (18 in.).

8.1.4.8 Where flexible smooth-bore tubing is used from the metal breathing tube to the inlet connection of the breathing machine, it shall have a maximum length of 1.2 m (4 ft) and a 19 mm (¾ in.) I.D. with a nominal 3 mm (1/8 in.) wall thickness.

8.1.4.9 The breathing machine shown in Figure 8.1.4.9 shall be used.
8.1.4.9.1 The breathing machine shall consist of a flexible bellows material attached at one end to a fixed plate and at the other end by a free plate constrained to two degrees of freedom.

8.1.4.9.2 The free plate shall be connected to a rotating shaft by means of a connecting rod, vibration damper, and bellows crank mechanism.

8.1.4.9.3 The bellows crank mechanism shall have a center-to-center distance of 57 mm, ±0.005 mm (2 ¼ in., ±0.01 in.).

8.1.4.9.4 The connecting rod shall have a center-to-center free plate distance of 133 mm, ±0.005 mm (5 ¼ in., ±0.01 in.).

8.1.4.9.5 The vibration damper shall be a rubber-to-metal bonded antivibration mounting with a mounting flange hole spacing of 50 mm, ±5 mm (2 in., ±3/16 in.) and an overall height of 20 mm, ±2 mm (3/16 in., ±5/64 in.) and have a static force/ displacement curve with a slope of 11.5 N/mm, ±0.5 N/mm.

8.1.4.10 The bellows material shall consist of neoprene-impregnated nylon fabric convoluted tubing.

8.1.4.10.1 The tubing shall have an I.D. of 200 mm, ±5 mm (8 in., ±3/16 in.) and an O.D. of 250 mm, ±5 mm (10 in., ±3/16 in.).

8.1.4.10.2 The nominal wall thickness of the tubing shall be 1.5 mm (1/32 in.).

8.1.4.10.3 The breathing machine shall have the capability to conduct breathing resistance testing at 103 L/min, ±3.0 L/min.
8.1.4.10.4 The tidal volume of the lung shall determine the volume of air moved during each inhalation/exhalation cycle.

8.1.4.10.5 The airflow shall be determined by the number of inhalation/exhalation cycles per minute, the tidal volume of the lung, and the breathing waveform.

8.1.4.10.6 The breathing waveform shall be produced by reciprocal action of the shaft.

8.1.4.10.7 Inspired and expired volumes as a function of time shall be incorporated in accordance with the values given in Table 8.1.4.10.7 which lists the linear displacement of the bellows free plate as a function of time for 103 L/min volume work rates.

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8.1.5 Procedure.

8.1.5.1* The test setup for conducting the airflow performance test shall be calibrated at least once each day before tests are conducted and shall be verified at least once each day after testing.

8.1.5.1.1 The calibration procedure utilized for the differential pressure transducer shall consist of confirmation of at least three different pressures between 0 mm and 125 mm (0 in. and 5 in.) water column.

8.1.5.1.2 The pressure shall be measured using an incline manometer or equivalent with a scale measuring in increments of ±0.5 mm (±0.02 in.) water column or less.

8.1.5.3 The respirator being tested shall be secured to the test headform. Appropriate measures shall be taken to ensure a leak-free seal of the respirator to the test headform.

8.1.5.4 The remaining components of the respirator, if applicable, shall be mounted to simulate the proper wearing position as specified by the manufacturer’s instructions.

8.1.5.5 Tight-fitting PAPR wildland fire fighting respirators shall have the blower turned off during testing.

8.1.5.6 Loose-fitting PAPR wildland fire fighting respirators shall have the blower turned on during testing.

8.1.5.7 Respirators shall be tested at an ambient temperature of 22°C, ±3°C (72°F, ±5°F) and relative humidity (RH) of 50 percent, ±25 percent.

8.1.5.8 The airflow performance test shall begin after five cycles of the breathing machine and shall continue for one minute +10 seconds, –0 seconds.

8.1.5.9 The breathing machine shall be set at a rate of 103 L/minute, ±3 L/minute with a respiratory frequency of 30 breaths/minute, ±1 breath/minute.

8.1.6 Report. The peak inhalation pressure and peak exhalation pressure shall be recorded and reported for each specimen.

8.1.7 Interpretation.

8.1.7.1 The peak inhalation pressure and peak exhalation pressure shall be used to determine pass or fail performance.

8.1.7.2 One or more specimens failing this test shall constitute failing performance.

8.2 Respirator Heat Resistance Test.

8.2.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.2.2 Samples.

8.2.2.1 Samples shall be complete wildland fire fighting respirators.

8.2.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.2.3 Specimens.

8.2.3.1 Specimens for conditioning shall be complete respirators.

8.2.3.2 At least three specimens shall be tested.

8.2.4 Apparatus.

8.2.4.1 Specimens for testing shall be securely mounted on a room-temperature nonconductive test headform specified in Figure 8.2.4.1 in the “as-worn” position.

8.2.4.2 The test oven shall be a horizontal-flow circulating air oven with minimum internal
dimensions of 460 mm x 460 mm x 460 mm (18 in. X 18 in. X 18 in.).

8.2.4.3 The thermocouple or other temperature-sensing component used shall be mounted within the chamber in a manner in which it will be exposed directly to the chamber atmosphere.

8.2.4.4 The oven shall be heated and stabilized to a temperature of 177°C, +5°/-0°C (350°F, +10°/-0°F) for a minimum of 30 minutes.

8.2.5 Procedure

8.2.5.1 Specimen respirators mounted on the headform shall be placed in the center of the oven and shall face into the air flow.

8.2.5.2 Specimens shall be exposed to 177°C, +5°/-0°C (350°F, +10°/-0°F) for 5 minutes, +15 seconds/-0 seconds.

8.2.5.3 Immediately after the specified exposure, specimens shall be removed and examined for evidence of ignition, melting, dripping, or separation.

8.2.6 Report. Observations of ignition, melting, dripping, or separation shall be recorded and reported for each specimen.

8.2.6 Interpretation.

8.2.6.1 Any evidence of ignition, melting, dripping, or separation on any specimen shall constitute failing performance.

8.2.6.2 One or more specimens failing this test shall constitute failing performance.

8.3 Respirator Flammability Test.

8.3.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.3.2 Samples.

8.3.2.1 Samples shall be complete wildland fire fighting respirators.

8.3.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.3.3 Specimens.

8.3.3.1 Specimens for conditioning shall be complete respirators.

8.3.3.2 At least three specimens shall be tested.
8.3.4 Apparatus.

8.3.4.1 A 1 mm diameter Nichrome™ wire as specified in Figure 8.3.4.1 shall be used.

![Figure 8.3.4.1 Wire configuration](image)

8.3.4.2 The Nichrome™ wire shall be connected to a power supply. A wire temperature of 550°C, +50°/-0°C (1022°F, +90°F/-0°F) shall be maintained.

8.3.4.3 Specimens for testing shall be securely mounted on a room-temperature headform as shown in Figure 8.1.4.1 or Figure 8.1.4.2 in the “as-worn” position.

8.3.5 Procedure

8.3.5.1 The heated wire shall be placed on each externally exposed respirator material for 3 seconds, +1/-0 seconds. Each externally exposed respirator material shall be tested in three different locations.

8.3.6 Report. Observations of flame after removal of the heat source shall be recorded and reported for each specimen.

8.3.6 Interpretation.

8.3.6.1 Any evidence of flame after removal of the heat source shall constitute failing performance.

8.3.6.2 One or more specimens failing this test shall constitute failing performance.

8.4 Storage Integrity Test.

8.4.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.4.2 Samples.

8.4.2.1 Samples shall be complete wildland fire fighting respirators.

8.4.2.2 Where the respirator manufacturer’s user instructions require the respirator to be stored in a protective storage device when the respirator is not in use, the storage device shall be included as part of the sample.

8.4.2.3 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.4.3 Specimens.

8.4.3.1 Specimens shall be complete respirators. Where 8.4.2.2 applies, the protective storage devices shall be part of the specimen.
8.4.3.2 At least three specimens shall be tested.

8.4.4. Procedure.

8.4.4.1* Prior to testing, the test subject shall undergo and pass a qualitative or quantitative fit test procedure with the test specimen. The fit test procedure shall be as defined in 29 CFR 1910.134(f) and 29 CFR 134(m)(2).

8.4.4.2 Where the respirator manufacturer’s user instructions require the respirator to be stored in a protective storage device when the respirator is not in use, the respirator shall be placed in the storage device at the conclusion of the fit test.

8.4.4.3 Specimens shall be subjected to a static compressive load of 100 kg for 1 minute, +10 seconds/-0 seconds, in three mutually perpendicular planes. The load shall be applied using a flat plate of sufficient area to cover the specimen. Where 8.4.4.2 applies, the load shall be applied using a flat plate of sufficient area to cover the surface of the specimen storage device.

8.4.4.4 Specimens shall be oriented in each of three mutually perpendicular planes and shall then be dropped three times from a height of 2 m onto a concrete surface.

8.4.4.5 Following the three drops, specimens shall be removed and the fit testing shall be performed in as specified in 8.4.4.1 using the same test subject and fit test procedure.

8.4.4.6 Where 8.4.4.2 applies, following the three drops the specimens shall be removed from the storage devices and the fit testing shall be performed in as specified in 8.4.4.1 using the same test subject and fit test procedure.

8.4.5 Report. Fit test results shall be recorded and reported.

8.4.6 Interpretation.

8.4.6.1 Fit test results shall be used to determine pass or fail performance.

8.4.6.2 One or more test subjects failing the fit test in 8.4.4.5 shall constitute failing performance.

8.4.6.3 Where 8.4.4.2 applies, one or more test subjects failing the fit test in 8.4.4.6 shall constitute failing performance.

8.5 Lens Abrasion Test.

8.5.1 Application. This test method shall apply to all wildland fire fighting respirators that contain a lens as a component of the respiratory inlet covering.

8.5.2 Samples.

8.5.2.1 Samples shall be complete wildland fire fighting respirator lenses.

8.5.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.5.3 Specimens.

8.5.3.1 Seven specimens shall be chosen from the four respirator lenses.

8.5.3.2 Four specimens shall be taken from the left viewing area of the lenses, and three specimens shall be taken from the right viewing area of the lenses.

8.5.3.3 One of the four specimens taken from the left viewing area shall be the “set-up” specimen.

8.5.3.4 The left test specimens shall conform to all the following criteria:

1. Specimens shall be a square measuring 50 mm × 50 mm (2 in. × 2 in.).
2. Two edges of the square section shall be parallel within ±2 degrees of the axis of the cylinder or cone in the center of the specimen.
(3) At least 38 mm (1½ in.) of the 50 mm × 50 mm (2 in. × 2 in.) square shall be taken from the left side of the center line of the lens.

(4) The 50 mm × 50 mm (2 in. × 2 in.) square shall be cut at approximately eye level.

8.5.3.5 The right test specimens shall conform to all the following criteria:
(1) Specimens shall be a square measuring 50 mm × 50 mm (2 in. × 2 in.).
(2) Two edges of the square section shall be parallel within ±2 degrees of the axis of the cylinder or cone in the center of the specimen.
(3) At least 38 mm (1½ in.) of the 50 mm × 50 mm (2 in. × 2 in.) square shall be taken from the right side of the center line of the lens.
(4) The 50 mm × 50 mm (2 in. × 2 in.) square shall be cut at approximately eye level.

8.5.3.6 Each of the specimens shall be cleaned in the following manner:
(1) Specimens shall be rinsed with clean tap water.
(2) Specimens shall be washed with a solution of nonionic/low-phosphate detergent and water using a clean, soft gauze pad.
(3) Specimens shall be rinsed with de-ionized water.
(4) Specimens shall be blown dry with clean compressed air or nitrogen.

8.5.4 Apparatus. The test apparatus shall be constructed in accordance with Figure 8.5.4(a) and Figure 8.5.4(b).

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**FIGURE 8.5.4(a) Lens Abrasion Tester.**
FIGURE 8.5.4(b) Lens Abrasion Tester (details).

8.5.5 Procedure.

8.5.5.1 The haze of the specimen shall be measured using a haze meter in accordance with ASTM D 1003, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics, and recorded with the following additions:
   (1) The haze shall be measured in the middle of the specimen ±1.6 mm (±1/16 in.).
   (2) The specimen shall be repositioned to achieve the maximum haze value within the area defined in 8.9.5.1(1).
   (3) The haze meter shall have a specified aperture of 22.4 mm (7/8 in.).
   (4) The haze meter shall have a visual display showing 0.1 percent resolution.
   (5) The haze meter shall be calibrated before and after each day’s use following procedures specified in ASTM D 1003, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.

8.5.5.2 The set-up specimen shall be placed cover side up in the test apparatus specimen holder.

8.5.5.3 The specimen holder shall be configured with a flat surface under the lens or with an inner radius support.

8.5.5.4 The pad holder shall consist of a cylinder 10 mm (3/8 in.) high and 25 mm (1 in.) in diameter with a radius of curvature equal to the radius of curvature of the outside of the lens in the viewing area, ±0.25 diopter. This cylinder shall be rigidly affixed to the stroking arm by a #10-32 UNF threaded rod.

8.5.5.5 The pad shall be a Blue Streak M306M wool felt polishing pad or equivalent, 24 mm (15/16 in.) in diameter.

8.5.5.6 The abrasive disc shall be made from 3M Part Number 7415, Wood Finishing Pad, or equivalent.
8.5.5.6.1 A disc 24 mm (15/16 in.) in diameter shall be cut from the abrasive sheet.

8.5.5.6.2 The marked side of the disc shall be placed against the pad and the orientation shall be maintained for each abrasive disc throughout the testing.

8.5.5.7 The pad holder, pad, and abrasive disc shall be installed on the stroking arm. The stroking arm shall be leveled to ±3 degrees by adjusting the threaded pin, and the pin shall be secured to prevent rotation of the pad holder. The axis of curvature of the pad holder shall be coincident with the axis of curvature of the lens.

8.5.5.8 The stroking arm shall be counterbalanced with the pad holder, pad, and abrasive disc in place.

8.5.5.9 The set-up specimen shall be replaced with one of the six specimens to be tested.

8.5.5.10 The 1000 g, ±5 g (2.2 lb, ±0.18 lb) test weight shall be installed on the pin above the test specimen.

8.5.5.11 The test shall be run for 200 cycles, ±1 cycle. One cycle shall consist of a complete revolution of the eccentric wheel.

8.5.5.12 The length of stroke shall be 14.5 mm (9/16 in.), producing a pattern 38 mm (1½ in.) long. The frequency of the stroke shall be 60 cycles, ±1 cycle, per minute. The center of the stroke shall be within ±2 mm (±1/16 in.) of the center of the specimen.

8.5.5.13 The specimen shall be removed and cleaned following the procedure specified in 8.5.3.6.

8.5.5.14 The abrasive disc shall be discarded.

8.5.5.15 The haze of the specimen shall be measured following the procedure specified in 8.5.5.1.

8.5.5.16 The delta haze shall be calculated by subtracting the initial haze from the final haze.

8.5.5.17 The testing steps specified in 8.5.3.6 through 8.5.5.16 shall be repeated five times with a new specimen and abrasive disc.

8.5.6 Report. The six delta haze values shall be recorded, and the values shall be averaged, recorded, and reported.

8.5.7 Interpretation.

8.5.7.1 The average delta haze shall be used to determine pass or fail performance.

8.5.7.2 Failure of the average value of one or more specimens shall constitute failing performance.

8.6 Donning Performance Test.

8.6.1 Application. This test method shall apply to all wildland fire fighting respirators with or without protective storage devices.

8.6.2 Samples.

8.6.2.1 Samples shall be complete wildland fire fighting respirators.

8.6.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.6.3 Specimens.

8.6.3.1 Specimens shall be complete respirators.

8.6.3.2 At least three specimens shall be tested.

8.6.4 Procedure
8.6.4.1 Prior to testing, the test subject shall be trained to don the respirator in accordance with the respirator manufacturer's instructions.

8.6.4.2 The test subject shall don the respirator in accordance with the manufacturer's instructions.

8.6.4.3 For respirators with a tight-fitting respirator inlet covering, the test subject shall perform a fit check to confirm that the respirator is adequately sealed to the test subjects' face.

8.6.5 Report. The time required to don the respirator, and to perform a fit check if applicable, shall be recorded and reported.

8.6.6 Interpretation.
8.6.6.1 The time required to don the respirator, and to perform a fit check if applicable, shall be used to determine pass or fail performance.

8.6.6.2 One or more specimens failing this test shall constitute failing performance.

8.7 Communication Test.
8.7.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.7.2 Samples.
8.7.2.1 Samples shall be complete wildland fire fighting respirators.

8.7.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.7.3 Specimens.
8.7.3.1 Specimens shall be complete respirators.

8.7.3.2 At least three specimens shall be tested.

8.7.4 Apparatus.
8.7.4.1 Testing shall be conducted in a chamber that absorbs a minimum of 90 percent of all sound from 500 Hz to 5000 Hz.

8.7.4.2 Five listening subjects and five talkers consisting of four males and one female shall be available for testing. The alternative of electronic recording of five talkers for testing automation and repeatability shall be permitted.

8.7.4.3 The subjects participating as listeners shall have "audiometrically normal" hearing as defined in Section 5.3 of ANSI S3.2, Method for Measuring the Intelligibility of Speech over Communication Systems, in the range of 500 Hz to 3000 Hz and shall not be permitted to use any device that would enhance their ability to hear.

8.7.4.4 Talkers and listeners shall be selected and trained according to Section 7 of ANSI S3.2, Method for Measuring the Intelligibility of Speech over Communication Systems.

8.7.4.5 The five talkers shall not have facial hair, any unusual facial characteristics, or any other condition that could cause interference with the seal of the facepiece.

8.7.4.6 The talkers shall perform and pass a qualitative facepiece-to-face fit check in accordance with the respirator manufacturer's instructions.

8.7.4.7 Where the talker is qualified to wear several sizes of respirators, the talker shall choose the respirator that is most comfortable.

8.7.4.8 The five talkers shall be trained in the donning and usage of the respirator per manufacturer's instructions.
8.7.4.9 The five talkers shall have no obvious speech defect or strong regional accent.

8.7.4.10 The distance between the talker and the listener(s) shall be 1.5 m, +305 mm/-0 mm (5 ft, +1/-0 ft), and they shall be facing each other.

8.7.4.11 The test chamber shall be filled with broadband “pink” noise with a tolerance of 6 dB per octave band from 400 Hz to 4000 Hz.

8.7.4.12 The forward axis of the loudspeaker shall be oriented away from the listener group.

8.7.4.13 The distance between the loudspeaker and the listeners shall be as great as possible so as to create a quasi-uniform sound field over the listening group.

8.7.4.14 More than one loudspeaker shall be permitted to be used to achieve the desired sound field.

8.7.4.15 The gain of the power amplifier used to generate the pink noise shall be adjusted to achieve an A-weighted sound level of 70 dB, ±2 dB, at each listener’s head position, without listeners present.

8.7.5 Procedure.

8.7.5.1 The method for measuring word intelligibility shall be as specified in ANSI S3.2, Method for Measuring the Intelligibility of Speech over Communication Systems, with the modified apparatus specified in 8.7.4.

8.7.5.2 The test material shall be the reading of one complete list of modified rhyme words as contained in Table 2 of ANSI S3.2, Method for Measuring the Intelligibility of Speech over Communication Systems.

8.7.5.2.1 The words shall be spoken singularly in the following carrier sentence: “Would you circle [list word] now?”

8.7.5.2.2 The rate shall be approximately one test word every 6 seconds.

8.7.5.2.3 The talkers shall be trained to talk at 75 dBA to 85 dBA without a respirator, measured at the listener’s ear, and shall not place any unusual stress on any word.

8.7.5.2.4 Training shall include the use of background noise as defined in 8.7.4.11 through 8.7.4.15.

8.7.5.2.5 The talkers shall not vary their voice level from that used without the respirator after the respirator is donned.

8.7.5.2.6 The listeners shall circle each word as they hear it.

8.7.5.3 The talkers shall conduct two tests in the chamber having an ambient noise field as specified in 8.7.4.11 through 8.7.4.15. A different word list shall be used for the condition of “no respirator,” and another different word list for the condition of “with the respirator worn and operated per the respirator manufacturer’s instructions.”

8.7.5.4 Talkers’ speech shall be monitored during the tests to determine if the talkers conform to the word list specified for that test.

8.7.5.5 Each listener’s response form shall be scored as to the number of correct responses out of the 50 words recited.

8.7.5.5.1 Listeners’ scores shall be based on the words actually spoken by the talkers.

8.7.5.5.2 Listeners’ scores shall not be reduced because of speaking mistakes of the talkers.

8.7.5.5.3 All of the listeners’ scores without the respirator used by the talker shall be averaged, and all of the listeners’ scores with the respirator used by the talker shall be averaged.
8.7.5.5.4 The average score of the five listeners for the talker using the respirator shall be divided by the average score of the five listeners for the talker without using the respirator, and the result shall be called the “score value.” This procedure shall be performed for each of the five talkers.

8.7.5.6 The average of the score values obtained in 8.7.5.5.3 and 8.7.5.5.4 shall be calculated.

8.7.5.6.1 Where the average of the score values is ≥80 percent, this average score value shall be used to determine pass or fail.

8.7.5.6.2 Where the average of the score values is <80 percent, the sample standard deviation (s.d.) of the score values shall be calculated in the following manner:

\[
s.d. = \sqrt{\frac{\sum x^2 - (\frac{\sum x}{N})^2}{N - 1}}
\]

where:
\[x = \text{score values}\]
\[N = \text{sample size (5)}\]

8.7.5.6.3 Where the calculated sample standard deviation of the test score values is ≥10.0, the test shall be invalidated and the procedures of 8.7.5.2 through 8.7.5.6.6 shall be repeated.

8.7.5.6.4 Where the calculated sample standard deviation of the test score values is <10.0, a test statistic, \(T\)-value, shall be calculated to determine if the average of the score values obtained is or is not equivalent to 80 percent. The \(T\)-value shall be calculated in the following manner:

\[
T = \frac{(\mu - \bar{X})\sqrt{N}}{s.d.}
\]

where: \(\mu = 72\) percent; \(\bar{X} = \text{average of the score values}\); \(N = \text{sample size (5)}\); and \(s.d. = \text{sample standard deviation}\)

8.7.5.6.5 For \(T\)-values ≤2.13, the score value shall be considered 80 percent and shall be used to determine pass or fail.

8.7.5.6.6 For \(T\)-values >2.13, the score value shall be as calculated in 8.7.5.6, and this calculated score value shall be used to determine pass or fail performance.

8.7.6 Report. The average of the score values obtained shall be calculated, recorded, and reported.

8.7.7 Interpretation.

8.7.7.1 The average of the score values shall be used to determine pass or fail performance.

8.7.7.2 One or more specimens failing this test shall constitute failing performance.

8.8 Air Purification Component Capacity Test.

8.8.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.8.2 Samples.
8.8.2.1 Samples shall be air purifying components of wildland fire fighting respirators, or complete disposable wildland fire fighting respirators.

8.8.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.8.3 Specimens.

8.8.3.1* Specimens shall be the air purification component or components, or complete disposable respirators.

8.8.3.2 Prior to testing, specimens shall be conditioned as specified in the applicable NIOSH test procedure.

8.8.3.3 At least three specimens of each air purification component shall be tested.

8.8.4 Apparatus and Procedure.

8.8.4.1 Carbon Monoxide Capacity Test. Testing shall be performed as specified in NIOSH Statement of Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Air Purifying Escape Respirator.

8.8.4.2 Inspired Air Temperature Test. Testing shall be performed as specified in NIOSH Standard Test Procedure Number RCT-APR-STP-0034, Carbon Monoxide Service Life Test Standard Testing Procedure.

8.8.4.3 Organic Vapor Capacity Test for Air Purifying Respirators (APR). Testing shall be performed as specified in NIOSH Standard Test Procedure Number TEB-APR-STP-0046A, Determination of Organic Vapor (Carbon Tetrachloride) Service Life Test, Air-Purifying Respirators with Cartridges.

8.8.4.4 Organic Vapor Capacity Test for Powered Air Purifying Respirators (PAPR). Testing shall be performed as specified in NIOSH Standard Test Procedure Number TEB-APR-STP-0046C, Determination of Organic Vapor (Carbon Tetrachloride) Service Life Test, Powered Air-Purifying Respirators with Cartridges.

8.8.4.5 Sulfur Dioxide Capacity Test. Testing shall be performed as specified in NIOSH Standard Test Procedure Number RCT-APRS-STP-0048, Determination of Sulfur Dioxide Service Life Test, Air-Purifying Respirators.

8.8.4.6 Nitrogen Dioxide Capacity Test. Testing shall be performed as specified in NIOSH Standard Test Procedure Number RCT-APR-STP-0062, Determination of Nitrogen Dioxide Service Life Test.

8.8.4.7 Formaldehyde Capacity Test. Testing shall be performed as specified in NIOSH Standard Test Procedure Number RCT-APR-0039, Determination of Formaldehyde Service Life Test, Air-Purifying Respirators.

8.8.5 Report. Breakthrough concentration shall be recorded and reported for each test specimen.

8.8.6 Interpretation.

8.8.6.1 Breakthrough concentration shall be used to determine pass or fail performance.

8.8.6.2 One or more specimens failing this test shall constitute failing performance.
### Table 8.8.4a Air Purification Component Capacity Test Requirements

<table>
<thead>
<tr>
<th>Protection</th>
<th>Test condition</th>
<th>Test atmosphere</th>
<th>Flow rate* (Liters per minute; LPM)</th>
<th>Number of tests</th>
<th>Penetration (parts per million; PPM)</th>
<th>Minimum life (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide</td>
<td>0°C</td>
<td>CO 6000</td>
<td>64</td>
<td>3</td>
<td>500</td>
<td>5</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>25°C</td>
<td>CO 6000</td>
<td>64</td>
<td>3</td>
<td>500</td>
<td>5</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0°C</td>
<td>CO 3600</td>
<td>64</td>
<td>3</td>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>25°C</td>
<td>CO 3600</td>
<td>64</td>
<td>3</td>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>25°C</td>
<td>CO 1200</td>
<td>40 cyclic</td>
<td>3</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>As received</td>
<td>CCl₄ 1000</td>
<td>64</td>
<td>3</td>
<td>5</td>
<td>50</td>
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<tr>
<td>Organic vapors</td>
<td>Equilibrated</td>
<td>CCl₄ 1000</td>
<td>32</td>
<td>4</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Acid gases</td>
<td>As received</td>
<td>SO₂ 500</td>
<td>64</td>
<td>3</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Acid gases</td>
<td>Equilibrated</td>
<td>SO₂ 500</td>
<td>32</td>
<td>4</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Acid gases</td>
<td>As received</td>
<td>NO₂ 500</td>
<td>64</td>
<td>3</td>
<td>1.0</td>
<td>30</td>
</tr>
<tr>
<td>Acid gases</td>
<td>25% and 85% RH</td>
<td>NO₂ 500</td>
<td>64</td>
<td>4</td>
<td>1.0</td>
<td>30</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes (APR)</td>
<td>As received</td>
<td>HCHO 100</td>
<td>64</td>
<td>3</td>
<td>1.0</td>
<td>50</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes (APR)</td>
<td>Equilibrated</td>
<td>HCHO 100</td>
<td>64</td>
<td>4</td>
<td>1.0</td>
<td>50</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes ( Tight-fit PAPR)</td>
<td>As received</td>
<td>HCHO 500</td>
<td>115</td>
<td>3</td>
<td>1.0</td>
<td>120</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes ( Tight-fit PAPR)</td>
<td>Equilibrated</td>
<td>HCHO 500</td>
<td>115</td>
<td>4</td>
<td>1.0</td>
<td>120</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes (Loose-fit PAPR)</td>
<td>As received</td>
<td>HCHO 500</td>
<td>170</td>
<td>3</td>
<td>1.0</td>
<td>120</td>
</tr>
<tr>
<td>Formaldehyde Aldehydes (Loose-fit PAPR)</td>
<td>Equilibrated</td>
<td>HCHO 500</td>
<td>170</td>
<td>4</td>
<td>1.0</td>
<td>120</td>
</tr>
</tbody>
</table>

* Constant flow unless otherwise specified

### Table 8.8.4b Air Purification Component Residence Test Requirements
<table>
<thead>
<tr>
<th>Protection</th>
<th>Test condition</th>
<th>Test atmosphere</th>
<th>Flow rate, constant (liters per million, LPM)</th>
<th>Number of tests</th>
<th>Penetration (parts per million; PPM)</th>
<th>Minimum life (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic vapors</td>
<td>As received</td>
<td>CCl₄</td>
<td>1000</td>
<td>200</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>Equilibrated</td>
<td>CCl₄</td>
<td>1000</td>
<td>200</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Acid gases</td>
<td>As received</td>
<td>SO₂</td>
<td>500</td>
<td>200</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Acid gases</td>
<td>Equilibrated</td>
<td>SO₂</td>
<td>500</td>
<td>200</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Acid gases</td>
<td>As received</td>
<td>NO₂</td>
<td>500</td>
<td>200</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Acid gases</td>
<td>25% and 85% RH</td>
<td>NO₂</td>
<td>500</td>
<td>200</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>As received</td>
<td>HCHO</td>
<td>100</td>
<td>200</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Aldehydes (APR)</td>
<td>Equilibrated</td>
<td>HCHO</td>
<td>100</td>
<td>200</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>As received</td>
<td>HCHO</td>
<td>500</td>
<td>200</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Aldehydes (PAPR)</td>
<td>Equilibrated</td>
<td>HCHO</td>
<td>500</td>
<td>200</td>
<td>4</td>
<td>1.0</td>
</tr>
</tbody>
</table>

8.9 Air Purification Component Filter Efficiency Test.

8.9.1 Application. This test method shall apply to all wildland fire fighting respirators.

8.9.2 Samples.

8.9.2.1 Samples shall be air purifying components of wildland fire fighting respirators, or complete disposable wildland fire fighting respirators.

8.9.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.9.3 Specimens.

8.9.3.1 Specimens shall be air purification components or complete disposable respirators.

8.9.3.2 Prior to testing, specimens shall be conditioned as specified in the applicable NIOSH test procedure.

8.9.4 Apparatus and Procedure

8.9.4.1 Air Purifying Respirators.

8.9.4.1.1 P100 Series Filters. Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0051, Determination of Particulate Filter Efficiency Level for P100 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators.

8.9.4.1.2 P99 Series Filters. Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0052, Determination of Particulate Filter Efficiency Level for P99 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators.
8.9.4.1.3 **P95 Series Filters.** Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0053, Determination of Particulate Filter Efficiency Level for P95 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators.

8.9.4.1.4 **R100 Series Filters.** Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0054, Determination of Particulate Filter Efficiency Level for R100 Series Filters Against Liquid Particulates For Non-Powered, Air-Purifying Respirators.

8.9.4.1.5 **R99 Series Filters.** Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0055, Determination of Particulate Filter Efficiency Level for R99 Series Filters Against Liquid Particulates For Non-Powered, Air-Purifying Respirators.

8.9.4.1.6 **R95 Series Filters.** Testing shall be performed in accordance with NIOSH Standard Test Procedure Number TEB-APR-STP-0056, Determination of Particulate Filter Efficiency Level for R95 Series Filters Against Liquid Particulates For Non-Powered, Air-Purifying Respirators.

8.9.4.2 **Powered Air Purifying Respirators.** Testing shall be performed as specified in NIOSH Standard Test Procedure Number RCT-APR-STP-0001, Determination of Particulate Filter Penetration Test, Powered Air-Purifying Respirator Filters.

8.9.5 **Report.** Filter efficiency shall be recorded and reported for each test specimen.

8.9.6 **Interpretation.**

8.9.6.1 Filter efficiency shall be used to determine pass or fail performance.

8.9.6.2 One or more specimens failing this test shall constitute failing performance.

8.10 **Respirator Carbon Dioxide Concentration Test.**

8.10.1 **Application.** This test method shall apply to all wildland fire fighting respirators.

8.10.2 **Samples.**

8.10.2.1 Samples shall be complete wildland fire fighting respirators.

8.10.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.10.3 **Specimens.**

8.10.3.1 Specimens shall be complete respirators.

8.10.3.2 At least three specimens shall be tested.

8.10.3.3 Prior to testing, specimens shall be conditioned as specified in the applicable NIOSH test procedure.

8.10.4 **Apparatus and Procedure**

8.10.4.1 **Tight-Fitting Powered Air Purifying Respirators with the Blower Running.** Testing shall be performed in accordance with NIOSH Standard Test Procedure Number RCT-APR-STP-0063, Determination of Facepiece Carbon-Dioxide and Oxygen Concentration Levels of Tight Fitting Powered Air-Purifying Respirators with the Blower Unit Running.

8.10.4.2 **Air Purifying Respirators and Tight-Fitting Powered Air Purifying Respirators with the Blower Not Running.** Testing shall be performed in accordance with NIOSH Standard Test Procedure number RCT-APR-STP-0064, Determination of Facepiece Carbon-
8.10.5 Report. Carbon dioxide concentration shall be recorded and reported for each test specimen.

8.10.6 Interpretation.

8.10.6.1 Carbon dioxide concentration shall be used to determine pass or fail performance.

8.10.6.2 One or more specimens failing this test shall constitute failing performance.

8.11 Corrosion Resistance Test.

8.11.1 Application.

8.11.1.1 This test method shall apply to all reusable wildland fire fighting respirators.

8.11.1.2 This test method shall not apply to single-use, disposable wildland fire fighting respirators.

8.11.2 Samples.

8.11.2.1 Samples shall be complete wildland fire fighting respirators.

8.11.2.2 Samples shall be conditioned for a minimum of 4 hours at an ambient temperature of 22°C, ±3°C (72°F, ±5°F), and relative humidity (RH) of 50 percent, ±25 percent.

8.11.3 Specimens.

8.11.3.1 Specimens shall be complete respirators.

8.11.3.2 At least three specimens shall be tested.

8.11.3.3 Specimens shall be tested within 5 minutes after removal from conditioning.

8.11.4 Procedure.

8.11.4.1 Specimens shall be tested in accordance with ASTM B 117, *Standard Method of Salt Spray (Fog) Testing*. Salt spray shall be 5 percent saline solution, and the test exposure shall be for 48 hours, +30/-0 minutes. The chamber shall be stabilized at a temperature of 35°C, ±3°C (95°F, ±5°F).

8.11.4.2 Specimens shall be placed in the chamber in the typical operating position as used by first responders, as specified by the manufacturer.

8.11.4.3 At the conclusion of the salt spray period, specimens shall be stored in an environment of 22°C, ±3°C (72°F, ±5°F) at 50 percent, ±5 percent, relative humidity for a minimum of 48 hours.

8.11.4.4 Following the salt spray exposure, specimens shall be evaluated within 30 seconds of removal from the chamber.

8.11.5 Report.

8.11.5.1 Metals inherently resistant to corrosion shall be evaluated for corrosion and any specimens showing more than light surface-type corrosion shall be reported and recorded.

8.11.4.5 Ferrous metals shall be evaluated for corrosion and any corrosion of the base metals shall be reported and recorded.

8.11.4.5 Hardware shall be evaluated for use and function of controls and operating features and any reduction of function of controls and operating features shall be reported and recorded.

8.11.6 Interpretation. One or more specimens failing this test shall constitute failing performance.
ANNEX A  EXPLANATORY MATERIAL

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.4 Metric units are used throughout with U.S. approximate equivalents provided in parentheses.

A.2.3.5 NIOSH NPPTL Standard Testing Procedures, as well as other respirator regulations and directives, can be found and downloaded from their website at no cost. The NIOSH NPPTL website is: http://www.cdc.gov/NIOSH/NPPTL and under “Respirators” click on “Standard Testing Procedures (STPs).”

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction. The phrase “authority having jurisdiction” is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction could be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative could be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official could be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.14 Carbon dioxide comprises the bulk by weight of all of the combustion products emitted during the incomplete combustion of vegetation. It is normally present in outdoor ambient air at levels of approximately 0.036% - 0.039% (360-390 ppm), depending on location.

A.3.3.15 Carbon monoxide is emitted in large quantities from fires during the incomplete combustion of vegetation. Low levels of carbon monoxide are highly toxic.
A.3.3.24 Product Label. The product label is not the certification organization's label, symbol, or identifying mark; however, the certification organization's label, symbol, or identifying mark can be attached to it or be part of the product label.

A.3.3.31 Service life is determined by the type of substance being removed, the concentration of the substance, the ambient temperature, the specific component being tested (cartridge or canister), the flow rate resistance, and the selected breakthrough value.

A.4.1.8 The NFPA, from time to time, has received complaints that certain items of fire and emergency services protective clothing or protective equipment could be carrying labels falsely identifying them as compliant with an NFPA standard. The requirement for placing the certification organization's mark on or next to the product label is to help ensure that the purchaser can readily determine compliance of the respective product through independent third-party certification.

A.4.2.1 The certification organization should have sufficient breadth of interest and activity so that the loss or award of a specific business contract would not be a determining factor in the financial well being of the agency.

A.4.2.5 The contractual provisions covering a certification program should contain clauses advising the manufacturer that if requirements change, the product should be brought into compliance with the new requirements by a stated effective date through a compliance review program involving all currently listed products.

Without the clauses, certifiers would not be able to move quickly to protect their name, marks, or reputation. A product safety certification program would be deficient without these contractual provisions and the administrative means to back them up.

A.4.2.6 Investigative procedures are important parts of an effective and meaningful product safety certification program. A preliminary review should be carried out on products submitted to the agency before any major testing is undertaken.

A.4.2.7.1 For further information and guidance on recall programs, see 21 CFR 7, Subpart C.

A.4.2.9 Such inspections should include, in most instances, witnessing of production tests. With certain products the certification organization inspectors should select samples from the production line and submit them to the main laboratory for countercheck testing. With other products, it can be desirable to purchase samples in the open market for test purposes.

A.4.7 ISO 9000, Quality Management Systems — Fundamentals and Vocabulary, defines quality terms and concepts. It gives an overview of the content and use of the ISO 9000 series. ISO 9001, Quality Management Systems — Requirements, is used to register the manufacturer's quality system processes. It prescribes quality system requirements for design, development, production, installation, and servicing.

A.8.4.4.1 A fit test is a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

A.8.8.3.1 A disposal respirator is designed and manufactured to be discarded after the end of its recommended period of use, after excessive resistance or physical damage, or when odor breakthrough or other warning indicators render the respirator unsuitable for further use.

A.8.9.3.1 See A.8.8.3.1.
B.1 Referenced Publications.
The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not part of the requirements of this document unless also listed in Chapter 2.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

B.1.2 Other Publications.

B.1.2.2 ISO Publications. International Standards Organization, 1 rue de Varembé, Case Postale 56, CH-1211 Genève 20, Switzerland.


B.2 Informational References.
Agenda Item: TIA 1901-2009
Document: NFPA 1901, Standard for Automotive Fire Apparatus
Reference: 19.24.2.5.1 (New)
(TIA Log 958)

Comment Closing: 7/17/2009
1 Public Comment Received

TIA FINAL TC BALLOT RESULTS

According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21 [27 (eligible to vote) (All ballots were returned) – 0 (abstentions) = 27 × 0.75 = 20.25]

27 Eligible to Vote
0 Not Returned

TC FINAL Ballot results for Technical Merit are as follows:
27 Affirmative (Lackore, Mettler w/comments)
0 Negative
0 Abstentions
PASS

TC FINAL Ballot results for Emergency Nature are as follows:
27 Affirmative
0 Disagreement
0 Abstentions
PASS
MEMORANDUM

TO: Technical Committee on Fire Department Apparatus

FROM: Stacey Van Zandt

SUBJ: NFPA 1901 proposed TIA No. 958 FINAL BALLOT RESULTS

DATE: July 23, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21. (27 eligible to vote - 0 not returned - 0 abstentions = 27 × 0.75 = 20.25).

Technical Merit
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Affirmative (Affirmative with comment – Lackore and Mettler)
0 Negative

Emergency Nature:
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Agreement
0 Disagreement

Copies of the affirmative with comment ballots and the public comment are attached.

Attachments
Secretary
NFPA Standards Council
1 Batterymarch Park
Quincy, MA 02169-7471

Subject: Comment on TIA Log No. 958 to NFPA 1901

Gentlemen:

This proposed TIA is not needed to accomplish what the submitter is trying to achieve if wording is added to NFPA 1911 covering the testing for aerial devices designed with computer controlled or electronically controlled limitations to the range of aerial movement.

Paragraph 19.24.1 of NFPA 1901 states: “The aerial device shall be inspected and tested in accordance with the requirements of Chapter 19, Performance Testing of Aerial Devices, of NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, including all NDT, prior to being subjected to the tests defined in 19.24.2 through 19.24.4.” NFPA 1901 applies to new fire apparatus and 19.24.1 ensures that new aerial devices are tested to the same procedures required for in-service aerial devices without repeating all the testing procedures in NFPA 1901.

NFPA 1901 further states:

“4.20.1 Fire Apparatus Documentation. The contractor shall deliver with the fire apparatus at least one copy of the following documents:

(16) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus.”

Proposed TIA Log No. 959 to NFPA 1911 recommends adding wording to that document on the same subject as this proposed TIA. That is the appropriate document to define a test procedure as it then applies to both new aerial devices and aerial devices already in service. Putting the requirements in NFPA 1911 and just using Paragraph 19.24.1 in NFPA 1901 to require the testing of new aerial devices ensures that the test procedure will remain consistent. NFPA 1901 and NFPA 1911 are on different revision cycles and that can lead to inconsistent requirements for testing between documents if the wording is in both documents.

The wording of this proposed TIA lets the manufacturer define the test, which does not insure a rigorous or complete test. A test procedure with pass/fail criteria should be specified in the standards and those procedures not left to the manufacturer to define.

I recommend the Standards Council not issue this TIA.

Sincerely,

Carl E. Peterson
Agenda Item: TIA 1911-2007
Document: NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus
Reference: 19.8.4.10(7) (New)
(TIA Log 959)

Comment Closing: 7/17/2009
1 Public Comment Received

TIA FINAL TC BALLOT RESULTS

According to 5.4 in the NFPA (RGCP), the final results show this TIA HAS achieved the necessary ¾ majority vote on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21 [27 (eligible to vote) – 0 (abstentions) = 27 × 0.75 = 20.25]

27 Eligible to Vote
0 Not Returned

TC FINAL Ballot results for Technical Merit are as follows:
27 Affirmative
0 Negative
0 Abstentions
PASS

TC FINAL Ballot results for Emergency Nature are as follows:
27 Affirmative
0 Disagreement
0 Abstentions
PASS
MEMORANDUM

TO: Technical Committee on Fire Department Apparatus

FROM: Stacey Van Zandt

SUBJ: NFPA 1911 proposed TIA No. 959 FINAL BALLOT RESULTS

DATE: July 23, 2009

According to 5.4 in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Question 1 (Technical Merit) and Question 2 (Emergency Nature).

The number of affirmative votes needed to obtain a recommendation to issue the TIA is 21.

(27 eligible to vote - 0 not returned - 0 abstentions = 27 × 0.75 = 20.25)

Technical Merit
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Affirmative
0 Negative

Emergency Nature:
27 Eligible to Vote
0 Not Returned
0 Abstentions
27 Agreement
0 Disagreement

Attached is a copy of the public comment that was received.

Attachment
Maynard, Mary

From: Cabot, Paul [PCabot@aga.org] 
Sent: Friday, July 17, 2009 5:39 PM 
To: Fuller, Linda 
Cc: Lemoff, Ted 
Subject: RE: Standards Council and CSST

Linda,

Thank you for the opportunity to review the panel reason and provide a response.

As secretary to NFPA 54 and ASC Z223, I witnessed firsthand the importance of this issue and the discussions and testimony provided to the NFPA 54 committee regarding the need to provide a direct bond. In response to the panel’s comments:

“CMP-5 is not convinced that bonding to or around portions of CSST will solve the problem. No test records were provided to substantiate the adequacy of the minimum 6 AWG conductor.”
RESPONSE: The choice of the minimum 6 AWG conductor was based on laboratory testing (regarding it’s ability to carry high voltage loads) and based on the State of Florida code provisions that always required a minimum 6 AWG direct bonding conductor for gas piping. Experts testified that Florida, the State with the most lightning activity, has not experienced the pin holes or other failure modes that were being reported in other States.

“The problem could be directly related to the design and wall thickness of CSST.”
RESPONSE: This is correct and it is the reason why NFPA 54 responded by specifically revising the code’s bonding requirements to require direct bonding of CSST. CSST is a thin walled listed gas piping system that by its nature cannot carry large electrical currents (imposed from nearby lightning strikes) that traditional steel or copper piping was able too.

“CMP 5 was made aware of at least one manufacturer's product that does not require bonding beyond the requirements of Section 250.104 contrary to the information provided in the substantiation.”
RESPONSE: The NFPA 54 bonding requirements applies to all CSST systems and does not have an exception for this one manufacturer’s product. During the NFPA 54 revision process, no manufacturer requested an exception for their products. No manufacturer objected to the revised bonding requirements. One manufacture did request that the direct bond be allied to all gas piping systems (rigid steel and copper) but no evidence was submitted to justify that extension.

“The mitigation of the effects of lightning is a design option.”
RESPONSE: Since CSST by its nature is a thin-walled product, the only other design option is to make the walls significantly thicker to carry large electrical currents. That is a complete redesign of the product and not a reasonable design option.

“The purpose of the NEC is the practical safeguarding of persons and property from hazards arising from the use of electricity.”
RESPONSE: The NFPA 54 committee also struggled with this one. The National Fuel Gas Code also historically considered only electrical currents or loads from the use of electricity. It’s previous code revisions were based solely on possible electric faults and potential differences between the gas piping and other metallic systems and structures. The NFPA 54 decided that the issue as significant enough to expand the code’s consideration, to the effects of a possible nearby lightning strike.

“The recommendation is not currently prohibited by the NEC and should be covered by product standards. NFPA 54 contains bonding requirements specific to this product, and those requirements do not conflict with the NEC requirements in Section 250.104(B).”
RESPONSE: The NEC is utilized more than the NFPA 54 when it comes to the installation and inspection of electrical bonding. The NEC would be missing an opportunity to provide specific installation requirements to its users that both the CSST manufacturers and NFPA 54 have adopted.

Please let me know if you need anything else. Thank you again for the opportunity to respond.

Paul W Cabot | Secretary ASC Z223
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Mr. Cabot

In preparation of the August 2009 Standards Council Agenda, we were reviewing an Agenda item submitted by the NEC Technical Correlating Committee regarding a jurisdiction issue that would impact panel action on Proposal 5-251 regarding modified bonding requirements (those that were implemented in NFPA 54.) We have your comment on the TIA that is related to this Proposal, but we wondered if you had seen the panel statement on the proposal. I have attached that proposal for your review.

If you had any thoughts on their deliberations that could assist the Council we would appreciate receiving them.

Linda Fuller
Manager, Codes and Standards Administration
lfuller@nfpa.org
(617) 984-7248
Maynard, Mary

Subject: FW: Lightning, CSST and the Fire Service

From: Lhatha@aol.com [mailto:Lhatha@aol.com]
Sent: Wednesday, July 22, 2009 11:38 AM
To: Grant, Casey
Cc: Vondrasek, Bob
Subject: Lightning, CSST and the Fire Service

Casey, I am directing this to you due to our past association and for your determination if it warrants further consideration within the NFPA.

You may recall from our June 2007 telephone call that I have been active with a small group of volunteers in this 75,000 over 55 retirement community in central Florida in an attempt to educate concerned residents regarding lightning protection for their homes. The intent is to help raise awareness leading to a more informed decision on lightning protection where myths and misconceptions abound.

The purpose of this message is to share with you my personal concern that there is a fire protection issue that is not adequately being addressed. My premise is that the Fire Service may not be investigating lightning induced Corrugated Stainless Steel Tubing (CSST) gas pipe fire events and documenting them for the benefit of the technical committees responsible for the NFPA, NEC, and lightning.

An Internet search will show that there are a handful of fire departments that are on top of this issue. It is my contention that this is only the tip of the iceberg. There needs to be a greater awareness with the necessary technical information to determine if CSST was involved in a lightning fire.

For example, Rudick Forensic Engineering, Inc. had an excellent overall summary of the CSST-lightning fire problem that was found on the Internet in 2008. Here is a key statement that I believe should be shared with the Fire Service.

“For example, stainless steel (used in CSST) is not prone to melt during a fire because of its high melting point. So, if an arced hole is found in a CSST line after a fire, which is preceded by lightning (as verified by positive lightning reports), and the arcing was not caused by an energized wire contacting the CSST, then the process of elimination leaves lightning as the probable culprit.”

Apparently, I am not alone in expressing my concern on this matter. The March 2009, issue of NFPA News discussed a TIA for the NEC, paragraph 250-104. In the "Emergency Nature" section the submitter alludes to under reporting of CSST fire incidents

Further, the post-fire investigation should include an assessment of the bonding and grounding to determine if it was installed according to the NEC and NFG codes. CSST manufacturers promote NFPA-54, paragraph 7.13.2 that is intended to protect against indirect lightning strikes. Guidance is needed as to just what constitutes adequate bonding and grounding of all metallic systems to assure that they are at the same potential.

The CSST manufacturers are promoting bonding and grounding as the answer to the lightning induced CSST fire problem. See the March 2009 issue of Plumbing Engineering and my letter-to-the-editor that was published in the May issue. They are using as their rational the lack of documented fires being reported in certain jurisdictions (i.e. Florida) as proof that it is working as a prevention tool. The underreporting works in their favor in promoting their product while the fire problem flies below the radar.

My personal opinion is that bonding and grounding alone is not the answer to either the more frequent indirect lightning strike or the less frequent direct lightning strike where CSST is present. The best protection is an NFPA-780 lightning protection system.

Thanks for considering my concerns and best personal regards.

Len