25- Log #1 Final Action:
(Entire Document)

Note: This proposal appeared as Comment 25-1 (Log #127) which was held from the Annual 2010 ROC on Proposal 25-2.
Submitter: Jesus M. Carrasquillo, S&S Fire Suppression Systems Inc.
Recommendation: New text to read as follows:
In the General Requirements section of NFPA 25 it should indicate as when inspections and testing is to begin in relation to when the system was place in service. System inspections are to begin immediately after the system is placed in service to meet minimum requirements set by the standard.
Handbook Note:
Building owners are often misinformed and confused with the installation warranty of the system (one year) and the minimum inspection requirements set by NFPA 25.
Substantiation: None provided.

25- Log #CP1 Final Action:
(Entire Document)

Submitter: Technical Committee on Inspection, Testing, and Maintenance of Water-Based Systems,
Recommendation: Review entire document to: 1) Update any extracted material by preparing separate proposals to do so, and 2) review and update references to other organizations documents, by preparing proposal(s) as required.
Substantiation: To conform to the NFPA Regulations Governing Committee Projects.

25- Log #242 Final Action:
(Entire Document)

Submitter: David J. Burkhart, Code Consultants, Inc.
Recommendation: Revise Section 3.3.7 to read:

3.3.7.1 *Main Drain*. The primary drain connection located on the system riser ~~and also utilized as a flow test connection.~~

Add Section 3.3.36 to read:

3.3.36 *Test Connection*. A point in the system where water is discharged for purposes of testing a portion of the system. These connections can include the main drain, inspector's test connection, fire pump test header, backflow preventer test valves, fire hydrant and other similar locations.

Revise Table 5.1.1.2 to read:

Item Frequency Reference
~~Main Drain Table 13.1~~
Water Supply Annually 5.3.5

Renumber 13.2.5 to 5.3.5 and revise to read:

~~13.2.5~~ 5.3.5 Water Supply ~~Main Drain~~ Test. A ~~main drain~~ water supply test shall be conducted annually ~~at each water-based fire protection system riser~~ for each water supply lead-in to determine whether there has been a change in the condition of the water supply piping ~~and control valves.~~

Delete section 13.2.5.1:

~~13.2.5.1 In systems where the sole water supply is through a backflow preventer and/or pressure reducing valves, the main drain test of at least one system downstream of the device shall be conducted on a quarterly basis.~~

Renumber 13.2.5.2 to 5.3.5.1 without revision:

~~13.2.5.2~~ 5.3.5.1 Where there is a 10 percent reduction in full flow pressure when compared to the original acceptance test or previously performed tests, the cause of the reduction shall be identified and corrected if necessary.

Add section 5.3.5.2 to read:

5.3.5.2 Main drains, backflow prevention test valves, fire pump test headers or dedicated test connections shall be permitted to meet the requirements of 5.3.5.

Revise section 5.5.2 to read:

5.5.2 ~~A main drain test shall be required~~ if the system control or other upstream valve was operated ~~in accordance with 13.3.3.4~~ water shall be discharged downstream of the valve to ensure water continuity.

Revise Table 5.5.1 as follows:

Component Adjust Repair/Recondition Replace Required Action
~~Main Drain X X X Main drain test~~

Revise section 6.3.1.5 to read:

6.3.1.5 A ~~main drain~~ water supply test shall be performed on all standpipe systems with automatic water supplies ~~in accordance with the requirements of Chapter 13~~. for each water supply lead-in to determine whether there has been a change in the condition of the water supply piping.

Delete section 6.3.1.5.1

~~6.3.1.5.1 The test shall be performed at the low point drain for each standpipe or the main drain test connection where the supply main enters the building (when provided).~~

Add new section 6.3.1.5.1 to read:

6.3.1.5.1 Main drains, backflow prevention test valves, hose valves or dedicated test connections shall be permitted to meet the requirements of 6.3.1.5.

Add new section 6.3.1.5.2 to read:

6.3.1.5.2 Where there is a 10 percent reduction in full flow pressure when compared to the original acceptance test or previously performed tests, the cause of the reduction shall be identified and corrected if necessary.

Revise Table 6.1.1.2 to read:

Item Frequency Reference
~~Main Drain Table 13.1~~
Water Supply Test Annually 6.3.1.5

Revise Table 6.5.1 as follows:

Component Adjust Repair/Recondition Replace Required Action
~~Main Drain X X X Check for leaks and residual pressure during Main drain test~~

Add Section 7.5.1.1 to read:

7.5.1.1 Once a control valve is opened to place a component back into service, water shall be discharged downstream of the valve to ensure water continuity.

Delete Sections 7.5.3 and 7.5.3.1

~~7.5.3 A main drain test shall be required if the system control or other upstream valve was operated.~~

~~7.5.3.1 Where a main drain is not provided, other equivalent means of flow testing shall be permitted.~~

Revise section 9.6.3 to read:

9.6.3 ~~A main drain test shall be required~~ if the system control or other upstream valve was operated ~~in accordance with 13.3.3.4~~ water shall be discharged downstream of the valve to ensure water continuity.

Revise section 10.3.7.1.1 to read:

10.3.7.1.1 ~~Main drain~~ Water supply tests shall be conducted at the main riser to determine whether there has been any change in the condition of the water supply piping ~~and controlling valve~~.

Revise Table 10.5.1 as follows:

Component Adjust Repair/Recondition Replace Required Action

~~Main Drain X X X Full flow Main drain test~~

~~Auxiliary Drain X X X (1) check for leaks at system working pressure (2) Main drain test~~

Revise section 11.5.3 to read:

11.5.3 ~~A main drain test shall be required~~ if the system control or other upstream valve was operated ~~in accordance with 13.3.3.4~~ water shall be discharged downstream of the valve to ensure water continuity.

Revise section 13.3.1.2.1 to read:

13.3.1.2.1 When the valve is returned to service~~, a drain test (either main or sectional drain, as appropriate) shall be conducted to determine that the valve is opened.~~ water shall be discharged downstream of the valve to ensure water continuity.

Delete section 13.3.3.4

~~13.3.3.4 A main drain test shall be conducted any time the control valve is closed and reopened at system riser.~~

Revise section 13.8.3 to read:

13.8.3 ~~A main drain test shall be conducted in accordance with 13.3.3.4~~ if the system control or other upstream valve was operated water shall be discharged downstream of the valve to ensure water continuity.

Revise Table 13.8.1 by eliminating all references to main drain test.

Revise section A.13.2.5 to A.5.3.5 to read:

~~A.13.2.5~~ A.5.3.5 Main drains are installed on system risers for one principal reason: to drain water from the overhead piping after the system is shut off. This allows the contractor or plant maintenance department to perform work on the system or to replace nozzles after a fire or other incident involving system operation.

~~The test for standpipe systems should be done at the low-point drain for each standpipe or the main drain test connection where the supply main enters the building.~~

The main drain is only one of many test connections that can be used to provide a water supply test to give an indication ~~These drains also are used to determine~~ whether there is a major reduction in waterflow to the system, such as could be caused by a major obstruction, a dropped gate, a valve that is almost fully closed, or a check valve clapper stuck to the valve seat.

A satisfactory ~~drain~~ water supply test (i.e. one that reflects the results of previous tests) does not necessarily indicate an obstructed passage, nor does it prove that all valves in the upstream flow of water are fully opened. However, these tests provide a reasonable level of confidence that the water supply has not been compromised.

The performance of drain tests is not a substitute for a valve check on 100 percent of the fire protection valves ~~valving~~.

The main drain test is conducted in the following manner:

(1) Record the pressure indicated by the supply water gauge.

(2) Close the alarm control valve on alarm valves

(3) Fully open the drain valve

(4) After the flow has been stabilized, record the residual (flowing) pressure indicated by the water supply gauge.

(5) Close the main drain valve slowly.

(6) Record the time taken for the supply water pressure to return to the original static (nonflowing) pressure.

(7) Open the alarm valve.

Substantiation: "A satisfactory drain test (i.e. one that reflects the results of previous tests) does not necessarily indicate an obstructed passage, nor does it prove that all valves in the upstream flow of water are fully opened. "

This is a quote from the current annex material. It says a lot about the value of these tests, yet the entire standard has been polluted with "Main Drain" tests to the point of absurdity. Some of the requirements for main drain tests don't even make any sense.

Some of the tables require a main drain test to be performed if you adjust a main drain! It is unreasonable to think that

a main drain test needs to be run every time a valve is exercised.

If any owner is contracting to have his system maintained in accordance with NFPA 25, then the valves should be in good enough shape that these tests are unnecessary, and if the owner does
not maintain to NFPA 25, then they won't get done anyhow.

The legal ramifications are so great as compared to the cost/benefit of these tests, that the committee is putting an undue burden on unsuspecting property owners.

In a time where water resources are being stretched, it is a total waste of water resources to do this many "main drain" tests. The committee needs to think GREEN.

History:

Until the 1991 edition of NFPA 13, there was a requirement for a "Waterflow Test Connection". (See Supporting Material) Additionally, Section 4-5.3.4.4 of NFPA 13-19 9 (See Supporting Material) also allowed the use of main drain as this test connection, but they were not necessarily one in the same. At this time, there were relatively few backflow preventers on fire protection systems and 95% of the systems used the Main Drain as the test connection. The exception was when a fire pump test header was available. This resulted in the use of the slang "Main Drain Test" which was common in the field.

In the fall 1993 code cycle a proposal 13-103 (See Supporting Material) was submitted by Jeff Cisney of the Department of Veterans Affairs. This proposal indicated that "Test connections shall be sized in accordance with table 4-5.3.4.2". His substantiation was to ensure that the test connection had a minimum size. The committee action was A.I.P. which gave birth to the term "Main Drain Test Connection" in NFPA 13. However, the intent was not changed and the committee was trying to distinguish between the water supply test and the "Inspector's Alarm Test". The origination of this language stems to the original version of NFPA 25.

In the spring 1996 cycle of NFPA 13, a proposal 13-23 (See Supporting Material) was submitted by Ken Isman of the National Fire Sprinkler Association. The committee action was A.I.P and the requirement to have a means to full flow the backflow preventer was established.

In the fall 1997 cycle of NFPA 25, a proposal 25-18 (See Supporting Material) was submitted by Roland Huggins of the American Fire Sprinkler Association. The proposal added a main drain test for class II and Class III standpipes because the standpipes could be used in lieu of 50% of the required fire extinguishers per NFPA 10. The language suggests this drain was intended only to measure the water supply flow for standpipe systems that were not combined systems. At this time a requirement for a "Main Drain" on standpipe systems did not exist. A typical design would have the isolation valve at the ceiling level with drainage accomplished by opening the first floor hose outlet. The committee action was A.I.P. and resulted in a quarterly test for all automatic standpipes regardless if they were Class I, II, or III. The annex language reveals the committee's intent for this test. Also the negative vote by Munno should be noted.

In the fall 2002 cycle of NFPA 14, a proposal 14-38 (See Supporting Material) was submitted by the technical committee to add the main drain requirement to NFPA 14. The substantiation was not technical in nature; however, provided a requirement for a main drain in NFPA 14. No guidance is provided to where on the system the main drain is to be located other than "at locations that will permit flow tests of water supply connections". This would be consistent with a location near the incoming water service.

Like so many experiences I have had in fire protection, the NFPA 25 committee has been guilty of allowing "code creep". The subtle changes over time with misapplication of the original intent add up.

I have clients who have been cited for not performing a "Main Drain" test on all there risers and all their standpipes even though there is only one in-coming water service to the building. In some buildings this could be as many as eight tests. It is our contention that only one test is needed to ensure the non-degradation of the water supply. Citations have also been issued to my clients for not having main drains on the standpipes, even though they were installed prior to 2002, because NFPA 25 requires the test.

The evolution of the sprinkler system now allows for multiple methods to test the water supply; the main drain, the backflow preventer test connection, the fire pump test header or a standpipe/hose outlet.

Note: Supporting material is available for review at NFPA Headquarters.

25- Log #252 Final Action:
(1.1.3.1 and A.1.1.3.1)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Revise 1.1.3.1 as follows:

~~1.1.3.1* This standard does not require the inspector to verify the adequacy of the design of the system.~~

A.1.1.3.~~1~~ The requirement to evaluate the adequacy of the design of the installed system as indicated in 4.1.5 and 4.1.6 is not typically a part of the periodic inspection, testing, and maintenance of a water based fire protection system ~~requirements of this standard~~. However, such evaluation can be added ~~is the responsibility of~~ if the property owner or designated representative clearly states this intent in writing ~~as indicated in 4.1.5 and 4.1.6~~.

Substantiation: So long Sections 4.1.5 and 4.1.6 remain in the standard, then changes in hazard and design are part of the scope of NFPA 25. As such, existing text needs to be deleted as its contradictory to scope. NFPA 25 is not a document where text should be crafted towards what the "inspector" does or doesn't do; it needs to be a document that ensures water based systems will perform; otherwise, there's no point for an owner to comply with the document. By deleting the text in 1.1.3.1, the conflict is removed. The existing annex note tied to 1.1.3.1 has been relocated to 1.1.3 and has been revised to indicate that verifying the adequacy of the design is not typically a part of ITM but it could be, provided this intent is clearly stated in writing. I recognize the typical "inspector" is not tasked or qualified to assess the adequacy of the design, but this should not be grounds for keeping such a task out of the scope of an "inspection" should an owner desire it. Note: if Sections 4.1.5 and 4.1.6 are removed, as suggested in another proposal, then this change is not necessary.

25- Log #35 Final Action:
(1.1.4)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 1.1.4 as follows:

1.1.4 Corrective action needed to ensure that a system operates in a satisfactory manner shall be in accordance with this standard unless this standard specifically refers to an ~~the~~ appropriate installation standard.

Substantiation: Now that NFPA 25 includes Summary of Component replacement Action Requirements tables in each chapter the user does not have to perform corrective actions per the installation standard unless specifically referred to in the tables. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #274 Final Action:
(1.1.5 and Chapter 16 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise text to read as follows:

1.1.5 This standard shall not apply to sprinkler systems designed, installed, and maintained in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes except for systems installed in Board and Care occupancies, which shall only be required to meet Chapter 16.

Chapter 16 Board and Care Facilities with NFPA 13D Systems

16.1* Board and Care Facilities with NFPA 13D system protection shall only be required to meet the requirements of this chapter and the applicable portions of Chapter 4.

16.2 Inspection Requirements

16.2.1 Control valves shall be inspected monthly 13.3.2.

16.2.2 Gages shall be inspected monthly to verify that they are in good condition and that normal pressure is being maintained.

16.2.3 Alarm devices shall be inspected quarterly to verify that they are free from physical damage.

16.2.4 Sprinklers visible from floor level shall be inspected annually in accordance with 5.2.1.

16.2.5 Pipe visible from floor level shall be inspected annually in accordance with 5.2.2.

16.2.6 Pipe hangers visible from floor level shall be inspected annually in accordance with 5.2.3.

16.2.7 Dry-pipe systems that extend into unheated portions of the building shall be inspected in accordance with 13.4.4.

16.3 Testing Requirements

16.3.1 Alarm devices shall be tested semiannually in accordance with 5.3.3.

16.3.2 A representative sample of fast response sprinklers shall be tested once the sprinklers in the system are 20 years old in accordance with 5.3.1.1.1.3. If any sprinkler in the sample fails the test, all of the sprinklers represented by that sample shall be replaced. If the sprinklers pass the test, the test shall be repeated every 10 years thereafter.

16.3.3 A representative sample of dry-type sprinklers shall be tested once the sprinklers in the system are 10 years old in accordance with 5.3.1.1.1.6. If any sprinkler in the sample fails the test, all of the sprinklers represented by that sample shall be replaced. If the sprinklers pass the test, the test shall be repeated every 10 years thereafter.

16.3.4 Antifreeze solutions shall be tested in accordance with 5.3.4.

16.3.5 Dry-pipe systems that extend into the unheated portions of the building shall be tested in accordance with 13.4.4.

16.4 Maintenance Requirements

16.4.1 Control valves shall be operated through their full range and returned to normal annually.

16.4.2* Operating stems of OS&Y valves shall be lubricated annually.

16.4.3 Dry-pipe systems that extend into the unheated portions of the building shall be maintained in accordance with 13.4.4.

A.16.1 The intent of NFPA 25 is not to require all of the rules of all of the chapters of NFPA 25 to be used in the small NFPA 13D systems installed in Board and Care Facilities. Instead, just a few of the inspection, testing, and maintenance rules need to be followed. Where other sections of NFPA 25 are referenced, the intent is to use these sections for procedural information and pass/fail criteria, not to have the frequencies or other requirements of these sections pulled into this chapter.

The presence of this chapter in no way implies that NFPA 13D systems in single-family dwellings or two-family dwellings need to be inspected, tested or maintained in accordance with NFPA 25. Instead, this chapter creates some special inspection, testing and maintenance requirements for situations where Board and Care Facilities have used NFPA 13D because these occupancies need more formal procedures for maintaining their systems. This chapter only applies to Board and Care Facilities.

A.16.4.2 It is a good idea to lubricate the valve in accordance with this section first, then close the valve all the way and open it again as required by section 16.4.1. This way, the lubricant gets distributed with a minimum amount of time and effort.

Substantiation: It has always been the intent of NFPA 25 to exempt fire sprinkler systems in one and two family homes from the requirements of the standard. However, several years ago, the NFPA Committee on Board and Care Occupancies beefed up the rules of NFPA 13D and allowed the installation of such systems into small Board and Care Facilities (in NFPA 101 and NFPA 5000). When they did this, they recognized that such systems would need to be maintained in some standardized fashion.

The Committee on Board and Care Occupancies created Section 32.2.3.5.8 in the Life Safety Code (NFPA 101) with inspection, testing and maintenance requirements for these systems in Board and Care Facilities. This section of NFPA 101 contains its own frequencies for activities that do not necessarily agree with NFPA 25. Unfortunately, most members of the fire sprinkler industry do not read NFPA 101 and are not familiar with its contents.

The rules for inspecting, testing and maintaining fire sprinkler systems need to be in NFPA 25. Since these rules exist within the NFPA system, they should be moved to NFPA 25 from NFPA 101.

This is not original material; its reference/source is as follows:

NFPA 101, Section 32.2.3.5.8, modified with new section numbers for the 2011 edition of NFPA 25.

25- Log #326 Final Action:

(1.2.1 and A.1.2.1)

Submitter: Peter A. Larrimer, US Department of Veterans Affairs

Recommendation: Modify 1.2.1 and the annex as follows:

1.2* Purpose.

1.2.1 The purpose of this document is to provide minimum requirements ~~that ensure a reasonable degree of protection for life and property from fire through minimum~~ for inspection, testing, and maintenance ~~methods~~ for water-based fire protection systems.

1.2.2 In those cases where it is determined that an existing situation involves a distinct hazard to life or property, the authority having jurisdiction shall be permitted to require inspection, testing, and maintenance methods in excess of those required by the standard.

A.1.2 ~~History has shown that the performance r~~ Reliability of a water-based fire protection system under fire-related conditions increases where a comprehensive inspection, testing, and maintenance program is in place. ~~procedures are enforced. Diligence during an inspection is important. The inspection, testing, and maintenance of some items in the standard might not be practical or possible, depending on existing conditions. The inspector should use good judgment when making inspections.~~ However, this standard does not address some common failure modes that are known for water based systems nor are the requirements written to address the performance of a system. This standard does not require the inspector to notify the owner of any design issues that might affect the performance of the system.

Substantiation: Below is data from NFPA (John Hall Jr. Report of Feb 2010) on system failures that support the changes to the "Purpose" of the document. Since the ITM requirements of NFPA 25 do not address some of the reasons why systems did not operate and why some systems were ineffective after operation, the annex note was added to clarify that the system owner should not expect the standard to accomplish something that is not a goal of the standard. In addition, based on the ITM requirements in NFPA 25, the degree of protection for life and property from fire cannot be established one way or the other based upon the requirements of NFPA 25 since NFPA 25 doesn't address performance. A visit from a contractor to a property where the ITM has been accomplished in compliance with the requirements of NFPA 25 could leave the owner with a rack storage system protected by a light hazard sprinkler system.

Based on NFPA data, 93% operated, 7 % did not operate. Reasons for when sprinklers fail to operate

(a) system shut off before fire (53%),

(b) Inappropriate system for fire(20%)

(c) Lack of maintenance (15%)

(d) Manual intervention defeated system (9%)

(e) Damage component (2%)

Based on NFPA data , 97% effective, 3% were ineffective. Reasons for when sprinklers are ineffective:

a) Water did not reach fire (43%)

b) Not enough water released (31%)

c) Inappropriate system for fire (12%)

d) Manual intervention defeated system (5%)

e) Damaged component (4%)

f) Lack of maintenance. (4%)

25- Log #108 Final Action:
(1.2.2)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise text to read as follows:
1.2.2 In those cases where it is determined ~~that an existing condition involves a distinct hazard to life or property,~~ that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to require inspection, testing, and maintenance methods in excess of those required by the standard.
Substantiation: The term "distinct hazard" is vague. The proposed revision using the term "unacceptable degree of risk" mirrors that found in NFPA 13 relating to retroactivity and better describes the condition(s) in which ITM methods in excess of the standard can be incorporated.
This is not original material; its reference/source is as follows:
NFPA 13, 2010 - 1.4.2 under 1.4 Retroactivity

25- Log #2 Final Action:
(Chapter 3 Definitions)

Note: This proposal appeared as Comment 25-8 (Log #1) which was held from the Annual 2010 ROC on Proposal N/A.
Submitter: Daniel Hartel, Liberty Fire Protection Systems, Inc.
Recommendation: Add new text as follows:
Daily – Occurring Every Day
Weekly – Occurring Every Week
Monthly – Occurring Every Month
Quarterly – Occurring Every 3 Months
Biannual – Occurring Every 6 Months
Annual – Occurring Every 12 Months
Semi-annual – Occurring Every 24 Months
3 Years – Occurring Every 36 Months
5 Years – Occurring Every 60 Months
Etc.
Substantiation: There is confusion between Biannual and Semi-annual.
Merriam-Webster Dictionary describes Biannual as occurring twice a year; and describes Semiannual as occurring 1/2 in the first year and 1/2 in the second year. Since you can't really do 1/2 of an inspection or a test, an argument can be made that this means that the inspection or test can be done every 2 years.

25- Log #112 Final Action:
(3.3.x Automatic Transfer Switch (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.3.X. Automatic Transfer Switch. Self-acting equipment for transferring the connected load from one power source to another power source.

Substantiation: 8.3.3.4 has testing requirements for automatic transfer switches used with fire pumps. The standard should have a definition.
This is not original material; its reference/source is as follows:
NFPA 20, 2010 - 3.3.48.2.1

25- Log #114 Final Action:
(3.3.x Hydrostatic Test (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.3.XX. Hydrostatic Test. A test of a closed piping system and its attached appurtenances consisting of subjecting the piping to an increased internal pressure for a specified period of duration to verify system integrity and leak rates.
Renumber remaining sections as required.
Substantiation: NFPA 25 contains requirements for performing hydrostatic test(s). A definition for hydrostatic test should be in the standard.
This is not original material; its reference/source is as follows:
NFPA 13, 2010 - 3.8.1.14.3

25- Log #33 Final Action:
(3.3.x Recommendation and A.3.3.x (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new text to read as follows:
3.3.XX Recommendation. A finding or observation identified during normal inspection, testing or maintenance activities that is brought to attention of the owner or designated representative that is not based on the requirements of this standard.
A.3.3.XX An example of a recommendation is the appearance that sprinklers in an area may be over spaced due to changes in the building. Personnel performing normal inspection, testing, or maintenance tasks may observe a condition of the system that is not a deficiency or impairment as defined in this standard, but should be brought to the attention of the owner or designated representative. The result of a recommendation may be an evaluation of the system as described in Annex F.
Substantiation: This definition is need to differentiate between what's required to be recorded in an inspection report as a deficiency or impairment and something that the inspector thinks should be investigated. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #113 Final Action:
(3.3.x Waterflor Alarm Device (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.3.XX. Waterflow Alarm Device. An attachment to the sprinkler system that detects a predetermined water flow and is connected to a fire alarm system to initiate an alarm condition or is used to mechanically or electrically initiate a fire pump or local audible or visual alarm.

Substantiation: NFPA 25 has requirements for the inspection and testing of waterflow alarm devices. A definition should be included in the standard.
This is not original material; its reference/source is as follows:
NFPA 13, 2010 - 5.1.3

25- Log #158 Final Action:

(3.3.1 Alarm Receiving Facility, 3.3.x Supervising Station (New), 5.1.5, 6.1.8, 8.1.11, 9.1.5, 10.3.2.1, 11.1.7, and 12.x (New))

Submitter: Russell B. Leavitt, Telgian Corporation

Recommendation: Revise 5.1.5; 6.1.8; 7.1.6; 8.1.11; 9.1.5; 10.3.2.1; and 11.1.7 to read:

Notification to ~~Supervisory Service~~ Supervising Station . To avoid false alarms where a ~~supervisory service~~ supervising station is ~~provided~~ utilized, the ~~alarm receiving facility~~ supervising station shall be notified by the property owner or designated representative as follows: (no changes to remaining text)

Delete all of 3.3.1 Alarm Receiving Facility.

Add new section:

3.X.X Supervising Station. A facility that receives signals from protected premises fire alarm systems and at which personnel are in attendance at all times to respond to these signals.

Add new section:

12.X.X Notification to Supervising Station. To avoid false alarms where a supervising station is utilized. the supervising station shall be notified by the property owner or designated representative as follows:

(1) Before conducting any test or procedures that could result in the activation of an alarm

(2) After such tests of procedures are concluded

Substantiation: There is no definition for "supervisory service" that is applicable to the way it is used in the standard. "Supervising station" is the term used by NFPA 72. The definition for "Alarm Receiving Facility" is unique to NFPA 25 is not needed but a definition for "Supervising Station" is needed if the revision is approved. Chapter 12 "Water Mist Systems" should have a "notification" section.

25- Log #253 Final Action:

(3.3.4 Deficiency and A.3.3.4)

Submitter: Joshua Elvove, U.S. General Services Administration

Recommendation: Revise 3.3.4 as follows:

3.3.4* Deficiency. For the purposes of inspection, testing, and maintenance of water-based fire protection systems, a condition ~~in~~ which will or has the potential to adversely impact the performance of a system or portion thereof ~~is damaged, inoperable, or in need of service,~~ but does not rise to the level of an impairment.

~~3.3.4.1 Critical Deficiency. A deficiency that, if not corrected, can have an effect on the performance of the fire protection system.~~

~~3.3.4.2 Noncritical Deficiency. A deficiency that does not have an effect on the performance of the fire protection system, but correction is needed for the proper inspection, testing, and maintenance of the system(s).~~

A.3.3.4 Deficiency. Depending on the nature and significance of the deficiency it can result in a system impairment. Critical deficiencies will adversely impact performance but without the need for the implementing impairment procedures. Noncritical deficiencies have the potential to impact performance.

Substantiation: The revised language removes limiting and potentially conflicting language regarding an inoperable system which could also be considered an impairment (as noted by Bill Sheppard in his negative ballot comment on ROC 25-12), and substitutes broader language that can be applied to any condition noted that has the potential to negatively impact on the performance of a water based fire protection system. The sub-classifications have been revised and relocated to the annex because the terms do not appear in the body of the standard, nor are they needed in the body of the standard, whether or not there's a table distinguishing between critical and noncritical deficiencies.

25- Log #311 Final Action:
(3.3.4.2 Noncritical Deficiency)

Submitter: Ken Bogue, SimplexGrinnell/Rep Tyco/SimplexGrinnell
Recommendation: Change the term Noncritical Deficiency to Minor Deficiency in Chapter 3 and anywhere it is used throughout the document.
3.3.4.2 ~~Noncritical~~ Minor Deficiency
Substantiation: The meaning of Noncritical doesn't meet the intent of the definition. "Minor" means lesser in seriousness or danger. Minor Deficiency better states the meaning intended of not in a state of crisis or emergency.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #57 Final Action:
(3.3.11 Foam Discharge Device and A.3.3.11 (New))

Submitter: Marcelo M. Hirschler, GBH International
Recommendation: Revise text to read as follows:
3.3.11 Foam Discharge Device. Any device that, when fed with a foam-water solution, produces foam. ~~These devices are permitted to be non-air-aspirating (e.g., sprinklers, water nozzles) or air-aspirating (e.g., foam-water sprinklers, directional foam water nozzles, foam nozzles). All discharge devices have a special pat~~tern of distribution peculiar to the particular device.
A.3.3.11 These devices are permitted to be non-air-aspirating (e.g., sprinklers, water nozzles) or air-aspirating (e.g., foam-water sprinklers, directional foam water nozzles, foam nozzles). All discharge devices have a special pattern of distribution peculiar to the particular device.
Substantiation: The NFPA Manual of Style requires definitions to be in single sentences. The added sentences should not be part of the definition (and in this case they are simply added explanations) but should be in the body of the document or in an annex note, as recommended in this proposal.
The added information might be helpful in chapter 11.

25- Log #36 Final Action:
(3.3.17.1 Emergency Impairment)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 3.3.17.1 as follows:
3.3.17.1 *Emergency Impairment.* A condition where a water-based fire protection system or portion thereof is out of order due to an unexpected occurrence, such as a ruptured pipe, an operated sprinkler, or an interruption of the water supply to the system, or the condition was found while performing inspection testing or maintenance activities.
Substantiation: Most impairments are discovered while performing inspection, testing, and/or maintenance on the system, and yet this standard doesn't clearly state that this condition is defined as an emergency impairment once it's discovered. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #58 Final Action:
(3.3.19 Inspection, Testing, and Maintenance Service and A.3.3.19 (New))

Submitter: Marcelo M. Hirschler, GBH International
Recommendation: Revise text to read as follows:
3.3.19 Inspection, Testing, and Maintenance Service. A service program provided by a qualified contractor or qualified property owner's representative in which all components unique to the property's systems are inspected and tested at the required times and necessary maintenance is provided. ~~This program includes logging and retention of relevant records.~~
A.3.3.19 This program includes logging and retention of relevant records.

Substantiation: The NFPA Manual of Style requires definitions to be in single sentences. The added sentences should not be part of the definition (and in this case they are simply added explanations) but should be in the body of the document or in an annex note, as recommended in this proposal.
The added information might be helpful in chapter 14.

25- Log #307 Final Action:
(3.3.29 Reduced-Pressure Principle Backflow Prevention Assembly (RPBA))

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
3.3.29 Reduced-Pressure Principle Backflow Prevention Assembly (RPBA). Two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and ~~below~~ upstream of the first check valve. These units are located between two tightly closed resilient-seated shutoff valves, as an assembly, and are equipped with properly located resilient-seated test cocks.
Substantiation: The use of the term "below" infers that the device can only be a vertical assembly. A more appropriate term of "upstream" would apply to any orientation.

25- Log #59 Final Action:
(3.3.29 Reduced-Pressure Principle Backflow Prevention Assembly (RPBA) and A.3.3.29 (New))

Submitter: Marcelo M. Hirschler, GBH International
Recommendation: Revise text to read as follows:
3.3.29 Reduced-Pressure Principle Backflow Prevention Assembly (RPBA). Two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. ~~These units are located between two tightly closed resilient-seated shutoff valves, as an assembly, and are equipped with properly located resilient-seated test cocks.~~
A.3.3.29 These units are located between two tightly closed resilient-seated shutoff valves, as an assembly, and are equipped with properly located resilient-seated test cocks.

Substantiation: The NFPA Manual of Style requires definitions to be in single sentences. The added sentences should not be part of the definition (and in this case they are simply added explanations) but should be in the body of the document or in an annex note, as recommended in this proposal.

25- Log #110 Final Action:

(3.3.30.x Concealed Sprinkler, Flush Sprinkler, Sidewall Sprinkler, Institutional Sprinkler, Intermediate Level Sprinkler/Rack Storage Sprinkler, and Pilot Line Detector (New))

Submitter: Russell B. Leavitt, Telgian Corporation

Recommendation: Add the following sprinkler definitions:

3.3.30.XX. Concealed Sprinkler. A recessed sprinkler with a cover plate.

3.3.30.XX. Flush Sprinkler. A sprinkler in which all or part of the body, including the shank thread, is mounted about the lower plane of the ceiling.

3.3.30.XX. Sidewall Sprinkler. A sprinkler having special deflectors that are designed to discharge most of the water away from the nearby wall in a pattern resembling one-quarter of a sphere, with a small portion of the discharge directed at the wall behind the sprinkler.

3.3.30.XX. Institutional Sprinkler. A sprinkler specially designed for resistance to load-bearing purposes and with components not readily converted for use as weapons.

3.3.30.XX. Intermediate Level Sprinkler/Rack Storage Sprinkler. A sprinkler equipped with integral shields to protect its operating elements from the discharge of sprinklers installed at higher elevations.

3.3.30.XX. Pilot Line Detector. A standard spray sprinkler or thermostatic fixed-temperature release device used as a detector to pneumatically or hydraulically release the main valve, controlling the flow of water into a fire protection system.

Substantiation: NFPA 25 has a number of sprinkler definitions. These should be added so that the list is complete.

This is not original material; its reference/source is as follows:

The definitions are extracted from NFPA 13, 2010

25- Log #37 Final Action:

(3.3.30.x Installation Orientation (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell

Recommendation: Add text and new definitions and renumber existing definitions in Chapter 3 as follows:

(new) 3.3.30.1 Installation Orientation. The following sprinklers are defined according to orientation.

(new) 3.3.30.1.1 *Concealed Sprinkler.* A recessed sprinkler with cover plate.

(new) 3. 3.30.1.2 *Flush Sprinkler.* A sprinkler in which all or part of the body, including the shank thread, is mounted above the lower plane of the ceiling.

(existing 3.3.30.10) 3. 3.30.1.3 *Pendent Sprinkler.* A sprinkler designed to be installed in such a way that the water stream is directed downward against the deflector.

(existing 3.3.30.14) 3. 3.30.1.4 *Recessed Sprinkler.* A sprinkler in which all or part of the body, other than the shank thread, is mounted within a recessed housing.

(new) 3. 3.30.1.5 *Sidewall Sprinkler.* A sprinkler having special deflectors that are designed to discharge most of the water away from the nearby wall in a pattern resembling one quarter of a sphere, with a small portion of the discharge directed at the wall behind the sprinkler.

(existing 3.3.30.19) 3. 3.30.1.6 *Upright Sprinkler.* A sprinkler designed to be installed in such a way that the water spray is directed upwards against the deflector.

Renumber the rest of section 3.3.30 accordingly.

Substantiation: These definitions are needed to understand the requirement to inspect for proper orientation in the Chapter 5. This entire section is extracted from NFPA 13 2010 section 3.6.2. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #14 Final Action:
(3.3.30.1 Automatic Sprinkler, 3.3.30.8 Open Sprinkler, and A.3.3.30.x (New))

Submitter: Milosh T. Puchovsky, Worcester Polytechnic Institute
Recommendation: Add text to read as follows:

3.3.30.1 Automatic Sprinkler. A sprinkler that operates automatically when its heat-activated element is heated to its thermal rating or above.

3.3.30.XX*Sprinkler. A listed fire protection device through which water or water combined with an additive is discharged in the form of droplets of varying sizes in a predetermined pattern so as to cover and reach a specified floor area with the intent of suppressing or controlling a fire located below, and which is evaluated for such performance through standardized test methods. Water droplets discharged are of sufficient size to penetrate the fire plume, cool the combustion zone, pre-wet adjacent combustibles and surfaces, and reduce ceiling temperatures.

A.3.3.30.XX Water droplets produced by a sprinkler typically range in size from 200 microns to 1800 microns. See "Measurement of Droplet Size in Sprinkler Sprays" by J.R. Lawson, W.D. Walton, and D.D. Evans, NIST, February 1988 (NBSIR 88-3715). While sprinkler devices are designed and manufactured to discharge a certain amount of water in a certain pattern over a predetermined floor area, individual design and installation standards address the use of sprinklers in specific fire protection systems for specific applications. For example, NFPA 15, *Standard on Water Spray Systems,* permits the use of sprinklers as a means of exposure protection of vertical surfaces such as those on transformers and storage tanks.

~~3.3.30.8 *Open Sprinkler:* A sprinkler that does not have actuatorsor heat-responsive elements. [13, 2010]~~
3.3.30.8 Open Sprinkler. A sprinkler that does not have a cap or heat-activated element to control water discharge.

Substantiation: NFPA 13 does not include a definition for the term sprinkler. The proposed language describes how a sprinkler is intended to perform and function, and aims to more clearly differentiate a sprinkler from other types of devices that can be used as part of a water-based fire protection system.

The proposed language in this comment was created by an intercommittee task group consisting of members of the RSS, SSI and NFPA 25 TC's. This task group was created at the request of the TCC. While the majority of the task group members agreed with the proposed language, there was a minority position that preferred not to include annex text in regard to NFPA 15.

25- Log #109 Final Action:
(3.3.31.5 Semiautomatic Dry Standpipe System (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:

3.3.31.5 Semiautomatic Dry Standpipe System. A standpipe system permanently attached to a water supply that is capable of supplying the system demand at all times arranged through the use of a device such as a deluge valve and that requires activation of a remote control device to provide water at hose connections.

Substantiation: Testing of semi-automatic standpipe systems are referred to in 6.2.3.3. A definition should be included in the standard.
This is not original material; its reference/source is as follows:
NFPA 14, 2010 - 3.3.12.6

25- Log #111 Final Action:
(3.3.34.1 Supervisory Alarm Device (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.3.34.1 Supervisory Alarm Device. A device that is arranged to supervise the operative status of water-based suppression systems and is connected to an alarm system to electrically initiate a trouble or alarm condition.

Substantiation: Supervisory alarm devices are referred to in 5.2.5. A definition should be included in the standard.

25- Log #147 Final Action:
(3.3.35.1 Performance-Based Testing (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.3.35.1 Performance-Based Testing. Testing methods and frequencies that have been demonstrated to deliver equivalent or superior levels of performance through quantitative performance-based analysis.
Substantiation: The standard allows an alternative for compliance using performance-based testing but does not have a definition for the term.
This is not original material; its reference/source is as follows:
NFPA 25, 2011 - A.4.6

25- Log #115 Final Action:
(3.5.6 Pressure Relief Valve (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.5.6 Pressure Relief Valve. A device that allows the diversion of liquid to limit excess pressure in a system.

Substantiation: Relief valves are referred to in 13.5; 13.5.7.2; 13.5.7.2.1; and 13.5.7.2.2. A definition should be included in the standard.
This is not original material; its reference/source is as follows:
NFPA 20, 2010 - 3.3.55.5

25- Log #116 Final Action:
(3.5.6.1 Circulation Relief Valve (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.5.6.1. Circulation Relief Valve. A valve used to cool a pump by discharging a small quantity of water, this valve is separate and independent of the main relief valve.

Substantiation: Circulation relief valves are referred to in 13.5.7.1 and 13.5.7.1.2. A definition should be included in the standard.
This is not original material; its reference/source is as follows:
NFPA 20, 2010 - 3.3.55.5.1

25- Log #70 Final Action:
(3.6 Water Mist System (New))

Submitter: Zachary L. Magnone, Tyco Fire Protection Products
Recommendation: Add new definitions in Chapter 3 and Annex material as follows:

3.6. XX Water Mist System. A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and the applicable standard. [750, 2010]

3.6.XX.1 Deluge Water Mist System. A water mist system using open nozzles attached to a piping system that is connected to a water supply through a valve that is opened by means of a detection system installed in the same area as the mist nozzles. When the valve opens, water flows into the piping system and discharges through all nozzles attached to the system. [750, 2010]

3.6.XX.2 Dry Pipe Water Mist System. A water mist system using automatic nozzles attached to a piping system containing air, nitrogen, or inert gas under pressure, the release of which (as from an opening of an automatic nozzle) allows the water pressure to open a dry pipe valve. The water then flows into the piping system and out through any open nozzles. [750, 2010]

3.6.XX.3 Local-Application Water Mist System. A water mist system arranged to discharge directly on an object or hazard in an enclosed, unenclosed, or open outdoor condition. [750, 2010]

3.6.XX.4 Preaction Water Mist System. A water mist system using automatic nozzles attached to a piping system that contains air that might or might not be under pressure, with a supplemental detection system installed in the same areas as the mist nozzles. The actuation of the detection system opens a valve that allows water to flow into the piping system and discharges through all opened nozzles in the system. [750, 2010]

3.6.XX.5 Wet Pipe Water Mist System. A water mist system using automatic nozzles attached to a piping system containing water and connected to a water supply so that water discharges immediately from nozzles operated by the heat from a fire. [750, 2010]

Substantiation: These definitions are needed to differentiate water mist systems from other types of water based fire suppression systems which are subject to the inspection, testing, and maintenance procedures outlined in this standard. It is necessary to include these definitions as water mist systems are utilized in lieu of traditional water spray and sprinkler systems in common applications. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
The text contained in this proposal has been extracted nearly verbatim fromt he 2010 edition of NFPA 750, Standard on Water Mist Fire Protection Systems.

25- Log #120 Final Action:
(3.6.x Water Mist System (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:

3.6.X. Water Mist System. A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and this standard.

Renumber 3.6.5 Water Spray System and 3.6.6 Water Tank
Substantiation: Chapter 12 of NFPA 25 covers water mist systems and the standard should contain a definition.
This is not original material; its reference/source is as follows:
NFPA 750, 2010 - 3.3.22

25- Log #117 Final Action:
(3.6.4.x Marine System (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.6.4.X. Marine System. A sprinkler system installed on a ship, boat, or other floating structure that takes its supply from the water on which the vessel floats.

Substantiation: NFPA 13 mandates in Chapter 25 that Marine Systems are maintained in accordance with NFPA 25 and NFPA 25 5.4.4 has requirements for certain maintenance of Marine Systems. The standard should have a definition for this type of system.
This is not original material; its reference/source is as follows:
NFPA 13, 2010 - 25.1.3(8)

25- Log #263 Final Action:
(3.6.4 Sprinkler System)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise the definition of a Sprinkler System to extract the definition from NFPA 13.
Substantiation: As of the date for submittal of proposals, the definition of Sprinkler System has not finished the revision process in NFPA 13. However this definition ends up, the definition should be extracted into NFPA 25.

25- Log #19 Final Action:
(3.6.4.1.1 Premixed Antifreeze Solution)

Submitter: Milosh T. Puchovsky, Worcester Polytechnic Institute
Recommendation: Revise text to read as follows:
3.6.4.1.1 Premixed Antifreeze Solution. A mixture of an antifreeze material with water that is prepared and factory-mixed by the manufacturer ~~at afactory~~ with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous and that the concentration is as specified.

Substantiation: The definitions for Premixed Anti freeze Solution put forth in the TIA's for NFPA13,13D and 25 all varied slightly. The proposed language has been provided to create a single definition for pre-mixed Antifreeze Solution in NFPA 13, 13D and 25.
This proposed language was created by an intercommittee task group consisting of members of the RSS, SSI and NFPA 25 TC's. This task group was created at the request of the TCC.

25- Log #22 Final Action:
(3.6.4.1.1 Premixed Antifreeze Solution (New), 5.3.4, and A.5.3.4)

Note: This Proposal originates from Tentative Interim Amendment 25-11-1 (TIA 1014) issued by the Standards Council on March 1, 2011.

Submitter: Russell P. Fleming, National Fire Sprinkler Association, Inc.

Recommendation: *1. Add a new definition as 3.6.4.1.1 to read as follows:*

3.6.4.1.1 Premixed Antifreeze Solution. A mixture of an antifreeze material with water that is prepared by the manufacturer at a factory with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous.

2. Revise 5.3.4 to read as follows:

5.3.4* Antifreeze Systems. ~~The freezing point of solutions in antifreeze shall be tested annually by measuring the specific gravity with a hydrometer or refractometer and adjusting the solutions if necessary.~~ Annually, before the onset of freezing weather, the antifreeze solution shall be tested using the following procedure:

(1) Using installation records, maintenance records, information from the owner, chemical tests, or other reliable sources of information, the type of antifreeze in the system shall be determined.

a) If the type of antifreeze is found to be a type that is no longer permitted, the system shall be drained completely and replaced with an acceptable solution.

b) If the type of antifreeze cannot be reliably determined, then the system shall be drained completely and replaced with an acceptable solution.

(2) If the antifreeze is not replaced in accordance with step 1, test samples shall be taken at the top of each system and at the bottom of each system.

a) If the most remote portion of the system is not near the top or the bottom of the system, an additional sample shall be taken at the most remote portion.

b) If the connection to the water supply piping is not near the top or the bottom of the system, an additional sample shall be taken at the connection to the water supply.

(3) The specific gravity of each solution shall be checked using a hydrometer with a suitable scale or a refractometer having a scale calibrated for the antifreeze solution.

(4) If any of the samples exhibits a concentration in excess of what is permitted by NFPA 25, the system shall be emptied and refilled with a new acceptable solution. If a concentration greater than what is currently permitted by NFPA 25 was necessary to keep the fluid from freezing, alternate methods of preventing the pipe from freezing shall be employed.

(5) If any of the samples exhibits a concentration lower than what is necessary to keep the fluid from freezing, the system shall be emptied and refilled with a new acceptable solution.

~~5.3.4.1* Solutions shall be in accordance with Table 5.3.4.1(a) and Table 5.3.4.1(b)~~

5.3.4~~.2~~.1 The use of antifreeze solutions shall be in conformity with state and local health regulations.

5.3.4.1.1* Listed CPVC sprinkler pipe and fittings shall be protected from freezing with glycerin only. The use of diethylene, ethylene, or propylene glycols shall be specifically prohibited.

~~5.3.4.1.2 The concentration of antifreeze solution shall be limited to the minimum necessary for the anticipated minimum temperature.~~

5.3.4.2* Antifreeze solutions shall comply with one of the following:

(1) The concentration of a glycerin solution measured in an existing system shall be limited to 50% by volume.

(2) Newly introduced solutions shall be factory premixed antifreeze solutions of glycerin (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 48% by volume.

(3) The concentration of a propylene glycol solution measured in an existing system shall be limited to 40% by volume.

(4) Newly introduced solutions shall be factory premixed antifreeze solutions of propylene glycol (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 38% by volume.

(5) Other solutions listed specifically for use in fire protection systems.

5.3.4.3 The antifreeze solution shall be tested at its most remote portion and where it interfaces with the wet pipe system.

5.3.4.~~3.1~~4 Where antifreeze systems have a capacity larger than 150 gal (568 L), tests at one additional point for every 100 gal (379 L) shall be made.

5.3.4.~~3.2.~~4.1 If the ~~test~~ results indicate an incorrect freeze point at any point in the system, the system shall be drained~~, the solution adjusted,~~ and ~~the systems~~ refilled with new premixed antifreeze.

5.3.4.~~3.3.~~4.2 For premixed solutions, the manufacturer's instructions shall be permitted to be used with regard to the

number of test points and refill procedure.

4. Remove Table 5.3.4.1(a) and 5.3.4.1(b) and add Table 5.3.4.1 as follows:

****INSERT TABLE 5.3.4.1 HERE****

5. Revise A.5.3.4 to read as follows:

A.5.3.4 ~~Many refractometers are calibrated for a single type of antifreeze solution and will not provide accurate readings for the other types of solutions.~~ Sampling from the top and bottom of the system helps to determine if the solution has settled. Antifreeze solutions are heavier than water. If the antifreeze compound is separating from the water due to poor mixing, it will exhibit a higher concentration in the lower portion of the system than in the upper portion of the system. If the concentration is acceptable near the top, but too low near the water connection, it may mean that the system is becoming diluted near the water supply. If the concentration is either too high or too low in both the samples, it may mean that the wrong concentration was added to the system.

Two or three times during the freezing season, test samples can be drawn from test valve B as shown in Figure 7.6.2.1(1) of NFPA 13, especially if the water portion of the system has been drained for maintenance or repairs. A small hydrometer can be used so that a small sample is sufficient. Where water appears at valve B, or where the sample indicates that the solution has become weakened, the entire system should be emptied and refilled with acceptable solution as previously described.

See Figure A.5.3.4 for expected minimum air temperatures in 48 of the United States and parts of Canada where the lowest one-day mean temperature can be used as one method of determining the minimum reasonable air temperature. In situations where the piping containing the antifreeze solution is protected in some way from exposure to the outside air, higher minimum temperatures can be anticipated.

Where systems are drained in order to be refilled, it is not typically necessary to drain drops. Most systems with drops have insufficient volume to cause a problem, even if slightly higher concentration solutions collect in the drops. For drops in excess of 36 in., consideration should be given to draining drops if there is evidence that unacceptably high concentrations of antifreeze have collected in these long drops.

When emptying and refilling antifreeze solutions, every attempt should be made to recycle the old solution with the antifreeze manufacturer rather than discarding it.

****INSERT FIGURE A.5.3.4 HERE****

~~*A.5.3.4.1 See Figure A.5.3.4.1.*~~ (*Renumber Figure to A.5.3.4).*

6. Add a new A.5.3.4.2 to read as follows:

A.5.3.4.2 The use of factory premixed solutions is required because solutions that are not mixed properly have a possibility of separating from the water, allowing the pure concentrate (which is heavier than water) to drop out of solution and collect in drops or low points of the system. Such concentrations are combustible and could present problems during fires. The properties of glycerin are shown in Table A.5.3.4.2.

****INSERT TABLE A.5.3.4.2 HERE****

Substantiation: Recent fire experience and subsequent fire testing have found that certain antifreeze solutions can contribute to the heat release rate of a fire under certain conditions. As such, the use of antifreeze systems needs to be dramatically limited. The following is a summary of the changes proposed and background material for these changes:

1. Ethylene glycol and diethylene glycol have been eliminated because they are poisons and because we know them to be combustible liquids. Research has not been performed to determine the extent that they may or may not contribute to the heat release rate of a fire. In the absence of such data, and knowing that such a small percentage of sprinkler systems utilize these solutions, they have been banned until such time as more research can be performed to

quantify their experience. This is not considered to create a problem because a substitute solution (glycerin) is available.

2. Glycerin solutions up to 50% (by volume) and propylene glycol up to 40% (by volume) are permitted because the extensive testing performed by both UL and the FPRF showed that solutions up to these concentrations had the same effect as pure water on some very severe fire challenges. We are aware that 55% glycerin did not do as well in some fire scenarios; however, we believe that the safety factor is sufficient when only premixed solutions are permitted. The manufacturers of glycerin assure us that they can hold the quality of the solutions to ± 1%, which should be sufficient for the use we are proposing.

3. The language maintains the allowance for freezer storage systems installed with ESFR sprinklers that have been specifically tested and listed. This allowance has been maintained because such systems are supported by multiple full scale fire tests.

4. Previously approved existing solutions are permitted to stay in service where they only serve unoccupied areas. This is a necessary inclusion in the TIA because these systems were originally designed at a time when these solutions were permitted and the system will freeze (causing damage) if these solutions are drained and replaced with lower concentration solutions. These systems are only allowed to remain in service if they only discharge into unoccupied areas. Life safety will not be compromised by this position.

5. The language was expanded to include other listed antifreeze products that may be developed in the future. We are aware of at least one project underway to get a non-combustible antifreeze recognized and there are some other products that have potential. A listing process would allow these products to come to the market without having to process another TIA.

6. The Table on specific gravity of antifreeze solutions has been modified to eliminate solutions that are no longer permitted. Lower percentage solutions are permitted by NFPA 13, but the specific gravity is not known at this time.

7. The use of premixed solutions is required because solutions that are not mixed properly have a possibility of separating from the water, which allows the pure concentrate (which is heavier than water) to drop out of solution and collect in drops or low points of the system. Such concentrations are combustible and could present problems during fires.

8. The annex text has been revised to reflect the state-of-the-art with respect to testing that has been performed and the requirements of this TIA.

9. Guidance has been provided in an annex note for dealing with drops. Small drops might end up with slightly higher concentrations of antifreeze solutions, but the volumes involved are not likely to cause the problems seen in the field with larger volume solutions. It is impractical to believe that all of the small drops in a system can be completely drained each time the system is drained. Where larger volume drops might have higher concentrations of solutions, consideration needs to be given to draining these larger drops.

10. Language was added to the annex of NFPA 13 to warn users about using appropriate orifice sprinklers and appropriate pressure water supplies when antifreeze solutions of 40% propylene glycol and 50% glycerin are used. The limit of k-4.7 sprinklers or larger and a pressure of 70 psi or less are defensible from the FPRF research (known as the Phase 2 tests). The 45% propylene glycol and the 55% glycerin solutions did not significantly add to the heat release rate of the fires when k-4.7 sprinklers are used below 70 psi (approximately 40 gpm). So, if we limit the solutions to 40% propylene glycol and 50% glycerin, this should be a significant enough safety factor.

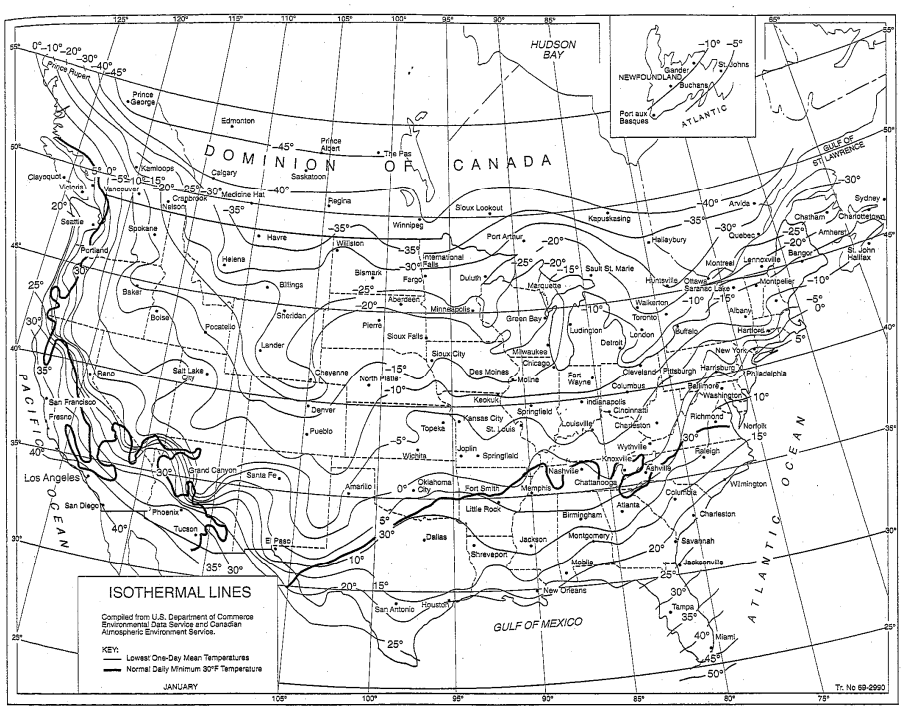
Emergency Nature:

1. The proposed TIA intends to correct a previously unknown existing hazard.

2. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation.

Table 5.3.4.1- Properties of Glycerin and Propylene Glycol

Material	Solution (% by volume)	Specific Gravity at 77ºF (25ºC)	Freezing Point	
			ºF	ºC
Glycerin (C.P. or U.S.P. grade)	0	1.000	32	0
	5	1.014	31	-0.5
	10	1.029	28	-2.2
	15	1.043	25	-3.9
	20	1.059	20	-6.7
	25	1.071	16	-8.9
	30	1.087	10	-12
	35	1.100	4	-15.5
	40	1.114	-2	-19
	45	1.130	-11	-24
	50	1.141	-19	-28
Propylene glycol	0	1.000	32	0
	5	1.004	26	-3
	10	1.008	25	-4
	15	1.012	22	-6
	20	1.016	19	-7
	25	1.020	15	-10
	30	1.024	11	-12
	35	1.028	2	-17
	40	1.032	-6	-21



Source: Compiled from United States Weather Bureau records.
For SI units, °C = ⅝ (°F −32); 1 mi = 1.609 km.

Figure A.5.3.4

Table A.5.3.4.2 Properties of Glycerin and Propylene Glycol

Material	Solution (% by volume)	Specific Gravity at 60ºF (15.6ºC)	Freezing Point	
			ºF	ºC
Glycerin (C.P. or U.S.P. grade)	50 water	1.145	-20.9	-29.4
Hydrometer scale 1.000 to 1.200				
Propylene glycol	60 water	1.034	-6	-21.1
Hydrometer scale 1.000 to 1.200 (subdivisions 0.002)				

C.P.: chemically pure; U.S.P.: United States Pharmacopoeia 96.5%.

25- Log #118 Final Action:
(3.6.5 Water Mist System (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.6.5 Water Mist System. A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and this standard.
Renumber 3.6.5 Water Spray System and 3.6.6 Water Tank

Substantiation: Chapter 12 of NFPA 25 covers water mist systems and the standard should contain a definition.
This is not original material; its reference/source is as follows:
NFPA 750, 2010 - 3.3.22

25- Log #119 Final Action:
(3.6.5.1 Ultra High-Speed Water Spray System (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
3.6.5.1 Ultra High-Speed Water Spray System. A type of automatic water spray system where water spray is rapidly applied to protect specific hazards where deflagrations are anticipated.

Substantiation: Ultra high-speed water spray systems are covered in 10.4. A definition of the system should be in the standard.
This is not original material; its reference/source is as follows:
NFPA 15, 2007 - 3.3.17

25- Log #331 Final Action:
(3.6.7 (New))

Submitter: Scott J. Harrison, Marioff Inc.
Recommendation: Add text to read as follows:
3.6.7 Water Mist System. A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and this standard.
Substantiation: Definitions for all types of Water Based Fire Protection Systems are provided under section 3.6 except Water Mist Systems. Since Water Mist Systems are referenced in the body and annex of this standard (Paragraph 2.4 and Annex G.1.1) as well as having an entire chapter devoted to the technology (Chapter 12) it would be appropriate to provide a formal definition of this fire protection system in the list of system types.
This is not original material; its reference/source is as follows:
Copyright: NFPA 750, Standard on Water Mist Protection Systems (2010 edition)

25- Log #154 Final Action:
(4.1.x, through 4.1.x.4, and A.4.1.x, A.4.1.x.2, and A.4.x.4 (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows;
4.1 .X* Hydraulic Design Information Sign.
Add the following section:
4.1.X.1 A permanently marked metal or rigid hydraulic information sign shall be placed at the alarm valve. dry pipe valve. preaction valve, or deluge valve supplying the corresponding hydraulically designed area.
4.1.X.2* The sign shall include the following information:
(1) Location of the design area or areas
(2) Discharge densities over the design area or areas
(3) Required flow and residual pressure demand at the base of riser
(4) Occupancy classification or commodity classification and maximum permitted storage height and configuration
(5) Hose stream allowance included in addition to the sprinkler demand
(6) The name of the installing contractor or person providing the information
A.4.1.X.2 Insert sample sign
A.4.1 .X The information needed to provide the appropriate sign can be found with the original system installation and acceptance testing documentation. If these records are not available. the owner should contract with a qualified engineer, consultant. or contractor to evaluate the hydraulic design of the system for the purposes of providing the information required by the sign. Where the evaluation shows that the design utilized the pipe schedule design approach, a further analysis beyond that needed to provide the information for the sign is not required.
4.1.X.3 Where system design approach utilizes the pipe schedule method a permanently marked metal or rigid information sign shall be placed at the alarm valve. dry pipe valve, or preaction valve supplying the pipe scheduled area
4.1.X.4* The sign shall include the following information:
(1) Location of the pipe scheduled design area
(2) The occupancy classification
(3) The name of the installing contractor or person providing the information
A.1.X.4 Insert sample sign
Substantiation: The standard currently does not address the issue of missing system design information. While this is not a part of the inspection, testing, and maintenance requirements specified by the standard, the information is critical for good fire protection and the owner should be required to provide the information. This is consistent with adding the system information sign that was previously adopted by the committee.

25- Log #149 Final Action:
(4.1.1.1, 4.1.1.1.1, and A.4.1.1.1.1)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Make the following editorial changes:
A.4.1.1.1.~~1~~
4.1.1.1~~*~~ Buildings.
4.1.1.1.1~~*~~ (delete the asterisk)
Substantiation: This is editorial. The annex material for 4.1.1.1 is incorrectly shown in the annex as A.4.1.1.1.1.

25- Log #95 Final Action:
(4.1.1.1, 4.1.2.1, and 4.1.2.2 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change title and number of this section and add new text as shown:
Renumber 4.1.2 and subsequent sections.
~~4.1.1.1 Buildings.~~ 4.1.2 Freeze Protection. The ~~building~~ property owner or designated representative shall ensure that all ~~areas of the building containing~~ water-filled piping ~~shall be~~ is maintained at a minimum temperature of 40°F (4.4°C) and not exposed to freezing conditions.
4.1.2.1 All areas of the building containing water-filled piping without other means of freeze protection shall be maintained at a minimum temperature of 40°F (4.4°C).
4.1.2.2 All other means of freeze protection including valve enclosures, heat tracing, insulation, and antifreeze solutions shall be inspected, tested, and maintained in accordance with this standard.

Substantiation: The current section title doesn't accurately describe that freeze protection is being addressed. It needs to be clear that the property owner is responsible to maintain proper heat in buildings with water-filled pipes as well as properly maintain other means of freeze protection. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #99 Final Action:
(4.1.1.1.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the number to 4.1.1.1 and revise the text as shown.
4.1.1.1~~.1~~* Inspection, testing, maintenance, and impairment procedures shall be implemented ~~in accordance with procedures meeting those~~ as established in this document and in accordance with the manufacturer's instructions.
Substantiation: This section was numbered wrong in the current document. The new number shown assumes current 4.1.1.1 will be renumbered per another proposal on this section. The word "procedures" needed to be added and other changes made to make the sentence understandable. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #148 Final Action:
(4.1.1.1.1)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise text to read as follows:
4.1.1.1.1* Inspection, testing, maintenance, and impairment procedures shall be implemented in accordance with ~~procedures meeting~~ those established in this document and in accordance with the manufacturer's instructions.
Substantiation: The current wording is hard to follow and is not grammatically correct. For example, "emergency" impairments are not implemented-it is the procedures for dealing with impairments that are implemented.

25- Log #34 Final Action:
(4.1.1.1.2, 4.1.4.1, and A.4.1.4.1.1 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new text to read as follows:
4.1.4.1.1* Impairments shall be corrected or repaired immediately.
A.4.1.4.1.1 The process of correcting or repairing an impairment should begin as soon as the impairment is discovered. If the necessary parts are on hand the correction or repair can be accomplished in a matter of a few hours. However, in many cases it make take several days to order repair parts, have them shipped, and schedule manpower to make the repair.
4.1.1.1.2 When an emergency impairment is discovered procedures as described in Section 15.6 of this standard shall be implemented until the correction or repair is complete including the "Required Action" described in the Summary of Component Replacement Action Requirements table in the applicable chapter.
Substantiation: The current language does not put any pressure on the property owner or the designated representative to have an impairment corrected with any sense of urgency. An impairment needs to be addressed immediately with the understanding that in many cases repair parts may need to be ordered and labor scheduled to make the repair. No matter how long it takes to make the correction of repair, emergency impairment procedures should be implemented right away. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #73 Final Action:
(4.1.1.2)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Add the term qualified to existing paragraph.
Inspection, testing, and maintenance shall be performed by qualified personnel who have developed competence through training and experience.
Substantiation: Personnel who perform inspection, testing, and maintenance not only should have developed competence through experience and training, but should meet the definition of qualified by the authority having jurisdiction.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #150 Final Action:
(4.1.1.2)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise text to read as follows:
4.1.1.2 Inspection, testing, and maintenance shall be performed by qualified personnel. ~~who have developed competence through training and experience.~~
Substantiation: The standard has a definition for qualified and using the term "qualified" is consistent with the style of the standard.

25- Log #96 Final Action:
(4.1.1.2.1 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add the following new text:
4.1.1.2.1 At the conclusion of inspection and/or testing activities the property owner or authorized representative shall be advised of any deficiencies found.
Substantiation: It is important that at the conclusion of performing inspections or tests that the proper person be notified right away of any deficiencies found, including non-critical ones, critical ones, and impairments. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #151 Final Action:
(4.1.1.3)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:
4.1.1.3* Where the property owner or designated representative is not the occupant, the property owner or designated representative shall be permitted to delegate the authority for inspecting, testing, ~~maintenance~~ maintaining, and managing impairments of the fire protection system to a designated representative.
Substantiation: The current use of the term "impairment" is not grammatically correct for the intent and is confusing. The proposed wording is clear regarding the intent.

25- Log #315 Final Action:
(4.1.1.3 (New))

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Add new text to read as follows:
4.1.1.3 State or local licensure regulations shall be followed to determine qualified personnel. Depending on state or local licensure regulations, qualified personnel shall include, but not be limited to, one or more of the following:
(1) Personnel who are registered, licensed, or certified by a state or local authority
(2) Personnel who are certified by a nationally recognized certification organization acceptable to the authority having jurisdiction
(3) Personnel who are factory trained and certified for water-based fire suppression systems of the specific type and brand of system and who are acceptable to the authority having jurisdiction
Substantiation: There is no present requirement within NFPA 25 for the qualified person or persons to demonstrate their competence through certification or license.
Renumber following paragraphs as required.
This is not original material; its reference/source is as follows:
NFPA 72.

25- Log #152 Final Action:
(4.1.1.4)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:
4.1.1.4 Where a designated representative has received the authority for ~~inspection~~ inspecting. testing, ~~maintenance~~ maintaining. and managing impairments, the designated representative shall comply with the requirements identified for the property owner or designated representative throughout this standard.
Substantiation: The proposed language is grammatically correct, correlates with the language of 4.1.1.3, and more clearly communicates the intent of the section.

25- Log #10 Final Action:
(4.1.3)

Submitter: James Everitt, Western Regional Fire Code Development Committee
Recommendation: Modify, Re-title and Renumber Section 4.1.3
Add new Section 4.1.4 and renumber subsequent Sections
4.1.3.1 Notification The property owner or designated representative shall notify the authority having jurisdiction, the fire department, if required, and the alarm receiving facility before testing or shutting down a system or its supply.
4.1.3.2 The notification of system shutdown shall include the purpose for the shutdown, the system or component involved, and the estimated time of shutdown.
4.1.3.3 The authority having jurisdiction, the fire department, and the alarm-receiving facility shall be notified when the system, supply, or component is returned to service.
4.1.4 Hazard Mitigation Measures. Where a fire protection system is out of service for more than 4 hours in a 24-hour period, the property owner or designated representative shall arrange for one of the following:
(a) Evacuation of the building or portion of the building affected by the system out of service
(b) An approved fire watch
(c) Establishment of a temporary water supply
(d) Establishment and implementation of an approved program to eliminate potential ignition sources and limit the amount of fuel available to the fire.
Substantiation: Language more in line with requirements in NFPA 1 Fire Code.

25- Log #316 Final Action:
(4.1.3)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:
4.1.3 Notification of System Shutdown. The property owner or designated representative shall notify the authority having jurisdiction, the fire department, if required, and the supervising station, communications center or emergency response agency ~~alarm-receiving facility~~ before testing or shutting down a system or its supply.
Substantiation: “Alarm receiving facility” is not defined within NFPA 72® or NFPA 1221. “Supervising Station, Communications Center and Emergency Response Agency" are.

25- Log #129 Final Action:
(4.1.3.2)

Submitter: Kevin Turay, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: Add a new requirement to 4.1.3 and renumber subsequent section(s) as follows:
4.1.3.2 The property owner or designated representative shall verify that the fire department and the alarm-receiving facility, if connected, has received a transmission of at least one alarm and one trouble signal at the off premises location upon completion of all Inspection, Testing, and Maintenance services.
Substantiation: This requirement is needed to ensure that transmission of all off premises signals are occurring and that the system is functioning correctly upon completion of all services. Many times the off premises transmission method is bypassed or disconnected during performance of Inspection, Testing, and Maintenance services to avoid false alarm response and upon reconnection the property owner or designated representative needs to ensure that all future transmissions will occur as required. This proposal is being submitted by the Tyco Codes and Standards ITM Task Group.

25- Log #317 Final Action:
(4.1.3.2)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:
4.1.3.2 The authority having jurisdiction, the fire department, and the supervising station, communications center or emergency response agency ~~alarm-receiving facility~~ shall be notified when the system, supply, or component is returned to service.
Substantiation: "Alarm receiving facility" is not defined within NFPA 72® or NFPA 1221. "Supervising Station, Communications Center and Emergency Response Agency" are.

25- Log #297 Final Action:
(4.1.4.1, 4.1.4.2, and A.4.1.4.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
Move the Annex material from A.4.1.4.2 to A.4.1.4.1 with appropriate asterisk reference.
Substantiation: Annex material is more appropriately associated with 4.1.4.1.

25- Log #28 Final Action:
(4.1.4.1.3 and A.4.1.4.1.3 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add the following new wording and annex material to section 4.1.4.1:
4.1.4.1.3* Critical deficiencies shall be corrected or repaired within 30 days.
A.4.1.4.1.3 The process of correcting or repairing a critical deficiency should begin as soon as it is discovered and with a sense of urgency. If the necessary parts are on hand the correction or repair can be accomplished in a matter of a few hours. However, in many cases it make take several days to order repair parts, have them shipped, and schedule manpower to make the repair. There are very few instances when a critical deficiency cannot be corrected or repaired within 30 days. If the correction or repair can't be accomplished within 30 days, the AHJ should be notified and permission obtained for an exception to this requirement.
Substantiation: The current language does not put any pressure on the property owner or the designated representative to have a critical deficiency corrected with any sense of urgency. A critical deficiency needs to be addressed quickly with the understanding that in many cases repair parts may need to be ordered and labor scheduled to make the repair. If the correction or repair can't be done within 30 days the AHJ should be notified and an exception provided. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #29 Final Action:
(4.1.4.1.4 and A.4.1.4.1.4 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add the following new wording and annex material to section 4.1.4.1:
4.1.4.1.4* Non-Critical deficiencies shall be corrected or repaired within 90 days.
A.4.1.4.1.4 Non-critical deficiencies do not have an effect on system performance and therefore correcting or repairing them is allowed to take longer. If the correction or repair can't be accomplished within 90 days, the AHJ should be notified and permission obtained for an exception to this requirement.
Substantiation: Currently there is no time frame stated for getting corrections or repairs performed and many building owners simply ignore them. A non-critical deficiency needs to be addressed but not as quickly or with the same sense of urgency as an impairment or critical deficiency. If the correction or repair can't be done within 90 days the AHJ should be notified and an exception provided. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #318 Final Action:
(4.1.4.3 (New))

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Add new text to read as follows:
4.1.4.3 State or local licensure regulations shall be followed to determine qualified personnel. Depending on state or local licensure regulations, qualified personnel shall include, but not be limited to, one or more of the following:
(1) Personnel who are registered, licensed, or certified by a state or local authority
(2) Personnel who are certified by a nationally recognized certification organization acceptable to the authority having jurisdiction
(3) Personnel who are factory trained and certified for water-based fire suppression systems of the specific type and brand of system and who are acceptable to the authority having jurisdiction
Substantiation: There is no present requirement within NFPA 25 for the qualified person or persons to demonstrate their competence through certification or license.
Renumber following paragraphs as required.
This is not original material; its reference/source is as follows:
NFPA 72®.

25- Log #30 Final Action:
(4.1.4.3 and A.4.1.4.3 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new text to section 4.1.4 and a new annex note as follows:
4.1.4.3 Refer to the "Summary of Component Replacement Action Requirements" tables in chapters 5 through 13 for the actions that shall be performed whenever a component in a water based fire protection system is adjusted, repaired, reconditioned or replaced.
A.4.1.4.3 These tables describe specific actions in the form of an inspection or test or cross-reference to another NFPA standard that needs to be performed when a component is adjusted, repaired, reconditioned or replaced. These additional actions are required to provide a reasonable level of assurance that the component will function as intended during a fire event.
Substantiation: Even though each of these tables in chapters 5 through 13 have specific charging paragraphs that should prompt the required actions to be performed, the owner may not be aware of such requirements, especially if they don't read past chapter 4. By putting the proposed new language in Chapter 4, the owner is made well aware of these specific follow-up requirements. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #319 Final Action:
(4.1.5)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:
4.1.5* Changes in Occupancy, Use, Process, or Materials. ~~The property owner or designated representative shall not make changes in the occupancy, the use or process, or the materials used or stored in the building without evaluation of the fire protection systems for their capability to protect the new occupancy, use, or materials.~~ Where changes in the occupancy, hazard, water supply, storage commodity, storage arrangement, building modification, or other condition that affects the installation criteria of the system are identified, the property owner or designated representative shall promptly take steps to evaluate the adequacy of the installed system in order to protect the new occupancy, use, material, building or hazard in question.
Substantiation: Section 4.1.6.1 of this Standard appears to state to same requirements, yet using different language to get to the same point. The same language should be used in both sections.
This is not original material; its reference/source is as follows:
NFPA 25.

25- Log #254 Final Action:
(4.1.5 and 4.1.6)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Delete Sections 4.1.5 and 4.1.6 completely...
Substantiation: In its letter denying an appeal of a previous effort to delete these two sections from NFPA 25, the Standards Council recommended that the NFPA Technical Committee decide for itself, whether the document scope should be revised to include or exclude sections 4.1.5 (Changes in Occupancy, Use Process or Materials) and 4.1.6 (Addressing Changes in Hazard). The appeal was submitted because of a concern that the existing inspection, testing and maintenance requirements of the document do not ensure that a system that's inspected, tested and maintained in accordance with NFPA 25 will actually perform as designed (i.e,. to control and/or extinguish a fire). Therefore, there would appear to be no need for this document to even address changes that may affect the design, especially when this is already addressed by local fire codes. As such, I have resubmitted this proposal to facilitate a discussion on the rightful scope of NFPA 25, and whether it should go further to address design and installation issues, or conversely, whether all such references to design and installation issues should be deleted. Note: deleting design and installation doesn't prohibit creating a new, companion document on this topic.

25- Log #255 Final Action:
(4.1.5.1 and A.4.1.5.1)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Revise 4.1.5.1 as follows:
4.1.5.1* The owner or designated representative shall be permitted to include the evaluation required by 4.1.5 ~~shall not be considered~~ as part of the normal inspection, testing and maintenance of a water based fire protection system.
A.4.1.5.1 The evaluation required by 4.1.5 is not typically a ~~shall not be considered~~ part of the normal inspection, testing, and maintenance required by this standard.
Substantiation: Should Section 4.1.5 remain, then it needs to be revised to address the owner's prerogative of adding the evaluation as part of their ITM. This permission needs to be listed in the body of the standard. But in order to ensure it's clear that such an evaluation is not routinely expected, the previous requirement from 4.1.5.1 has been moved to the annex.

25- Log #153 Final Action:
(4.1.7)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete entire text:
~~4.1.7 Valve Location. The location of shutoff valves shall be identified.~~
Substantiation: This general requirement is unclear as to the intent. 13.3.1 and 13.3.1.1 address signs for control valves. If the intent of 4.1.7 is for the shutoff valves to be identified in a particular way or for a particular function, then this should be specified.

25- Log #11 Final Action:
(4.1.7 and 4.1.8)

Submitter: James Everitt, Western Regional Fire Code Development Committee
Recommendation: Modify Sections 4.1.7 and 4.1.8 as follows:
4.1.7 Valve Location. The location of shutoff valves shall be identified in an approved manner.
4.1.8 Information Sign.
4.1.8.1 A permanently marked metal or rigid plastic information sign shall be placed at the system control riser supplying a sprinkler system, an antifreeze loop, dry system, preaction system, or auxiliary system control valve.
4.1.8.2 Each sign shall be secured with a corrosion-resistant wire, chain, or other approved means and shall indicate at least the following information in an approved manner:
(1) Location of the area served by the system
(2) Location of auxiliary drains and low-point drains for dry pipe and preaction systems
(3) The presence and location of antifreeze or other auxiliary systems
(4) The presence and location(s) of heat tape
Substantiation: It is common for building engineers to create valve and riser signs using in-house methods. Signs can be too small and their information difficult to understand and read. This change is necessary to ensure that fire service personnel can readily process sign information. Sign information should match emergency plans where provided.

25- Log #238 Final Action:
(4.1.7 and A.4.1.7 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a section new 4.1.7 and annex as shown and renumber subsequent sections as necessary.

4.1.7* Water-Based Fire Protection System Evaluation

A.4.1.7 Changes to the water supply or to the building or its use may have transpired since it was originally occupied and the current owner or designated representative may not be aware of the changes. Therefore, it is important to evaluate the capability of the fire protection systems to protect the building and hazards periodically. If the codes and standards enforced when the building was originally built are known, they can be used to perform the evaluation. If they are not know, the evaluation should be performed based on the current codes and standards enforced.

4.1.7.1 An evaluation of all water-based fire protection systems shall be performed every five years to determine the system(s) capability to protect the building and hazards based on the current occupancy, use, and/or materials.

4.1.7.1.1 The evaluation shall be based on the current editions of the applicable codes and standards required by the AHJ.

4.1.7.1.2 The evaluation shall be allowed to be based on the applicable codes and standards required by the AHJ at the time of the original occupancy of the building or the time of the last change in the building, hazards, occupancy, use, and/or materials.

4.1.7.2

Substantiation: Although the Owner's Section on Inspection reports was added to the annex last cycle, most inspection reports already included questions about changes in the building, use, occupancy, etc. Most owners either don't know the correct answer, or don't answer correctly. By requiring an evaluation at least every five years, there is a level of assurance that the fire protection system will actually protect the building. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #320 Final Action:
(4.1.7.1 (New))

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Add new text to read as follows:

4.1.7 Valve Location. The location of shutoff valves shall be identified.

4.1.7.1 The valve locations shall be identified at the system riser.

Substantiation: While the valves should be identified in the field, their locations should also be provided at the riser. Similar to other devices and appliances that may be within a building, they can become hidden or obstructed from view over time.

25- Log #31 Final Action:
(4.1.8, 4.1.8.1, 4.1.8.2, 4.1.8.3 (New) and A.4.1.8 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise entire section 4.1.8 as follows:
4.1.8* General Information Sign.
A.4.1.8 The general information sign is used to determine the system design basis and information relevant to the inspection, testing, and maintenance requirements of this standard, and is required to be installed on new systems by NFPA 13 *Standard for the Installation of Sprinkler Systems.* System control risers, antifreeze loops, and auxiliary system control valves that don't have a General Information Sign should have a new or replacement sign provided.
4.1.8.1 ~~A permanently marked metal or rigid plastic information sign shall be placed at the system control riser supplying an antifreeze loop, dry system, preaction system, or auxiliary system control valve.~~ A general information sign shall be provided at each system control riser, antifreeze loop, and auxiliary system control valve.
4.1.8.2 ~~Each sign shall be secured with a corrosion-resistant wire, chain, or other approved means and shall indicate at least the following information:~~
~~(1) Location of the area served by the system~~
~~(2) Location of auxiliary drains and low-point drains for dry pipe and preaction systems~~
~~(3) The presence and location of antifreeze or other auxiliary systems~~
~~(4) The presence and location(s) of heat tape~~
The sign shall include the following information:
(1) Name and location of the facility protected
(2) Occupancy classification
(3) Commodity classification
(4) Presence of high-piled and/or rack storage
(5) Maximum height of storage planned
(6) Aisle width planned
(7) Encapsulation of pallet loads
(8) Presence of solid shelving
(9) Flow test data
(10) Presence of flammable/combustible liquids
(11) Presence of hazardous materials
(12) Presence of other special storage
(13) Location of auxiliary drains and low point drains on dry pipe and preaction systems
(14) Original results of main drain flow test
(15) Name of installing contractor or designer
(16) Indication of presence
4.1.8.3 The information in 4.1.8.2 shall be provided on a permanently marked weatherproof metal or rigid plastic sign, secured to the riser, antifreeze loop or auxiliary system control valve with corrosion-resistant wire, chain, or other acceptable means.
Substantiation: The way the current text is written, the Information Sign is only required if there's an antifreeze loop, dry or preaction system, or auxiliary control valve. The name should be changed to match NFPA 13 and the sign should be on every system riser as well as at antifreeze loops and at auxiliary system control valves. The revised and new test provided matches the requirements in NFPA 13. If a sign was not provided when the system was installed even if it wasn't required at the time of installation, or if the sign is missing for any reason, a new sign must be provided. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #16 Final Action:
(4.1.8.1 and A.4.1.8.1)

Submitter: Doug Hohbein, Northcentral Regional Fire Code Development Committee
Recommendation: Add a new 4.1.8.1 and renumber the remaining:
4.1.8.1* Where buildings contain more than a single suppression system components shall be identified in a permanent manner that identifies those appurtenances as part of its associated system.
*A 4.1.8.1 The intent of this section is to have clear signage and system identification of all critical system components where there may be confusion caused by multiple systems in one single structure. As an example, a building with multiple risers must uniquely identify each riser and its associated critical components,(i.e. control valves, fire department connections, main drains, inspectors test valves, etc.) to clearly mark it as independent of any other system in the building. This can also be extended to proper signage of associated control valves and appurtenances on the exterior of the building that serves systems within the building.
Revise to read: 4.1.8.2 A permanently marked metal or rigid plastic information sign shall be placed at system risers and antifreeze loops, dry systems, preaction systems, or auxiliary systems control valves to identify that components role in the overall buildings suppression system.
Substantiation: Large buildings with multiple systems are consistently a problem for responding personnel due to lack of signage and maintenance thereof. In buildings with multiple risers and associated appurtenances (i.e. fire department connections), poor and missing signage leads to significant confusion, response delays, additional loss of business continuity and inconsistent inspection, testing and maintenance between the frequently changing testing companies.

25- Log #38 Final Action:
(4.1.9.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 4.1.9.1 as follows:
4.1.9.1 Where an impairment to a water-based fire protection system occurs or is found during inspection, testing or maintenance activities, the procedures outlined in Chapter 15 of this standard shall be followed, including the attachment of a tag to the impaired system.
Substantiation: Most impairments are discovered while performing inspection, testing, and/or maintenance on the system, and the owner or owner's representative needs to know to follow the procedures in Chapter 15 once an impairment is discovered. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #100 Final Action:
(4.1.9.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 4.1.9.2 as shown.
4.1.9.2 Where a water-based fire protection system is returned to service following an impairment, the system shall be verified to be working properly by means of an appropriate inspection or test as described in the table "Summary of Component Replacement Action Requirements" in the applicable chapter of this document.
Substantiation: This change directs the property owner or designated representative to the proper tables for the required action to verifying that an impairment was corrected properly. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #271 Final Action:
(4.1.10)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Insert a new section 4.1.10 as follows:
4.1.10 Additive Injection Systems. The building owner shall be responsible for maintaining any additive injection systems including anti-microbial and corrosion inhibitor fluids.
Substantiation: The maintenance of fluid injection systems is beyond the knowledge and scope of inspectors and testers of fire protection equipment. Such equipment is generally used to deal with water supply issues and the owner will need to research and comply with any specific requirements for keeping this equipment functional.

25- Log #321 Final Action:
(4.3.1.1 (New))

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Add new text to read as follows:
4.3.1* Records shall be made for all inspections, tests, and maintenance of the system and its components and shall be made available to the authority having jurisdiction upon request.
4.3.1.1 Records may be electronic.
Substantiation: A number of inspection programs that are on the market today provide for electronic records. These records are still accessible to AHJ's upon request.

25- Log #234 Final Action:
(4.3.2)

Submitter: Top Myers, Myers Risk Services
Recommendation: Revise text to read as follows:
4.3.2 Records shall indicate:
(1) The procedure/activity performed (e.g., inspection, test, or maintenance)
(2) The organization that performed the ~~work~~ activity
(3) The required frequency of the activity
(4) The results and date of the activity
(5) The name and contact information qualified contractor or owner including lead person for activity.
Substantiation: This language is offered to clarify intent of record keeping by committee. We have seen many situations where various AHJ's or Joint Commission inspectors misunderstands the intent of standard and ask for information that is not required.

25- Log #23 Final Action:
(4.3.4.1 (New))

Submitter: Frank Monikowski, SimplexGrinnell
Recommendation: Add new section and text as follows:
4.3.4.1 If records required by 4.3.4 are not available on site, and there is no hydraulic placard present, a system evaluation must be performed, and a new hydraulic placard provided and hung on the sprinkler riser.
Substantiation: Having a requirement such as 4.3.4 without having a solution serves little purpose. The importance of knowing how the system is designed is extremely important. Even though an inspection does not require evaluating occupancies and systems, this data when observed can be useful to multiple parties. SFPE magazine's Q4, 2010 publication cites ineffective performance of sprinkler systems 18% of the time is attributed to inappropriate design for the occupancy.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
2010 Q4 Edition of SFPE magazine

25- Log #39 Final Action:
(4.3.6 (New))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Add an additional requirement in Chapter 4 as follows:
4.3.6 The property owner or owners representative shall have a current copy of NFPA 25 on site for review by the authority having jurisdiction.
Substantiation: A copy of the current code would allow ready access to the standard for AHJ, the owner or owner's representative for reviewing or clarification. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #291 Final Action:
(4.3.6 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Insert a new section 4.3.6 as follows:
4.3.6 If there are no records indicating any previous inspection, testing or maintenance procedures on a system that is five years old or more, then the inspection, testing, and maintenance requirements for every five years (and more frequent) shall be conducted and the results maintained by the owner to establish a new baseline of information for future procedures.
Substantiation: A standardized policy has to be established for what to do with systems where there has been no maintenance of records. Also, building owners need to be discouraged from “shopping” around their inspection, testing and maintenance by hiring a new contractor every 3 or 4 years and not getting to the more serious, less frequent, procedures.

25- Log #298 Final Action:
(4.5.4)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
4.5.4 During testing ~~and maintenance~~, water supplies, including fire pumps, shall remain in service unless under constant attendance by qualified personnel or unless impairment procedures in Chapter 15 are followed.
Substantiation: Section 4.5 is for testing and not maintenance therefore maintenance should not be referenced within subsections thereof.

25- Log #101 Final Action:
(4.5.6)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 4.5.6 as shown.

4.5.6* When a major component or subsystem is rebuilt or replaced, the subsystem shall be tested in accordance with the original acceptance test required for that subsystem as described in the table "Summary of Component Replacement Action Requirements" in the applicable chapter of this document.

Substantiation: This change directs the property owner or designated representative to the proper tables for the required action to verifying that a major component or subsystem was rebuilt or replaced properly. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #155 Final Action:
(4.5.6 and A.4.5.6)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise text to read as follows:

4.5.6* When a ~~major~~ component or subsystem is ~~rebuilt~~ adjusted, repaired, reconditioned, or replaced, ~~the subsystem~~ it shall be tested in accordance with the original acceptance test required for that subsystem or the requirements where specified by the standard.

A.4.5.6 Examples of subsystems or components ~~are~~ include fire pumps, drivers or controllers, pressure regulating devices, detection systems and controls, alarm check, ~~and~~ dry pipe, deluge, and preaction valves. The required tests for components are contained in the corresponding chapter in tables titled *Summary of Component Replacement Action Requirements.*

Substantiation: Section 4.5.6 is not correlated with the summary component action tables found in each chapter. The proposed language is consistent with the requirements as found in the standard and better clarifies the intent of the section.

25- Log #264 Final Action:
(4.5.8)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Insert a new 4.5.8 regarding testing as follows:

"4.5.8 The property owner or designated representative shall keep the demand (flow and pressure) of the fire protection system(s) on file and shall make the demand(s) known to the personnel performing tests where the pass/fail criteria of the test will depend on the system demand(s). If the demand(s) are unavailable, then the pass/fail criteria for tests shall be based on the data from previously performed tests. If the demand(s) are unavailable and there is no data from previously performed tests, then the current test data shall be retained as a new base-line."

Substantiation: In previous cycles of the standard, the committee has attempted to deal with the problem of knowing demand data for pass/fail criteria on tests by putting "as provided by the owner" after each time that the system demand appears in testing criteria . But that has not been consistently done throughout the standard. It would seem appropriate to make sure that the owner understands that they need to keep this information and share it with the contractors performing various tests. Putting this requirement in the Owner's portion of Chapter 4 will help the owner understand their role.

Recognizing that all owners have not kept this information, options have been provided so that the owner will still be able to comply with NFPA 25 in the future.

25- Log #156 Final Action:
(4.6)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:
4.6 Performance-Based Programs. As an alternative means of compliance and where approved by ~~subject to~~ the authority having jurisdiction, components and systems shall be permitted to be inspected, tested, and maintained under a performance-based program.
Substantiation: The current wording inadvertently left out the word "approved".

25- Log #24 Final Action:
(4.7)

Submitter: Frank Monikowski, SimplexGrinnell
Recommendation: Revise existing 4.7 as follows:
Maintenance and Repairs. Maintenance shall be performed to keep the system equipment operable ~~or to make repairs.~~ and to promptly make repairs as needed.
Substantiation: The current wording seems to be lacking in regards to making necessary repairs to the system. The new wording should be more enforceable.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #157 Final Action:
(4.7)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise text as follows:
4.7 Maintenance. Maintenance shall be performed ~~to keep the system equipment operable or to make repairs~~ as required by the manufacturer or as specified by the appropriate chapters.
Substantiation: The current text is simply a repeat of the definition from chapter 3. 4.4 Inspection and 4.5 Testing provide direction to the owner. The revised wording is in line with that provided in 4.4 and 4.5.

25- Log #296 Final Action:
(Table 5.1.1.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:

1. Modify the following entry in two locations (one under Inspection and one under Test)
   Valve supervisory ~~alarm~~ devices
2. Correct the reference for the Inspection of the information sign from 5.2.6.1 to 5.2.8
3. Add an Item under inspection for Heat Trace at a frequency per manufacturers requirements and reference to 5.2.7.
4. Add an Item under Test for Valves (all types) [similar to what is under Inspection] with reference to Table 13.1
5. Add an Item under Test for the 5 Year test of sprinkler in harsh environments with reference to 5.3.1.1.2.
6. Change the Item under Test for Sprinklers –extra-high temperature to be named Sprinklers – extra-high or greater temperature solder type

Substantiation: 1. Valve tamper switches are supervisory devices and not alarm. The deletion makes the term technically correct.

2. Editorial correction.
3. Needed for complete coverage of all items in text.
4. Needed for consistent coverage of valves under both Inspection and Testing.
5. Needed for complete coverage of all items in text.
6. Better matches section text.

25- Log #127 Final Action:
(5.1.1.3 (New))

Submitter: Tom Scholtens, City of Charleston / Rep. NFPA Building Code Development Committee (BCDC)
Recommendation: Add new text to read as follows:

5.1.1.3 Reporting Requirements. Reports of inspections and tests that show a lack of maintenance or function in water based fire protection systems remaining unaddressed or unacceptable to the inspector shall be forwarded to the AHJ after 30 days from the date of initial inspection.

Substantiation: Note: This proposal was developed by the proponent as a member of NFPA's Building Code Development Committee (BCDC) with the committee's endorsement.

Many times a fire protection company performs an inspection and determines a deficiency that remains unaddressed or not repaired due to a lack of concern from the building tenant or owner. There is no way for the AHJ to take action unless these issues come to their attention. The failure to address system deficiencies may lead to a loss of life or property during a fire. It presents an unaccountable and unnecessary risk to firefighters.

Notification of the deficiency made to the AHJ would serve two purposes:

1. The AHJ could order the correction of the deficiency thus restoring the system to an acceptable service level.
2. The AHJ could note the deficiency and not expect the water based fire system to respond appropriately during a fire emergency. This reaction to the deficiency would allow the AHJ to protect assets from unexpected hazards.

25- Log #322 Final Action:
(5.1.5)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:

5.1.5 Notification to Supervisory Service. To avoid false alarms where a supervisory service is provided, the supervising station ~~alarm receiving facility~~ shall be notified by the property owner or designated representative as follows:

Substantiation: NFPA 72® does not define "alarm receiving facility." It does define a "supervising station."

25- Log #60 Final Action:
(5.2.1.1.x (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
5.2.1.1.X Any Flush type. Recessed, or concealed sprinkler that is missing or not installed with the correct escutcheon or cover plate shall have the Listed associated escutcheon or cover plate assembly installed.
Substantiation: The use of the wrong type of escutcheon with recessed or flush sprinklers or the wrong cover plate can result in the severe disruption of the spray pattern as well as affect the thermal sensitivity of the sprinkler.

25- Log #102 Final Action:
(5.2.1.1.2, 5.2.1.1.3, 5.2.1.1.3.1, A.5.2.1.1.2(2), and A.5.2.1.1.2(5))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise the existing text as shown, add new text with annex explanatory material, and renumber subsequent sections.
5.2.1.1.2 Any sprinkler that shows signs of any of the following shall be replaced:
(1) Leakage
(2) * Significant ~~C~~corrosion
(3) Physical damage
(4) Loss of fluid in the glass bulb heat responsive element
(5)* Significant ~~L~~loading
(6) Painting unless painted by the sprinkler manufacturer
5.2.1.1.3 A group of sprinklers that show signs of the following shall be allowed to be tested as described in 5.3.1.1 and left in service until the next annual inspection:
(1) Minor corrosion
(2) *Minor loading
5.2.1.1.3.1 Test procedures shall be repeated every year if sprinklers are not replaced.
A.5.2.1.1.2 (2) Significant corrosion on a sprinkler is any corrosion found around the seat, or a buildup of corrosion on the deflector that could affect the spray pattern, or a buildup on the link and lever arms that could affect the operation. Minor corrosion would include a light coating on the boss and/or frame arms, and/or the deflector that may not affect the operation or spray distribution pattern.
A.5.2.1.1.2 (5) Significant loading includes a buildup of oily dust or any other airborne particles, or spackle, tape, plastic, or any other material that accumulates on or is attached to a sprinkler that will affect the operation or spray distribution of the sprinkler. Minor loading would be a very light coating of airborne particles only.
A.5.2.1.1.~~2(5)~~ 3(2) In lieu of ~~replacing~~ testing sprinklers that are loaded with a minor coating of dry dust, it is permitted to clean sprinklers with compressed air or by a vacuum provided that the equipment does not touch the sprinkler.
Substantiation: This section needed to be clarified to allow for lightly loaded or corroded sprinkler to be tested rather than replaced. Descriptions were added to differentiate between sprinklers that could still remain in use by testing or cleaning and those that should be automatically replaced. Explanatory material is added to the annex to explain these differentiations. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #306 Final Action:
(5.2.1.1.2(2) and A.5.2.1.1.2(2) (New))

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Add new text to read as follows:
5.2.1.1.2
(2) *Corrosion
A.5.2.1.1.2 (2) Surface discoloration and light surface corrosion not impacting the operating elements of the sprinkler should not warrant the replacement of sprinklers. A degree of judgment should be exercised in the determination of the extent of corrosion that would necessitate replacement.
Substantiation: As written the provisions of 5.2.1.1.2 are being applied to require the replacement of sprinkler when any surface corrosion or discoloration exists. AHJ have cited that the Section does not provide for any judgment in its application. The additional Annex material provides for such judgment in the application of the section.

25- Log #74 Final Action:
(5.2.1.1.3)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Change text to read:
5.2.1.1.3* Any sprinkler that has been installed in the incorrect orientation shall be ~~replaced.~~ corrected by repositioning the branch line, drop, sprig, or be replaced.
Substantiation: It is possible to correct a problem with a sprinklers orientation without having to replace the sprinkler. A qualified person should be able to make the determination on the most economical remedy for an improperly installed sprinkler while still observing all installation standards.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #75 Final Action:
(5.2.1.1.4)

Submitter: John T. Johnson, Tyco Fire Protection Products
Recommendation: Remove section 5.2.1.1.4.
~~Any sprinkler shall be replaced that has signs of leakage, is painted, other than by the sprinkler manufacturer, corroded, damaged, or loaded, or is in the improper orientation.~~
Substantiation: Information in section 5.2.1.1.4 is also included in section 5.2.1.1.2. There is not an asterisk after the word loaded, it appears the intention was to delete section 5.2.1.1.4 in the 2011 Edition.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #159 Final Action:
(5.2.1.1.4 and 5.2.1.1.5)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete the following:
~~5.2.1 .1.4 Any sprinkler shall be replaced that has signs of leakage, is painted, other than by the sprinkler manufacturer, corroded, damaged, or loaded, or is in the improper orientation.~~
~~5.2.1.1.5 Glass bulb sprinklers shall be replaced if the bulbs have emptied.~~
Substantiation: 5.2.1.1.4 and 5.2.1.1.5 are redundant. 5.2.1.1.2 contains the same requirements for replacing sprinklers.

25- Log #76 Final Action:
(5.2.1.1.5)

Submitter: John T. Johnson, Tyco Fire Protection Products
Recommendation: Remove section 5.2.1.1.5.
~~Glass bulb sprinklers shall be replaced if the bulbs have emptied~~.
Substantiation: Information contained within section 5.2.1.1.5 is also found in section 5.2.1.1.2. and appears to be duplicated.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #272 Final Action:
(5.2.1.1.8 and 5.2.1.1.9 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add a new couple of sections as follows:
5.2.1.1.8 Escutcheons and cover plates for recessed, flush and concealed sprinklers shall be replaced if found missing during the inspection.
5.2.1.1.9 Escutcheons for pendent sprinklers that are not recessed, flush or concealed shall not be required to be replaced if found missing during the inspection.
Substantiation: The standard has never addressed the issue of how to deal with missing escutcheons and cover plates. Some escutcheons and cover plates are merely decorative while others serve a function in the operation of the sprinkler.
NFPA 13 (section 6.2.7) considers the escutcheons and cover plates on recessed, flush and concealed sprinklers to be a part of the sprinkler assembly, which means that they need to be replaced if they are missing. This is no different than discovering a sprinkler with a missing deflector. It would need to be replaced if the inspection revealed a missing part of the sprinkler.

25- Log #256 Final Action:
(5.2.1.1.8 and A.5.2.1.1.8)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Add new 5.2.1.1.8 as follows:
5.2.1.1.8* Areas of a building lacking sprinkler protection shall be identified.
A.5.2.1.1.8 The lack of a sprinkler in a room may not necessarily indicate a problem with the sprinkler system as designed, as NFPA 13 has unique spacing requirements and also exempts requirements for sprinklers in certain situations. However, an owner or designated representative, once advised that a sprinkler is observed to be missing, should conduct a subsequent evaluation to determine whether sprinklers are required in those areas where noted to be missing
Substantiation: The committee initially unanimously approved a similar proposal last cycle, then rejected this during the comment period. There is no special experience required to identify an area in a building where sprinklers are missing nor is the “inspector” being asked to indicate whether a missing sprinkler is necessarily a deficiency. Therefore, this should be noted as part of ITM. The annex note has been added to clarify that the mere fact that a sprinkler is missing is not necessarily a deficiency. As an owner, I would want to be informed of this so I could take decide whether subsequent any action is necessary. If the committee continues to reject this idea, it’s condoning the possibility of a system failing during a fire, even if it meets every other requirement in NFPA 25.

25- Log #240 Final Action:
(5.2.1.2 and 5.2.1.3 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise sections 5.2.1.2 and 5.2.1.3 and move part of annex material in A.5.2.1.2 to the main body as shown.

5.2.1.2* The minimum clearance ~~required by the installation standard~~ as described in 5.2.1.2.1 through 5.2.1.2.3 shall be maintained below all sprinkler deflectors.

5.2.1.2.1 Stock, furnishings and equipment shall be no closer than 18 in. (457 mm) to standard spray and residential sprinklers.

5.2.1.2.2 Stock, furnishings and equipment shall be no closer than 36 in. (914 mm) to all other types of sprinklers such as early suppression fast-response (ESFR) and large drop sprinklers.

5.2.1.2.3 Stock, furnishings and equipment against walls shall be permitted to ignore the minimum clearance rules in 5.2.1.2.1 and 5.2.1.2.2 as long as the sprinkler is not directly above the object.

5.2.1.3 Stock, furnishings, or equipment closer to the sprinkler deflector than permitted by the clearance rules ~~of the installation standard~~ as described in 5.2.1.2.1 through 5.2.1.2.3 shall be corrected.

Substantiation: Inspectors should not have to know the minimum clearances required by the installation standard, because those rules change over time and it's unreasonable to ask the inspector to know which ones applied when. There are some basic clearance rules in NFPA 13 and the ones that can be inspected to should be in NFPA 25. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #239 Final Action:
(5.2.1.4, 5.2.1.5, A.5.2.1.4, and A.5.2.1.5 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a new sections 5.2.1.4 and 5.2.1.5 and the annex material to go with them as shown, and renumber the subsequent sections accordingly.

5.2.1.4* Sprinkler spray patterns shall not be obstructed by temporary or non-permanent obstructions such as signs, banners, or decorations.

A.5.2.1.4 While it is impractical for an inspector to know all of the various obstruction rules for all the different types of sprinklers, the inspector can observe when temporary or non-permanent obstructions have been installed that could block or obstruct a sprinkler's spray pattern.

5.2.1.4.1 Temporary or non-permanent obstructions that appear to be obstructions to sprinkler spray patterns shall be removed or repositioned so they are not an obstruction.

5.2.1.5* Sprinklers shall not be required to be inspected to determine if they comply with installation obstruction rules that apply to structural or architectural features.

A.5.2.1.5 It is impractical for an inspector to know all of the various obstruction rules for all the different types of sprinklers based on the installation standards, especially when those obstruction rules have changed from edition to edition. It has to be assumed that when the system was installed all of the obstruction rules were followed. However, if it's obvious that a structural member or an architectural feature was added since the original installation that may be obstructing a sprinkler, the inspector can bring it to the owner or designated representative's attention in the form of a recommendation for an evaluation.

Substantiation: Obstructions are one of those gray areas that all inspectors have to deal with. The current language in the standard isn't much help, and little guidance is given. Obvious temporary obstructions should be recorded as a deficiency. However, the questionable ones should not be the inspector's responsibility to try to figure out. Just like many of the other assumptions that are made by this standard, and by extension the inspector, it needs to be stated that checking structural and architectural features as possible obstructions is not required. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #131 Final Action:
(5.2.1.4(3) (New))

Submitter: Elwin G. Joyce, II, Eastern Kentucky University
Recommendation: Add New Subsection:
5.2.1.4(3) Confirm that none of the sprinklers have been recalled or had their listings voided.
Substantiation: Due to the number of sprinklers that have been recalled or no longer listed (such as O-ring types) the inspector who is a representative of the owner needs to inform the owner that the problem exists. Even though the time table for assisted replacement has passed the owners need to know that they may have sprinklers that could fail to operate. At the moment I believe there are at least 18 or more sprinklers models that have been recalled or no longer to be used in the last 15 or more years. Some type of flag needs to be in place to at least to cover the issue to make owners aware of the problem.

25- Log #327 Final Action:
(5.2.1.8 and A.5.2.1.8)

Submitter: Peter A. Larrimer, US Department of Veterans Affairs
Recommendation: Add 5.2.1.8 and A.5.2.1.8 to read as follows:
5.2.1.8 Obvious obstructions to sprinkler spray patterns or missing sprinklers based upon the as-built drawings provided by the owner shall be identified.
A.5.2.1.8 Obstructions to spray patterns include horizontal obstructions near the ceiling, vertical obstructions, suspended or floor-mounted obstructions, and clearances between sprinklers and storage below. As-built drawings as identified in Section 4.3.4 should be used to establish those locations where sprinklers were obviously intended by design. Where as-built drawings are not available, the inspector may not be able to determine where sprinklers are missing or obstructed and this should be noted on the report.
Substantiation: Once the owner provides as-built drawings, there is no reason why obvious sprinkler installation errors that do not conform to the as-built drawings cannot be identified. Design data is required from the owner to test the pump relative to the system demand (See 8.3.5.7) so there is no reason why the same type of design information cannot be supplied to ensure that the sprinklers that can be seen from the floor are in a good position. If the design drawings show a room that is supposed to be sprinklered and there are no sprinklers in the room, this will allow the inspection to make that information available so that the lack of protection can be resolved.
The sprinkler industry is going to great lengths to remove all liability with respect to ITM and this is an attempt to allow the industry to provide a true service without being held liable for anything more that what is on the as-built drawings provided by the owner. If we are interested in ensuring sprinklers work then one easy step is making sure that obvious omission are resolved and that the sprinklers are installed where the drawings indicate.

25- Log #305 Final Action:
(5.2.2.1 and A.5.2.2.1 (New))

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Add new text to read as follows:
5.2.2.1* Pipe and fittings shall be in good condition and free of mechanical damage, leakage and corrosion.
(2) *Corrosion
A.5.2.2.1 Surface corrosion not impacting the integrity of the piping strength or raising concern of potential leakage should not warrant the replacement of piping. A degree of judgment should be exercised in the determination of the extent of corrosion that would necessitate replacement.
Substantiation: As written the provisions of 5.2.2.1 can be applied to require the replacement of pipe when it is not free of even surface corrosion. AHJ have cited that the Section does not provide for any judgment in its application. The additional Annex material provides for such judgment in the application of the section.

25- Log #132 Final Action:
(5.2.2.3.1 (New))

Submitter: Elwin G. Joyce, II, Eastern Kentucky University
Recommendation: Add new section:
5.2.2.3.1 Where piping of residential sprinkler systems is installed in unsprinklered accessible attics it shall be inspected annually per section 4.1.1.1 to confirmed that protection against freezing is being properly maintained.
Substantiation: Based on the wording of 5.2.2.3 piping that is installed in attics that are not sprinklered is not being checked to see if freeze protection is maintained. Residential uses such as hotels and motels have renovation work that is done in these spaces that may cause (such as insulation removal) the piping to be exposed to freezing conditions and break flooding the building. With the problems with antifreeze systems this can become an issue as more systems are insulated. This issue is mainly in systems installed per NFPA 13R where the attic is not required to be suppressed as would be per NFPA 13. I know of current legal cases where the inspectors are being sued over not checking the attics and insulation was removed covering the piping by people doing renovation work. This wording should make the matter clearer (also see A4.1.1 - NFPA 25)

25- Log #98 Final Action:
(5.2.3)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a new section 5.2.3 as shown and renumber the subsequent sections.
5.2.3* Dry and Preaction System Piping Pitch Check.
5.2.3.1 Dry system piping shall be checked for proper pitch every five years.
5.2.3.2* Preaction system piping installed in areas subject to freezing or where the installation standard requires it to be pitched shall be checked for proper pitch every five years.
5.2.3.3 After frozen pipes and/or fittings are repaired or replaced, all affected piping shall be checked for proper pitch.
5.2.3.4 Dry Pipe and Preaction Systems. Piping shall be pitched to drain as stated in 5.2.3.4.1 through 5.2.3.4.3.
5.2.3.4.1 Dry Pipe Systems in Non-refrigerated Areas. In dry pipe system, branch lines shall be pitched at least 1/2 in. per 10 ft (4 mm/m), and mains shall be pitched at least 1/4 in. per 10 ft (2 mm/m) in non-refrigerated areas.
5.2.3.4.2 Preaction Systems. In preaction systems, branch lines shall be pitched at least 1/2 in. per 10 ft (4 mm/m), and mains shall be pitched at least 1/4 in. per 10 ft (2 mm/m).
5.2.3.4.3 Dry Pipe and Preaction Systems in Refrigerated Areas. Branch lines shall be pitched at least 1/2 in. per 10 ft (4 mm/m), and mains shall be pitched at least 1/2 in. per 10 ft (4 mm/m) in refrigerated areas.
A.5.2.3 Pipes are pitched to provide proper drainage which is especially important in areas subject to freezing to ensure that water isn't accumulating in pipes that could freeze and damage the pipe and fittings or create an ice plug. Most freeze-ups that occur in dry or preaction systems are a result of improperly pitched pipes. Pipes that may have been properly pitched when installed can become improperly pitched because the building settled, or they were pushed out of alignment.
A.5.2.3.2 The requirement for pitching preaction system piping has changed over the years. Prior to the 2007 edition of NFPA 13, preaction system piping installed in heated areas could be installed without any pitch. However, accelerated corrosion was taking place in these pipes so the 2007 edition deleted this allowance.
Substantiation: Many freeze-ups have occurred in dry and preaction systems because water accumulated in the pipes and froze, impairing the systems. In most cases the water accumulated in pipes that were found to be improperly pitched either because the building settled or someone climbing around in an attic grabbed pipes for balance causing them to be become misaligned. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #103 Final Action:
(5.2.3.1 and 5.2.3.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 5.2.3.1 and 5.2.3.2 as follows:
5.2.3.1 Hangers and seismic braces shall not be damaged, ~~or~~ loose, unattached, or with missing components.
5.2.3.2 Hangers and seismic braces that are damaged, ~~or~~ loose, unattached, or with missing components shall be replaced or refastened.
Substantiation: The added conditions are deficiencies as well and should be included. Although most inspectors probably noted hangers or seismic braces that were unattached or with missing components, this standard didn't require them to do so. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #323 Final Action:
(5.2.4.1)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:
5.2.4.1* Gauges on wet pipe sprinkler systems shall be inspected quarterly ~~monthly~~ to ensure that they are in good condition and that normal water supply pressure is being maintained.
Substantiation: Most, but not all sprinkler systems are under contract for the inspection requirements of this Standard to be performed. For those that are, a quarterly inspection should suffice. For those that are not, they are most likely not being performed by anyone at any period as specified by this Standard. As this is a minimum standard, for those properties that are having inspections performed by their personnel, they may still elect to perform a monthly inspection.

25- Log #304 Final Action:
(5.2.4.1 and 5.2.4.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
5.2.4.1* Gauges on wet pipe and deluge sprinkler systems shall be inspected monthly to ensure that they are in good condition and that normal water supply pressure is being maintained.
5.2.4.2 Gauges on dry and; preaction~~, and deluge~~ systems shall be inspected weekly to ensure that normal air or nitrogen, and water pressures are being maintained.
Substantiation: Deluge system have open nozzles or sprinklers without air pressurization having no need for inspection of air gauges and should be relocated to 5.2.4.1 for monthly inspection of the water gauges to same as wet systems.
Dry and preaction system can include the use of nitrogen as well as air and should be recognized in 5.2.4.2.

25- Log #61 Final Action:
(5.2.4.2)

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Revise text to read as follows:
5.2.4.2 Gauges on dry, preaction and deluge systems shall be inspected weekly to ensure that ~~normal~~ the specifically designed air and normal water pressures are being maintained in accordance with the original design of the system.

Substantiation: The design of dry, deluge, and preaction systems are often dependent on a specific air pressure in the dry pilot line and or sprinkler piping for the successful operation or trip time as well as delivery time of water to the inspector's test connection. Improper air pressure could result in additional heads to operate and potential for the system to fail.

25- Log #303 Final Action:
(5.2.5)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
5.2.5 Waterflow Alarm and Supervisory Devices. Waterflow alarm and supervisory ~~alarm~~ devices shall be inspected quarterly to verify that they are free of physical damage.
Substantiation: These are supervisory and not alarm devices.

25- Log #104 Final Action:
(5.2.6)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 5.2.6 and add new sections 5.2.6.1 and 5.2.6.2 as follows:
5.2.6* Hydraulic Design Information Sign. The hydraulic design information sign for ~~hydraulically designed systems~~ shall be inspected quarterly to verify that it is provided, attached securely to the sprinkler riser, and is legible.
5.2.6.1 A hydraulic design information sign that is missing or illegible shall be replaced.
5.2.6.2 A pipe schedule system shall have a hydraulic design information sign that reads “Pipe Schedule System”.
5.2.6.3 The property owner or designated representative shall provide the design criteria needed to comply with 5.2.6.1 and 5.2.6.2.
Substantiation: There is always a question about the need for a hydraulic design information sign when none is present on the system riser. The proposed changes make it clear that if a sign isn’t present, one needs to be provided, either to replace the one that’s missing, or to retrofit a sign if the system is a pipe schedule. When a sign needs to be replaced or added, the owner is to supply the information for the sign based on the records from the original installation, or from the most recent system evaluation. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #17 Final Action:
(5.2.6.1 (New))

Submitter: Doug Hohbein, Northcentral Regional Fire Code Development Committee
Recommendation: Add a new section to read:

5.2.6* Hydraulic Design Information Sign. The hydraulic design information sign for hydraulically designed systems shall be inspected quarterly to verify that it is attached securely to the sprinkler riser and is legible.

5.2.6.1 The sign shall verify the current building information:
(1) Name and location of the facility protected
(2) Occupancy classification
(3) Commodity classification
(4) Presence of high-piled and/or rack storage
(5) Maximum height of storage planned
(6) Aisle width planned
(7) Encapsulation of pallet loads
(8) Presence of solid shelving
(9) Flow test data
(10) Presence of flammable/combustible liquids
(11) Presence of hazardous materials
(12) Presence of other special storage
(13) Location of auxiliary drains and low point drains on dry pipe and preaction systems
(14) Original results of main drain flow test
(15) Name of installing contractor or designer
(16) Indication of presence and location of antifreeze or other auxiliary systems. (13:24.6.2)

Substantiation: There is a sign requirement in 13 with the information provided in 5.2.6.1. To ensure that the system is adequate design you would use the sign to verify the design information.

25- Log #25 Final Action:
(5.2.7)

Submitter: Frank Monikowski, SimplexGrinnell
Recommendation: Revise existing 5.2.7 as follows:

Heat ~~Tape~~ Tracing. Heat ~~tape~~ tracing shall be inspected and maintained per manufacturer's requirement.

Substantiation: The industry term associates more with heat tracing rather than heat tape. Inspecting does not do much unless maintenance is performed if needed.

This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #105 Final Action:
(5.2.8)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revised 5.2.8 as follows:

5.2.8* General Information Sign. The general information sign required by 4.1.8 shall be inspected annually to verify that it is provided, securely attached, and is legible.

Substantiation: The heading is changed to match the correct name of the sign per NFPA 13 and section 4.1.8. The additional text is needed to make it clear that this sign is to be present on each system control valve, antifreeze loop, and auxiliary system control valve. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #128 Final Action:
(5.2.9 and A.5.2.9)

Submitter: Robert G. Caputo, Fire & Life Safety America
Recommendation: Add new text to read as follows:
5.2.9 General Information Sign. The general information sign required by NFPA 13 Section 24.6.1 shall be inspected annually to verify that it is securely attached and legible.
A 5.2.9 It is not the intent of this section to require verification of sprinkler system design criteria, storage arrangements or building uses based upon the data provided on the general information sign. The data provided is intended to assist the local AHJ and others when an evaluation of the system is required by Section 4.1.5 of this standard. The general information sign is not required for systems installed prior to the NFPA 13 2007 edition.
Substantiation: TC on Sprinkler Installation Criteria added Section 24.6 in the 2007 edition code cycle to ensure core information will be available to those conducting an evaluation of system adequacy into the future when as built plans and relevant design data may not be readily available. This general information sign and its data are beneficial to owner's, tenants, AHJ's and others when evaluating systems and should be inspected to ensure it is present (when required), secure and legible.

25- Log #9 Final Action:
(5.3.2)

Submitter: Byron F. Blake, SimplexGrinnell, LP
Recommendation: Revise text to read as follows:
Gauges shall be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge. Gauges not accurate to within 3 percent of the full scale shall be recalibrated or replaced. 5 year testing period shall be determined from the date of gauge manufacturer [where provided]. When date of manufacturer cannot be readily determined date of installation shall govern [where provided].
Substantiation: NFPA 25 standard states that pressure gauges are to be replaced or recalibrated at five year intervals. The standard is vague. The standard does not indicate whether the five year interval starts from the date of pressure gauge manufacture, from the date the pressure gauge was installed (installation date), from the date of certificate of occupancy, date of fire final; date of "rough" inspection or some other date.
It is currently industry practice to replace (or recalibrate, though this is uncommon) pressure gauges at five year intervals based on the date of installation. This industry practice is achieved through permanent field marking (e.g. Sharpie type magic marker) of the date of gauge replacement on the pressure gauge facing or body.
The vagueness in the standard allows for different interpretation and causes confusion among owners of these systems, service providers who work on these systems and Authorities Having Jurisdiction. At present, there appears to be no scientifically based peer reviewed literature addressing the frequency of or number of pressure gauge failures. There appears to be no NFPA, FM, UL or other study to support the current NFPA standard in replacing or calibrating gauges at five year intervals. Regardless, the vagueness in the standard is problematic. The recommended text addresses the vagueness.

25- Log #160 Final Action:
(5.3.2.3 (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add the following:
5.3.2.3 Where multiple system risers are supplied by a common source and the gauges for all system risers read within 3 percent of the other, the gauges shall not be required to be tested or replaced.
Substantiation: Where multiple system risers contain gauges that all are reading within an acceptable range, it is apparent that they are functioning to accepted tolerances and do not need further investigation.

25- Log #93 Final Action:
(5.3.3, 5.3.3.1, 5.3.3.2)

Submitter: Howard G. Clay, VSC Fire & Security, Inc.
Recommendation: Revise text to read as follows:
~~Vane type and pressure type~~ All waterflow devices shall be tested ~~semiannually~~ quarterly.
Note: Delete 5.3.3.1
Substantiation: Notwithstanding the testing performed by NFPA 72 in 1996 showing the failure rates of the switches with no appreciable difference between quarterly and semiannual testing, NFPA 25 , 2008 edition still requires the testing of other pressure switches (low air, low temp) to be tested on a quarterly basis. Arguably the most, if not one of the most, important switches on a water based fire protection system has been changed from quarterly to semiannual testing while other switches still require their testing on a quarterly basis, even though the switches operate identically. The goal of NFPA 25 is to provide the community with a reasonable degree of protection while decreasing the human error. The best way to decrease human error is to focus the inspector's attention in as few directions as possible. The inspector should be focused on the knowledge he has of how to test the equipment, not on whether the test is needed this visit. Similar equipment should be grouped together and tested at the same intervals.
This is not original material; its reference/source is as follows:
NFPA 25, 2008 Edition

25- Log #261 Final Action:
(5.3.3.1, 5.3.3.1.1, and 5.3.3.1.2 (New))

Submitter: Don Moeller/Chair/TC on Cultural Resources, The Fire Consultants, Inc.
Recommendation: Revise 5.3.3.1 by adding new paragraphs 5.3.3.1.1 and 5.3.3.1.2 as follows:
5.3.3.1 Mechanical waterflow devices including, but not limited to, water motor gongs, shall be tested quarterly.
5.3.3.1.1 The seminannual tests of waterflow devices shall be conducted using the most remote test connection on the system piping.
5.3.3.1.2 Tests of waterflow devices between semiannual tests shall be conducted using a means that does not introduce fresh water into the system piping.
Substantiation: This proposal is being submitted by me as chair of the Technical Committee on Cultural Resources on behalf of the committee at its direction via a vote at its November 2011 meeting. The same proposal was balloted and submitted in the committee's name during the last revision cycle, but could not be balloted for this cycle due to timing restrictions.
The testing of the waterflow alarms by opening the inspector's test connection and flowing water into the sprinkler system introduces oxygen into the system, which promotes corrosion of the piping. Since oxygen remains in the water for approximately one month after being introduced into the system, too frequent replacement of water during testing of the waterflow devices ensures that the sprinkler system will have an almost continuous supply of oxygen.

25- Log #328 Final Action:
(5.3.3.3)

Submitter: Peter A. Larrimer, US Department of Veterans Affairs
Recommendation: Modify 5.3.3.3 as follows:
5.3.3.3 Testing waterflow alarm devices on wet pipe systems shall be accomplished by opening the inspector's test connection and flowing water equal to that from a single sprinkler of the smallest orifice size.
Substantiation: This is attempt to coordinate testing with NFPA 72. The verbiage added was removed from NFPA 72 and reference to NFPA 25 was made in that document. This will require that the waterflow switch operates as intended.

25- Log #302 Final Action:
(5.3.3.4)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Delete 5.3.3.4
Substantiation: This section is not be specific to Waterfow Alarm Devices and should not be a part of the parent Section 5.3.3 regarding such.

25- Log #13 Final Action:
(5.3.4.2)

Submitter: Technical Correlating Committee on Automatic Sprinkler Systems,
Recommendation: The TCC recommends that the NFPA 25 TC review the need to specify the purity of antifreeze solutions in section 5.3.4.2.
Substantiation: Field mixing is no longer permitted based on the acceptance of TIA 1014, therefore there is no need to specify purity.

25- Log #15 Final Action:
(5.3.4.2(6) (New))

Note: This Proposal originates from Tentative Interim Amendment 25-11-2 (TIA 1026) issued by the Standards Council on August 11, 2011.
Submitter: Scott T. Franson, The Viking Corporation
Recommendation: *1. Add a new 5.3.4.2(6) to read as follows:*
(6) Premixed antifreeze solutions of propylene glycol exceeding 40% concentration by volume shall be permitted for use with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.
Substantiation: In the recently adopted NFPA 25 TIA 1014 propylene glycol solutions exceeding 40% in ESFR systems are not allowed. This does not correlate with the recently adopted NFPA 13 TIA 1015 which does allow propylene glycol solutions exceeding 40% in ESFR systems when the sprinkler is listed as such. Per review and discussion the TCC directed a task group to draft this TIA regarding this matter for correlation between NFPA 13 and NFPA 25.
Emergency Nature: Without the addition of the above paragraph, NFPA 25 will require existing ESFR systems utilizing 50% propylene glycol to be drained and replaced with 38% propylene glycol resulting in substantially reduced freeze protection thereby creating a problem for the system owner.

25- Log #134 Final Action:
(5.4.1.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new text as shown and renumber subsequent sections.
5.4.1.1 When a sprinkler has been removed for any reason it shall not be reinstalled.
Substantiation: The NFPA 13 Installation Criteria technical committee has determined that sprinkler cannot be reused for any reason. This is the same language adopted during the NFPA 13 ROC. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
NFPA 13 ROC

25- Log #161 Final Action:
(5.4.1.1, 5.4.1.1.1, and 5.4.1.4.1)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add the following new text:
5.4.1.1 Replacement sprinklers shall have the proper characteristics for the application intended~~.~~ ~~which shall include the following:~~
~~(1) Style~~
~~(2) Orifice Size and K factor~~
~~(3) Temperature rating~~
~~(4) Coating, if any~~
~~(5) Deflector type (e.g. upright, pendant, sidewall)~~
~~(6) Design requirements~~
5.4.1.1.1 A list of the sprinklers installed in the property shall be posted in the sprinkler cabinet and shall include the following:
(1) Sprinkler Identification Number (SIN) if equipped: or the manufacturer. model. orifice. deflector tvpe. thermal sensitivity. and pressure rating
(2) General description
(3) Quantity of each type to be contained in the cabinet
(4) Issue or revision date of the list
Renumber existing 5.4.1.1 .1. and 5.4.1.1.2
5.4.1.4.1 The sprinklers shall correspond to 5.4.1.1.1 and the types and temperature ratings of the sprinklers in the property.
Substantiation: NFPA 13 requires a list of the types of sprinklers used in the property. NFPA 25 should do the same to ensure that the proper types of spare sprinklers are maintained.
This is not original material; its reference/source is as follows:
NFPA 13, 2010 - 6.2.9.7 and 6.2.9.7.1

25- Log #12 Final Action:
(5.4.1.4)

Submitter: Technical Correlating Committee on Automatic Sprinkler Systems,
Recommendation: The TCC directs the TC's to develop a joint task group to review the requirements for number of spare sprinkler heads required to be kept on site.
Substantiation: The number of spare heads required varies from document to document. This activity should be coordinated

25- Log #20 Final Action:
(5.4.1.4)

Submitter: Milosh T. Puchovsky, Worcester Polytechnic Institute
Recommendation: Revise text to read as follows:

5.4.1.4* Stock of Spare Sprinklers. A supply of at least six spare sprinklers ~~(never fewer than six~~) shall be maintained on the premises so that any sprinklers that have operated or been damaged in any way can be promptly replaced.

5.4.1.4.1 The sprinklers shall correspond to the types and temperature ratings of the sprinklers in the property.

5.4.1.4.2 The sprinklers shall be kept in a cabinet located where the temperature in which they are subjected will at no time exceed 100°F (38°C).

5.4.1.4.3 Where dry sprinklers of different lengths are installed, spare dry sprinklers shall not be required, provided that a means of returning the system to service is furnished.

5.4.1.4.4 The stock of spare sprinklers shall include all types and ratings installed and shall be as follows:

(1) For protected facilities having under 300 sprinklers—no fewer than 6 sprinklers
(2) For protected facilities having 300 to 1000 sprinklers — no fewer than 12 sprinklers
(3) For protected facilities having over 1000 sprinklers — no fewer than 24 sprinklers

~~5.4.1.6* A special sprinkler wrench shall be provided and kept in the cabinet to be used in the removal and installation of sprinklers.~~

~~5.4.1.6.1 One sprinkler wrench shall be provided for each type of sprinkler installed.~~

5.4.1.4.5*One sprinkler wrench as specified by the sprinkler manufacturer shall be provided in the cabinet for each type of sprinkler installed to be used for the removal and installation of sprinklers in the system.

5.4.1.4.6 A list of the sprinklers installed in the property shall be posted in the sprinkler cabinet.

5.4.1.4.6.1* The list shall include the following:

(1) Sprinkler Identification Number (SIN) if equipped; or the manufacturer, model, orifice, deflector type, thermal sensitivity, and pressure rating
(2) General description
(3) Quantity of each type to be contained in the cabinet
(4) Issue or revision date of the list

A.5.4.1. 4.5~~6 . Other types of wrenches could damage the sprinklers.~~ One sprinkler wrench design can be appropriate for many types of sprinklers and should not require multiple wrenches of the same design.

A.5.4.1.4.6.1 The minimum information in the list contained in the spare sprinkler cabinet should be marked with the following: a general description of the sprinkler, including upright, pendent, residential, ESFR, etc.; and the quantity of sprinklers that is to be maintained in the spare sprinkler cabinet. An example of the list is shown in Figure A.5.4.1.4.6.1

Substantiation: This language was revised to be consistent with the requirements of NFPA 13 Section 6.2.9.
This proposed language was created by an intercommittee task group consisting of members of the RSS, SSI and NFPA 25 TC's. This task group was created at the request of the TCC. (see 13-82a Log #575).

25- Log #301 Final Action:
(5.4.1.4.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:

5.4.1.4.2 The sprinklers shall be kept in a cabinet located where the temperature in which they are subjected will at no time exceed 100°F (38°C) for cabinets containing sprinklers with an ordinary temperature rating.

Substantiation: The restriction for a 100°F maximum temperature rating is warranted for ordinary temperature rated sprinklers. Higher rated sprinklers allow for temperatures of 150°F and greater.

25- Log #314 Final Action:
(5.4.1.4.3 (New))

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Add new text to read as follows:
5.4.1.4.3 The location of the cabinet shall be identified at the riser if the cabinet is not located next to the riser.
Substantiation: Finding the location of the sprinkler cabinet should not be an adventure of hide and go seek when it is not located next to the riser. While the preferred location of the cabinet is for it to be near the riser, there are situations when this is not possible. In these cases, the location should be noted at the riser so that it may be inspected in accordance with this Standard.

25- Log #176 Final Action:
(5.4.1.7)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Move section 5.4.1.7 to the end of section 5.4.1, renumber, add a title, and revise as shown. Renumber other sections accordingly including annex.
5.4.1.~~7~~9 Protective Coverings .
5.4.1.~~7~~9.1 Sprinklers protecting spray ~~coating~~ areas and mixing rooms in resin application areas installed with protective coverings shall continue to be protected against overspray residue so that they will operate in the event of fire.
5.4.1.~~7~~9.2* Sprinklers ~~subject to overspray accumulations~~ installed as described in 5.4.1.9.1 shall be protected using cellophane bags having a thickness of 0.003 in. (0.076 mm) or less or thin paper bags.
5.4.1.~~7~~9.3 Coverings shall be replaced periodically so that heavy ~~when~~ deposits of ~~or~~ residue do not accumulate.
Substantiation: These changes clarify the entire application of protective coverings by adding a separate section title and using most of the wording from NFPA 13. The use of protective coverings is very limited in NFPA 13 and the current text in NFPA 25 seems to imply that these coverings can be retrofitted in other applications. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #107 Final Action:
(5.4.3)

Submitter: John Desrosier, Tyco Fire Protection Products
Recommendation: Delete section 5.4.3 and the corresponding annex section A.5.4.3 in their entirety.
Substantiation: Delete the provided section as this section of code is redundant. Table 5.5.1 Summary of components Replacement Action Requirements covers this scenario and the explanatory material is not relevant to NFPA 25 as it should be thoroughly explained in NFPA 13. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #162 Final Action:
(5.4.3 and A.5.4.3)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete entire text as follows:
~~5.4.3 Installation and Acceptance Testing. Where maintenance or repair requires the replacement of sprinkler system components affecting more than 20 sprinklers, those components shall be installed and tested in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.*~~
~~A.5.4.3 Where pressure testing listed CPVC piping, the sprinkler systems should be filled with water and air should be bled from the highest and farthest sprinkler before test pressure is applied. Air or compressed gas should never be used for pressure testing.~~
~~For repairs affecting the installation of less than 20 sprinklers, a test for leakage should be made at normal system working pressure.~~
Substantiation: 5.4.3 is redundant as is covered by 1.1.4 for installation and Table 5.5.1 for acceptance testing. A.5.4.3 is unneeded as this information is contained in the installation standard.

25- Log #40 Final Action:
(Table 5.5.1)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Modification to table 5.5.1 as follows:
Table 5.5.1 Alarm and Supervisory Components
Component: Pressure switch-type waterflow device. Required Action: Operational test using the~~ inspector's test connection~~alarm by pass test valve
Component: Detection systems (for deluge or preaction system). Required Action: Operational test for conformance with~~ NFPA 13~~ chapter 13 and / or NFPA 72.
Substantiation: A pressure style water flow switch would require the operation of the alarm by pass valve for proper test. Detection systems section should be referring to chapter 13 of NFPA 25 not NFPA 13. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #146 Final Action:
(Table 5.5.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the “Required Action” in Table 5.5.1 Summary of Component Replacement Action Requirements for the “Informational Components” as follows:

Identification signs	X	X	X	Check for conformance with NFPA 13 and this standard
Hydraulic ~~placards~~ Design Information Sign	X	X	X	Check for conformance with NFPA 13 and this standard
General Information Sign	X	X	X	Check for conformance with this standard

Substantiation: The Informational Components, or signs, need to be present, attached properly, and legible to comply with NFPA 25. The names need to be changed to match what’s in NFPA 13 & 25, and the requirement for the General Information Sign needs to be added. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #71 Final Action:
(5.5.2)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Modify existing text:
5.5.2* A ~~main drain~~ waterflow test shall be ~~required~~ conducted if the system control or other upstream valve is operated ~~in accordance with 13.3.3.4.~~ to verify the valve is open.

Substantiation: Upstream valves may not have main drains, so the term waterflow test would be inclusive to all drain tests, main or sectional.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #18 Final Action:
(Table 6.1.1.2)

Submitter: Scott Adams, Western Regional Fire Code Development Committee
Recommendation: Table 6.1.1.2
Recommendation: Revise table to read:
Testing
Hose ~~5 years/3 years~~ Annually NFPA 1962

Substantiation: NFPA 1962 requires annual testing of fire hose. We can find no mention of a 3 or 5 year testing in 1962. The change is consistent with the requirements in 1962.

25- Log #295 Final Action:
(Table 6.1.1.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
Change the frequency of Inspection for Gauges from Weekly to Weekly/Monthly.
Revise the Test Item entry for Valve supervisory ~~alarm~~ devices as shown.
Substantiation: Change needed to match the varying inspection frequencies in 6.2.2
Tamper switches are not alarm devices.

25- Log #309 Final Action:
(Table 6.1.1.2)

Submitter: Ken Bogue, SimplexGrinnell/Rep Tyco/SimplexGrinnell
Recommendation: In Table 6.1.1.2 add Hose Valves as an item in all three sections, Inspection, Test, and Maintenance. Do not indicate a frequency, and add "Table 13.1" under Reference for each.
In Table 6.1.1.2 add Hose Connections as an item under the Test section. Do not indicate a frequency, and add "Table 13.1" under Reference.
Substantiation: Add the term "Hose valve" to all three sections, add the term "Hose Connections" to the Test section of the table, and refer all of these to Table 13.1.1.2. The hose valve is a key component and needs to be inspected, tested and maintenance performed. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #310 Final Action:
(6.1.2, Table 6.1.2, and 6.1.3)

Submitter: Ken Bogue, SimplexGrinnell/Rep Tyco/SimplexGrinnell
Recommendation: Move Table 6.1.2 to the annex and change the number to Table A.6.5.1.
Add an Asterisk to 6.5.1. (*)
Move Sections 6.1.2 and 6.1.3 to the annex as A.6.5.1 and revise as shown.
~~6.1.2~~A.6.5.1 Table A.6.~~1.2~~.5.1 ~~shall~~ can be used for guidance for the inspection, testing, and maintenance of all classes of standpipe and hose systems. ~~6.1.3~~ Checkpoints and corrective actions outlined in Table A.6.~~1.2~~.5.1 ~~shall be followed~~ are recommended to determine that components are free of corrosion, foreign material, physical damage, tampering, or other conditions that adversely affect system operation.
Substantiation: Table 6.1.2 on standpipe and hose systems needs to be placed in the annex as reference materials for corrective action. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #300 Final Action:
(6.2.2.1 and 6.2.2.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
6.2.2.1 Gauges on automatic wet and semi-automatic dry standpipe systems shall be inspected monthly to ensure that they are in good condition and that normal water supply pressure is being maintained.
6.2.2.2 Gauges on automatic dry, ~~preaction, and deluge valves~~ standpipe systems shall be inspected weekly to ensure that normal air or nitrogen and water pressure are being maintained.
Substantiation: The revised language more appropriately matches the specific types of standpipe systems to which the inspection of gauges apply.
Dry systems can include the use of nitrogen as well as air and should be recognized.

25- Log #137 Final Action:
(6.2.3)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 6.2.3 and add new sections 6.2.3.1 and 6.2.3.2 as follows:
6.2.3* Hydraulic Design Information Sign. ~~When provided, t~~The hydraulic design information sign for standpipe systems shall be inspected annually to verify that it is provided, attached securely, and is legible.
6.2.3.1 A hydraulic design information sign that is missing or illegible shall be replaced.
6.2.3.2 A standpipe system that was not sized by hydraulic design shall have a hydraulic design information sign that reads “Pipe Schedule System”.
6.2.3.3 The property owner or designated representative shall provide the design criteria needed to comply with 6.2.3.1 and 6.2.3.2.
Substantiation: There is always a question about the need for a hydraulic design information sign when none is present on the standpipe system. The proposed changes make it clear that if a sign isn’t present, one needs to be provided, either to replace the one that’s missing, or to retrofit a sign if the standpipe system is a pipe schedule. When a sign needs to be replaced or added, the owner is to supply the information for the sign based on the records from the original installation, or from the most recent system evaluation. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #231 Final Action:
(6.3.1.1, 6.3.1.2, and 6.3.1.3)

Submitter: James M. Feld, University of California
Recommendation: Revise Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 as follows:

6.3.1 Flow Tests.

6.3.1.1* A flow test shall be conducted every 5 years on all standpipe systems ~~at the hydraulically most remote hose connections of each zone of an automatic standpipe system~~ to verify that the required flow and pressure are available at the hydraulically most remote hose value outlet(s) while flowing the standpipe system demand. ~~the water supply still provides the design pressure at the required flow.~~

6.3.1.2 Where a flow test of the hydraulically most remote outlet(s) is not practical, the authority having jurisdiction shall be consulted for the appropriate location for the test.

6.3.1.3 ~~All systems shall be flow tested and pressure tested at the requirements for~~ The standpipe system demand shall be based on the design criteria in effect at the time of the installation. Where the standpipe system demand cannot be determined, the authority having jurisdiction shall determine the standpipe system demand.

Substantiation: There is a conflict between Sections 6.3.1.1 and 6.3.1.3. Section 6.3.1.1 requires a flow test for each zone of automatic standpipe systems. Section 6.3.1.3 requires a flow test for ALL standpipe systems regardless of whether they re multi-zoned systems or not.

Standpipe systems represent a critical tool for fire fighters to use to extinguish a fire. This occurs in buildings protected with a fire sprinkler system and those which are not so protected. It is essential to ensure that standpipe systems operate as intended and that fire fighters have confidence in the standpipe system to provide the required water flow at required pressures. If the proper flow rate and pressure are not provided, not only is the property in jeopardy of being destroyed, but also, more importantly, the lives of the occupants and the fire fighters are in jeopardy.

25- Log #277 Final Action:
(6.3.1.1 and 6.3.1.3)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise text to read as follows:

6.3.1.1* ~~A~~ Every automatic standpipe system shall be flow tested ~~shall be conducted~~ at least once every 5 years at the two hydraulically most remote hose connections of each zone ~~of an automatic standpipe system to verify the water supply still provides the design pressure at the required flow~~ with a flow of 250 gpm from each connection for a total flow during the test of 500 gpm.

6.3.1.3 ~~All systems shall be flow tested and pressure tested at the requirements for the design criteria~~ The purpose of the flow test is to make sure that the design pressure in effect at the time of the installation and as provided by the building owner is still available at the flow of 500 gpm at the two most remote outlets.

Substantiation: This proposal attempts to clean up a number of ambiguous situations within the test requirements. First, the proposal is trying to clean up which standpipe systems need to be tested. Section 6.3.1.1 says that “automatic systems” need to be tested, but Section 6.3.1.3 says that “all systems” need to be tested. We know from committee discussion that 6.3.1.3 was intended to be a clarifying statement to 6.3.1.1, not a new requirement for all systems to be tested, but many AHJ’s are unaware of this distinction and are requiring tests for all manual standpipe systems.

The second situation that we are trying to clarify is the flow required for the test. The committee has addressed this in the past and tried to clarify that the intent of this test is just to flow 500 gpm, even if the standpipe system has more than one riser. Rather than make building owners have hoses running through buildings or down stairwells to test the system at maximum flow every five years, the committee agreed that the test could be run using the roof manifold or other convenient outlets at the most remote portion of the system. But this has never been explicitly mentioned in the standard.

25- Log #163 Final Action:
(6.3.2.2 and A.6.3.2.2)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete 6.3.2.2.
~~6.3.2.2 Hydrostatic tests shall be conducted in accordance with 6.3.2.1 on any system that has been modified or repaired.~~
Renumber A.6.3.2.2 to A.6.3.2.1.3
Substantiation: This requirement is covered in Table 6.5.1 Summary of Component Replacement Action Requirments.

25- Log #312 Final Action:
(Table 6.5.1)

Submitter: Ken Bogue, SimplexGrinnell/Rep Tyco/SimplexGrinnell
Recommendation: In Table 6.5.1 in the Water Delivery Components section, make two rows for "Fire Hose" and in the Alarm and Supervisory Components section combine "Vane-type waterflow" into one row as shown.

Insert Table here

Substantiation: Fire hoses can be repaired by replacing couplings so the option needs to be added in the table. The required action for a flow switch is the same no matter what corrective action is taken, so they can be combined into one row. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #72 Final Action:
(6.5.3)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Modify existing text:
6.5.3* A ~~main drain~~ waterflow test shall be ~~required~~ conducted if the system control or other upstream valve is operated ~~in accordance with 13.3.3.4.~~ to verify the valve is open.

Substantiation: Upstream valves may not have main drains, so the term waterflow test would be inclusive to all drain tests, main or sectional.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

Component	Adjust	Repair	Replace	Required Action
Water Delivery Components				
Fire hose			X	No action required
Fire hose		X		Perform hydrostatic test in accordance with NFPA 1962
Alarm and Supervisory Components				
Vane-type waterflow	X	X	X	Operational test using inspector's test connection
~~Vane-type waterflow~~			~~X~~	~~Operational test using inspector's test connection~~

25- Log #87 Final Action:
(7.2.2.1.2)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete entire section and change annex reference to A.7.2.2.1.1
~~7.2.2.1.2* Piping shall be inspected, and the necessary corrective action shall be taken. as specified in Table A.7.2.2.1.2.~~
Substantiation: This is explanatory information on repairs to exposed piping, and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #80 Final Action:
(Table 7.2.2.1.2, 7.2.2.3, 7.2.2.4, 7.2.2.5, 7.2.2.6, and 7.2.2.7)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Take the the following actions on tables 7.2.2.1.2, 7.2.2.3, 7.2.2.4, 7.2.2.5, 7.2.2.6, and 7.2.2.7:
1. Combine all six tables into one table, with sections labeled the same as the current title of each table;
2. Move the combined table to the annex as explanatory material to 7.5.1 and add an asterisk to 7.5.1;
3. Title the new table "A.7.5.1 Private Service Mains";
4. Add the following text before the table "A.7.5.1 The following table should be used as guidance for taking possible corrective action when a deficiency is identified."
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
Substantiation: Combining all of the corrective action tables currently found within Chapter 7 and moving them to Annex A will provide the reader with guidance from a single location for repairs to private fire service mains.

25- Log #82 Final Action:
(7.2.2.3)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete text as follows:
7.2.2.3* Mainline Strainers. Mainline strainers shall be inspected and cleaned after each system flow exceeding that of a nominal 2 in. (50 mm) orifice and shall be removed and inspected annually for failing, damaged, and corroded parts;. ~~with the necessary corrective action taken as specified in Table 7.2.2.3~~.
Substantiation: This is explanatory information on repairs to mainline strainers and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #83 Final Action:
(7.2.2.4)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete text as follows:
7.2.2.4* Dry Barrel and Wall Hydrants. Dry barrel and wall hydrants shall be inspected annually and after each operation;. ~~with the necessary corrective action taken as specified in Table 7.2.2.4.~~
Substantiation: This is explanatory information on dry barrel and wall hydrants, and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #294 Final Action:
(Table 7.2.2.4 and 7.2.2.5)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
Delete the final entry in each Table for Availability of operating wrench.
Substantiation: Operating wrenches are not typically maintained on premise for fire hydrants but are rather carried by the arriving fire department personnel.

25- Log #84 Final Action:
(7.2.2.5)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete text as follows:
7.2.2.5* Wet Barrel Hydrants. Wet barrel hydrants shall be inspected annually and after each operation~~;~~ ~~with the necessary corrective action taken as specified in Table 7.2.2.5.~~
Substantiation: This is explanatory information on repairs to wet barrel hydrants, and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #85 Final Action:
(7.2.2.6)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete text as follows:
7.2.2.6* Monitor Nozzles. Monitor nozzles shall be inspected semiannually~~;~~ ~~with the necessary corrective action taken as specified in Table 7.2.2.6.~~
Substantiation: This is explanatory information on repairs to monitor nozzles, and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #86 Final Action:
(7.2.2.7)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Delete text as follows:
7.2.2.7* Hose Houses. Hose houses shall be inspected quarterly~~;~~ ~~with the necessary corrective action taken as specified in Table 7.2.2.7.~~
Substantiation: This is explanatory information on repairs to house houses, and should be in Annex A with other explanatory information and not within the body of the document.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #164 Final Action:
(7.3.1)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:
7.3.1 Underground and Exposed Piping Flow Tests. Underground and exposed piping shall be flow tested to determine the condition of the piping at minimum ~~5~~ 3-year intervals.
Substantiation: This test examines the condition of the piping for possible deterioration. This is a critical test and a 5 year intervals is too infrequent. A 3 year interval provides a higher level of protection without significantly increasing costs to the owner.

25- Log #269 Final Action:
(7.3.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Delete 7.3.1 along with all of its subsections and annex note.
Substantiation: The test required by the current section is extremely expensive and does not add significant value to fire protection systems to offset its cost.
The typical flow test from hydrants as described by NFPA 291 is insufficient to comply with section 7.3.1 because the results cannot determine “the internal condition of the piping” as required by the section. A flow test with two hydrants (one gage hydrant and one flowing hydrant) might be able to show degradations in the available flow, but the results do not indicate whether the degradation is caused by a lack of available flow or pressure from the water supply or a change in the condition of the pipe.
Since the section requires that the condition of the pipe be evaluated, the test has to be run with three hydrants in a row. The flowing hydrant has to have two separate gage hydrants behind it so that the friction loss between the hydrants can be calculated. Once the friction loss is known, the Hazen-Williams formula can be used backwards to solve for the “C” factor, which will give some indication of the pipe condition. In order for this test procedure to work, the underground system needs to be isolated with loops closed so that all of the flow coming out of the flowing hydrant is going through the pipe attached to the two gage hydrants.
There is no reason for this test. As long as the main drain tests (already required by section 13.2.5) are performed, the adequacy of the water supply is fairly well known. When a problem becomes evident due to a poor result from a main drain test, section 13.2.5.2 already requires the problem to be explained. A flow test of the underground might be used to comply with section 13.2.5.2, but it should not be required every 5 years on systems that are already having good main drain test results.

25- Log #21 Final Action:
(Table 7.5.1)

Submitter: Robert R. Nii, CH2M-WG Idaho, LLC
Recommendation: Place an "X" in applicable columns for Valves and for Fire Pumps in Table 7.5.1 Summary of Component Replacement Action Requirements.
Substantiation: Table 7.5.1 Summary of Component Replacement Action Requirements.
Under the "Component" column — for Valves and for Fire Pumps, there are no "X"'s in any column for Adjust, Repair/Recondition, or Replace. It is unclear if the criteria in the Test Criteria column actually apply or not. For example, two rows below there is an X in the Replace column but not in the Adjust or Repair/Recondition columns signifying that the Test Criteria only applies to Replacements. For Valves or Fire Pumps, it is unclear of the Test Criteria from Chapter 13 and Chapter 8 (respectively) are applicable or not.

25- Log #81 Final Action:
(Table 7.5.1)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Revise Table 7.5.1 as follows:

System Housing and Protection Components

Hose houses	Verify integrity of hose <u>house</u> and hose house components
<u>Hose repair</u>	<u>Repair and test hose in accordance with NFPA 1962</u>
<u>Hose replace</u>	<u>No action required</u>

Substantiation: Separate components to provide clarification when using Table 7.5.1 with respect to maintaining hose houses, and fire hose contained within hose houses.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #308 Final Action:
(Table 7.5.1)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Add new text to read as follows:
Add <u>Flush in conformance with NFPA 24</u> to the Test Criteria required for Pipe and fittings (exposed and underground) under Water Delivery Components.
Substantiation: Work conducted on the piping should require flushing of the piping to ensure that no foreign materials remain within the piping.

25- Log #41 Final Action:
(8.1.2)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Move 8.1.2 to annex A.8.1.1.2 with modifications as follows:
8.1.2 Alternative Inspection, Testing and Maintenance Procedures, in the absence of manufacture's recommendations for preventative maintenance, Table ~~8.1.2~~ <u>A.8.1.1.2</u> ~~shall~~ <u>should</u> be used for alternative requirements.
Substantiation: Moving this section to the annex and applying the should allow it to be more flexible when used as an alternative for the manufacture's procedures. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #42 Final Action:
(Table 8.1.2)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Move Table 8.1.2 to annex and renumber with modifications as follows:
Table 8.1.2 Move this table to the annex and renumber A.8.1.1.2 as explanatory table 8.1.1.2.
Substantiation: Moving this table to the annex will allow more flexibility when applying alternative procedures the manufacture's procedures. These alternative methods should not be in the body of the code since there are only recommended methods. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #227 Final Action:
(Table 8.1.2)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Electrical System
Grease motor bearings [Check] annually
Grease motor bearings [Change] annually or as needed.
Substantiation: Most new motors now have sealed bearings and are shipped without grease czert fittings installed for field lubrication. Greasing motors without grease czert fittings would cause grease to enter the windings and cause the motors to fail.

25- Log #229 Final Action:
(Table 8.1.2)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
Mechanical Transmission
Lubricate right-angle gear drive bearings [Change] annually or as needed
Substantiation: There are two types of lubrication required for right-angle gear drives. An oil is used to fill the gear case and a grease is used to lubricate the bearings. The recommended maintenance table should differentiate between case lubrication and bearing lubrication. Please see the attached supplemental data from one of the leading industry suppliers of right-angle gear drives requiring that the oil be changed at least once every six months or after 1200 hours of operation.

25- Log #230 Final Action:
(Table 8.1.2)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Pump System
Lubricate pump bearings [Check] annually
Lubricate pump bearings [Change] annually or as needed.
Substantiation: More bearings fail due to over greasing than from any other single failure. Adding grease annually arbitrarily may cause premature failure. Bearing lubrication should be check annually and changed annually or as needed.

25- Log #197 Final Action:
(8.2.2(1))

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
(1) Pump house conditions as follows: (a) Heat is adequate, not less than 40°F (5°C) for pump rooms with diesel pump without engine heaters. (b) The diesel engine combustion chamber temperature is maintained at 120°F (49°C). (b)(c) Ventilating louvers are free to operate.
Substantiation: The requirement for maintaining the diesel engine combustion chamber at 120°F (49°C) comes from NFPA #20 11.2.8.2. NFPA #25 has been wrong for some time now.

25- Log #43 Final Action:
(8.2.2(e))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.2.2(e) Suction reservoir ~~is full~~ has the proper water level.
Substantiation: Modification allows for the variances in different manufactures definition of "full". This change also takes into consideration a suction reservoir that may be oversized, and doesn't have to be "full" to meet the system demand for the required duration. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #165 Final Action:
(8.2.3.6)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete entire section.
~~8.2.3.6 An automatic timer shall be permitted to be substituted for the starting procedure.~~
Substantiation: This allowance is inconsistent and not practical with the requirement for qualified operating personnel to be in attendance (8.3.2.7) and the observations to be made as specified in 8.3.2.8 which includes such items as recording the pump starting pressure, the time it takes an electric motor to accelerate to rated speed, the time a diesel engine cranks before starting, etc.

25- Log #244 Final Action:
(8.3.1.1)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Leadership in Education
Recommendation: Revise text as follows:
Reduce operating test frequency to monthly from weekly
8.3.1.1 Diesel engine–driven fire pumps shall be operated ~~weekly~~ monthly.

Substantiation: The education facilities industry would like to re-join a discussion begun last cycle by the US General Services Administration, the US Department of Energy, the US Veteran's Hospital Administration and other large users of this document on the issue of the existing mandatory fixed interval testing for fire pumps; both diesel and electric driven. During the last cycle, the testing frequency was reduced to monthly from weekly for electric-driven fire pumps only. So far, no reports of catastrophic failures, life or property losses, seem to be tracking in the trade literature. The hope is that the money saved was put toward reducing a larger risk elsewhere.

Since we now know from the debate during the last cycle that the first edition of NFPA 25 did not contain substantiation for fire pump testing that was anything more than anecdotally-informed, we feel that is appropriate to raise the level of debate on whether the minimum fixed-interval diesel fire pump operating test should be similarly relaxed.

Our $200 billion (annual) industry is a significant part of the US gross domestic product and we would like to see the fire protection industry innovate upon fire pump technology so that they perform more reliably and at much lower cost. The reasons behind the selection of the prime mover for fire pumps spans a range of choices that recognizes the risks in the availability of power from the local power grid, to the fuel security during a catastrophe. Also, the range of risks within the protected premises may be a warehouse with un-insured contents or a hospital with dense life safety risk. A one-size-fits all, fixed-interval test is not cost effective. There are methods, such as condition-based maintenance, or reliability centered maintenance programs, that are detailed in Annex N of NFPA 70B. (Refer to related proposal regarding adaptation of that Annex in this document.)

25- Log #44 Final Action:
(8.3.1.2)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.3.1.2* Electric motor--driven fire pumps shall be operated ~~monthly~~ weekly.
Substantiation: Weekly run cycle should return to the previous wording of weekly instead of monthly until sufficient data is collected to validate the frequency change. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #325 Final Action:
(8.3.1.2)

Submitter: Brett Scharpenter, CB Marketing
Recommendation: Add new text to read as follows:
8.3.1.2 Electric motor-driven fire pumps shall be operated monthly, except as noted.
a). Split case pumps driven by motors of less than 25 HP shall be tested weekly
Substantiation: Field data indicates that a note worthy number of split case fire pumps are discovered in a seized condition during routine inspections/testing. The underlying cause of seizing appears be corrosion. The secondary cause appears to be directly related to the size of the motor. Motors less than 25HP are unable to break the pump free when attempting to start. These smaller motored split case pumps need to be exercised more than monthly to assure proper operation. The seizing issue does not appear to affect vertical in line pumps with motors less than 25HP.

25- Log #247 Final Action:
(8.3.2.1)

Submitter: John Whitney, Clarke Fire Protection Products, Inc.
Recommendation: Revise text to read as follows:
8.3.2.1 A test of the fire pump assemblies shall be conducted without ~~flowing~~ discharging or re-circulating water.
Substantiation: The recirculation of fire pump water back to pump suction is becoming more and more a problem. We see this problem becoming worse because it is becoming more common and with today engines using this water to cool not just the engine, as in days of old, but also to cool the engine intake air temperature which is critical to conform to the EPA engine emission requirements. It is tolerable to see raw cooling water up to 104F, but we have seen temperatures of 120 to 150F plus. You might stuff enough water through the engine at part load to cool the coolant but you cannot keep the inlet air temperature down to acceptable levels; which results in engine alarms due to the engine intake air being too hot and the engine is operating outside of EPA operational compliance. The engine alarms are viewed as a nuisance and something the alarms systems are defeated resulting in putting the fire pump system reliability at risk.

25- Log #248 Final Action:
(8.3.2.7.1 (New))

Submitter: John Whitney, Clarke Fire Protection Products, Inc.
Recommendation: Add text to read as follows:
8.3.2.7.1 The use of the automatic timer allowed in 8.3.2.6 shall not eliminate the requirement of 8.3.2.7 to have qualified operating personnel present during test.

Substantiation: Too many owner/operators are using the timer initiated test to run the test without the presence of a qualified operator.

25- Log #88 Final Action:
(8.3.3.x (New))

Submitter: Zachary L. Magnone, Tyco Fire Protection Products / Rep. Tyco/Simplex Grinnell
Recommendation: Add a new text into Chapter 8 regarding the proper inspection, testing, and maintenance procedures for positive displacement pumps as follows:

8.3.3. X Positive Displacement Pumps. An annual test of each positive displacement pump assembly shall be conducted by qualified personnel under its rated and maximum flow conditions at the system design pressure provided by the owner by controlling the quantity of water or additive discharged through an approved test device.

8.3.3.X.1 The annual test shall be conducted as described in 8.3.3.X.1.1, and 8.3.3.X.1.2, unless otherwise specified by the pump system manufacturer.

8.3.3.X.1.1 Use of Pump Discharge via Bypass Flowmeter or Orifice Plate to Drain or Suction Reservoir. Pump suction and discharge pressure and the flowmeter measurements shall determine the total pump output.

8.3.3.X.1.2 Use of Pump Discharge via Bypass Flowmeter or Orifice Plate to Pump Suction (Closed Loop Metering). Pump suction and discharge pressure and the flowmeter measurements shall determine the total pump output.

8.3.3.X.3 Where the annual test is conducted in accordance with 8.3.3.X.1.2, a test shall be conducted every 3 years in accordance with 8.3.3.X.1.1 in lieu of the method descried in 8.3.3.X.1.2.

8.3.3.X.4 If an orifice plate is present in the discharge piping, the orifice size and corresponding design discharge pressure to be maintained on the upstream side of the orifice plate shall be provided by the owner.

8.3.3.X.4.1 The actual discharge pressure on the upstream side of the orifice plate shall be recorded and compared to the design discharge pressure.

8.3.3.X.4.2 If the actual discharge pressure on the upstream side of the orifice plate is less than 95% of the design discharge pressure, an investigation shall be performed to determine the cause of the reduced pressure.

Substantiation: Positive displacement pumps are routinely utilized to supply all types of water mist systems – wet pipe, dry pipe, deluge, and preaction. As many of these systems are being installed in lieu of standard sprinkler systems for the same application, it is necessary to ensure they are inspected, tested, and maintained to achieve an equivalent level of dependability. The existing annual flow test requirements of Chapter 8 are unique to centrifugal pumps – e.g. the test to ensure 150% rated capacity at 65% rated head – which are characteristics not mutually inherent to positive displacement pumps. A unique feature of positive displacement pumps is the fact that the flow they supply is directly proportional to driver speed (RPM), and that pressure is typically controlled via a pressure sustaining valve or other regulating bypass device installed downstream of the pump. As a result they exhibit a fairly flat pump curve which ends abruptly once the maximum capacity of the pump is reached. In addition, they do not “churn” in the same manner as a standard fire pump. Therefore, an annual flow test program specific to the key operating characteristics of positive displacement pumps is required. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
Portions of the above text have been copied or paraphrased from the 2010 edition of NFPA 20, Standard for the Installation of Stationary Fire Pumps for Fire Protection.

25- Log #45 Final Action:
(8.3.3.1)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:

8.3.3.1* An annual test if each pump assembly shall be conducted by qualified personnel under minimum, rated and ~~peak~~ 150% of the pump rated capacity flows of the fire pump by controlling the quantity of water discharged through approved test devices.

Substantiation: The clarification of 150% instead of peak gives the user a defined meaning to the word (peak). This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #46 Final Action:
(8.3.3.1.1)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.3.3.1.1 If available suction supplies do not allow flowing of 150 percent of the rated pump capacity, the fire pump shall be permitted to operate at maximum allowable discharge equal to or greater than the system demand as supplied by the owner.
Substantiation: The clarification allows for the maximum discharge rate, but still requires the system demand be met as an acceptable test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #278 Final Action:
(8.3.3.1.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise text to read as follows:
8.3.3.1.1 If available suction supplies do not allow flowing of 150 percent of the rated pump capacity, the fire pump shall be permitted to operate at maximum allowable discharge as long as the pump meets the fire protection system demand (as provided by the owner) or the rated flow of the pump, whichever is greater.
Substantiation: The concept of not reaching 150% of the rated flow of the pump during the test has been long established. However, the NFPA 20 committee has recently clarified that they want the pump to at least be capable of reaching the fire protection system demand or the rated flow of the pump, whichever is greater. NFPA 25 should be changed to agree with NFPA 20.

25- Log #198 Final Action:
(8.3.3.1.2.3)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
… pump output. When testing in this manor, extreme care shall be taken as the water in the closed loop will increase in temperature and can destroy the equipment.
Substantiation: Several fire pump systems have been damaged by using this form of testing.

25- Log #199 Final Action:
(8.3.3.1.3)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
The annual test of each pump assembly, at each flow point, shall apply theoretical factors for the correction to the rated speed and velocity head where determining the compliance of the pump per the test.
Substantiation: The fire pump manufacturer’s curves include any applicable speed and velocity head corrections.

25- Log #47 Final Action:
(8.3.3.2(3) and A.8.3.3.2(3) (New))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.3.3.2(3)* For electric motor-driven pumps, the pump shall not be shut down until the pump has run for 10 minutes.
A.8.3.3.2(3) It is not necessary to flow water for the entire duration as long as the flow conditions are met.
Substantiation: Clarification allows for not discharging water during this time, but would allow churn for time stated. In areas with severe water restrictions this would define the intent of the standard more clearly. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #48 Final Action:
(8.3.3.2(4) and A.8.3.3.2(4) (New))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.3.3.2(4)* For diesel motor-driven pumps, the pump shall not be shut down until the pump has run for 30 minutes.
A.8.3.3.2(4) It is not necessary to flow water for the entire duration as long as the flow conditions are met.
Substantiation: Clarification allows for not discharging water during this time, but would allow churn for time stated. In areas with severe water restrictions this would define the intent of the standard more clearly. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #49 Final Action:
(8.3.3.3.2.1 (New))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Add new text to read as follows:
8.3.3.3.2.1 When it is necessary to close the relief valve to achieve minimum rated characteristics for the pump, the discharge indicating gate of butterfly valve shall be closed for the duration of the test.
Substantiation: This action allows for closing the pump discharge valve as to not permit over pressurization of the buildings sprinkler system(s). This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #249 Final Action:
(8.3.3.4(3) (New))

Submitter: John Whitney, Clarke Fire Protection Products, Inc.
Recommendation: Revise text to add; Verify that pump continues to perform at peak load on the alternate power source for 10 minutes or 30 minutes if alternate power source is a standby generator set.
Substantiation: During annual tests it is only appropriate that the alternate power source also be tested to assure that circuits and generators be tested to confirm they perform under peak load.

25- Log #292 Final Action:
(8.3.5 and A.8.3.5.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Delete the first paragraph of A.8.3.5.1.
Move the second, third and fourth paragraphs of A.8.3.5.1 to a new annex section A.8.3.3.
Replace 8.3.5 and all of its subsections and annex notes with the following:
8.3.5 Test Results and Evaluation
8.3.5.1 Interpretation
8.3.5.1.1 The interpretation of the test results shall be the basis for determining performance of the pump assembly.
8.3.5.1.2 Qualified individuals shall interpret the test results.
8.3.5.1.3 If the pump turned at rated speed during the test, the results shall be evaluated using the procedure in 8.3.5.2.
8.3.5.1.4 If the pump did not turn at rated speed during the test, the results shall be evaluated using the procedure in 8.3.5.3.
8.3.5.2 Evaluation for Pumps that Turned at Rated Speed During the Test
8.3.5.2.1 The net pressure curve (net pressure as a function of flow) shall be plotted on linear graph paper and shall be evaluated as follows:
(1)* The net pressure curve for this test shall be compared to the net pressure curve from the acceptance test as plotted at rated speed as provided by the owner if available.
(2) The net pressure at the three data points collected during the test shall be compared to the information on the pump nameplate.
(3) The fire pump assembly shall be considered acceptable if either of the following conditions is shown from the test results:
(a) The net pressure at rated flow during the test is at least 95% of the net pressure at rated flow from the original acceptance test at rated speed.
(b) The net pressure at churn, rated flow and maximum flow during the test are all at least 95% of the net pressure indicated for these three flows on the pump nameplate.
(4) The discharge pressure of the pump during the test shall meet or exceed the discharge pressure required for the fire protection system(s) as supplied by the owner.
8.3.5.2.2* Test results from section 8.3.5.2.1 that are not acceptable shall require an investigation to reveal the cause of degraded performance.
8.3.5.2.3 For electric motor driven fire pumps, current and voltage readings shall not exceed the product of the rated voltage and rated full-load current multiplied by the permitted safety factor.
8.3.5.2.4 For electric motor driven fire pumps, the voltage readings at the motor shall be within 5 percent below or 10 percent above the rated (i.e. nameplate) voltage.
8.3.5.3 Evaluation for Pumps that Did Not Turn at Rated Speed During the Test
8.3.5.3.1 The data from the test (net pressure and flow) shall be adjusted using theoretical factors to correct the results to rated speed and the adjusted net pressure curve (net pressure as a function of flow) shall be plotted on linear graph paper and shall be evaluated as follows:
(1)* The adjusted net pressure curve for this test shall be compared to the net pressure curve from the acceptance test as plotted at rated speed as provided by the owner if available.
(2) The adjusted net pressure at the three data points collected during the test shall be compared to the information on the pump nameplate.
(3) The internal components of the pump shall be considered acceptable if either of the following conditions is shown from the test results:
(a) The adjusted net pressure at rated flow during the test is at least 95% of the net pressure at rated flow from the original acceptance test at rated speed.
(b) The adjusted net pressure at churn, rated flow and maximum flow during the test are all at least 95% of the net pressure indicated for these three flows on the pump nameplate.
8.3.5.3.2* Test results from section 8.3.5.3.1 that are not acceptable shall require an investigation to reveal the cause of degraded performance.
8.3.5.3.3* If the rotation of the pump was more than ±10% of the rated speed, the assembly shall not be considered acceptable.
8.3.5.3.4 The unadjusted discharge pressure of the pump during the test shall meet or exceed the discharge pressure

required for the fire protection system(s) as supplied by the owner.

8.3.5.3.5 For electric motor driven fire pumps, current and voltage readings shall not exceed the product of the rated voltage and rated full-load current multiplied by the permitted safety factor.

8.3.5.3.6 For electric motor driven fire pumps, the voltage readings at the motor shall be within 5 percent below or 10 percent above the rated (i.e. nameplate) voltage.

A.8.3.5.2.1(1) The owner should have retained the performance curve from the acceptance test. The version of the performance curve from the acceptance test that is most useful is the version with the pump running at rated speed. The version of the acceptance test with the pump running at the speed of the manufacturers shop test may not be as valuable since it may not be at the rated speed of the pump and driver on this particular installation. If the owner has the acceptance test data with the pump running at rated speed, this can be used directly for comparison for this test. If the owner has the acceptance test data for the pump running at the manufacturers shop speed, the data can be adjusted to rated speed, and this adjusted data used as the baseline for future pump performance.

Figure A.8.3.5.2.1(1) shows the results from a pump test with the unadjusted pump test data on linear graph paper. While NFPA 25 only requires the plot of the net pressure, it is helpful to plot the suction pressure and discharge pressure as shown in the figure. Note that the system demands are below the discharge curve, making the pump assembly acceptable from this perspective.

Figure A.8.3.5.2.1(1) <old figure A.8.3.5.3(1)(b)>

A.8.3.5.2.2 See Annex C.

A.8.3.5.3.1(1) The owner should have retained the performance curve from the acceptance test. The version of the performance curve from the acceptance test that is most useful is the version with the pump running at rated speed. The version of the acceptance test with the pump running at the speed of the manufacturers shop test may not be as valuable since it may not be at the rated speed of the pump and driver on this particular installation. If the owner has the acceptance test data with the pump running at rated speed, this can be used directly for comparison for this test. If the owner has the acceptance test data for the pump running at the manufacturers shop speed, the data can be adjusted to rated speed, and this adjusted data used as the baseline for future pump performance.

Figure A.8.3.5.3.1(1) shows the results from a pump test with the pump test data on linear graph paper adjusted to rated speed. While NFPA 25 only requires the plot of the net pressure, it is helpful to plot the suction pressure and discharge pressure as shown in the figure. There are actually five curves on the figure with two of them (a recent field test and the adjusted results of this test) so closely overlapping, they are difficult to distinguish from each other. The fact that these curves are so close is a good indication that the internal parts of the pump are functioning well.

Figure A.8.3.5.3.1(1) <old Figure A.8.3.5.3(1)(a)>

A.8.3.5.3.2 See Annex C.

A.8.3.5.3.3 While the adjusted pump data may show that the internal working parts of the pump are functioning correctly, it does not mean that the pump assembly is acceptable. If the pump is turning too fast, it will overpressurize the system. If the pump is turning too slow, the proper system pressure may never be reached. Neither one of these conditions would be indicated by looking at the adjusted data from the pump test. Therefore, this extra step was inserted in the analysis. If the pump is running close to rated speed (within 10%) it should be close enough to expected performance so that it is not a problem. NFPA 20 requires the system to be designed to handle the pressure if the pump runs as high as 10% over rated speed. But if the pump turns faster than 10% over rated speed, or more than 10% below rated speed, it will need to be adjusted so that it runs at rated speed.

Substantiation: The first part of A.8.3.5.1 has been incorporated into the rewrite. The rest of A.8.3.5.1 is more appropriate for the test requirements (calibration of test equipment) than it is for the evaluation of the data after the test is run. If you run the test with equipment that is not calibrated, it is too late by the time the data evaluation is being conducted to fix the problem.

The rewrite hopes to clarify the rules with respect to when the data gets adjusted for rated speed and when it does not. There has been a great deal of confusion on this point. Right now, the standard contradicts itself by stating in section 8.3.5.2.1 that the data always has to be correct to rated speed for the comparison. But then sections 8.3.5.4 and 8.3.5.7 say that the unadjusted data needs to be used.

The reality is that both conditions need to be dealt with at different times depending on the outcome of the test. The rewrite hopes to straighten out when data needs to be adjusted and when it does not by splitting the evaluation section into two parts. One part is used when the pump runs at rated speed during the test, the other part for when it does not. By splitting the evaluation, it becomes more clear how and when to make the adjustments to rated speed.

The rewrite attempts to keep the requirements consistent with the intent of the previous editions, while clarifying that intent.

25- Log #138 Final Action:
(8.3.5.1.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 8.3.5.1.1 as follows:
8.3.5.1.1 The interpretation of the test results shall be the basis for determining ~~performance~~ the pass/fail criteria of the fire pump ~~assembly~~ system.
Substantiation: The intent of a NFPA 25 test of a fire pump is not to determine if the pump assembly alone is performing satisfactorily, but is to determine if the entire fire pump system will meet the demand of the fire protection system. There are actually two criteria the fire pump has to meet, to be within 95% of the name plate rated pressure and flow, and meet system demand. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #200 Final Action:
(8.3.5.1.2)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
… test results~~.~~ and make a specific written evaluation of the system.
Substantiation: The testing means nothing unless a written report is made to evaluate the equipment.

25- Log #50 Final Action:
(8.3.5.2.1)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Delete 8.3.5.2.1:
8.3.5.2.1 ~~Theoretical factors for corrections to the rated speed shall be applied where determining the compliance of the pump per the test.~~
Substantiation: Periodic test results per this standard are not theoretical and should not be adjusted by any theoretical factors. Theoretical factors are required to be applied for acceptance testing per NFPA 20, but not this standard. Modifications allows reference to NFPA 20 for which the standard for compliance of the pump should be stated. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group

25- Log #201 Final Action:
(8.3.5.2.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
…rated speed and velocity shall be applied…
Substantiation: The fire pump manufacturer's curves include any applicable speed and velocity head corrections.

25- Log #202 Final Action:
(8.3.5.2.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
…rated speed and velocity shall be applied…
Substantiation: The fire pump manufacturer's curves include any applicable speed and velocity head corrections.

25- Log #232 Final Action:
(8.3.5.2.1 and A.8.3.5.2.1)

Submitter: James M. Feld, University of California
Recommendation: Delete Section 8.3.5.2.1
8.3.5.2.1* ~~Theoretical factors for correction to the rated speed shall be applied where determining the compliance of the pump per the test.~~ Where the speed of the driver during a test varies from the rated speed of the driver, the test flow rates and pressures shall be corrected as allowed by NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection.
A.8.3.5.2.1 Extract Section A.14.2.5.4(f) from NFPA 20
8.3.5.2.1.1 A test curve (flow versus pressure) shall be prepared showing the results of the current test and the manufacturer's shop test results or the test points shown on the pump nameplate. Any significant deviation shall be cause for investigation and correction.
Substantiation: The term "theoretical factors" is not defined. The intent was to use the correction procedure as shown in NFPA 20 sometime referred to as the affinity laws. When the test speed of the pump is different from the certified shop test curve, the test pressures and flow rates must be corrected in order to compare the test results to the manufacturer's shop test results. A variation in the test results may be used to identify a problem in the fire pump. Use of the correction procedure (affinity laws) to determine compliance is inappropriate. The fire pump must be capable of satisfying the fire protection system demand, hopefully with a safety factor.

25- Log #139 Final Action:
(8.3.5.3)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add section title to 8.3.5.3 as shown.
8.3.5.3 Test Pass/Fail Criteria
Renumber current sections as follows: 8.3.5.3 as 8.3.5.3.1; 8.3.5.4 as 8.3.5.3.2; 8.3.5.5 as 8.3.5.3.3; 8.3.5.6 as 8.3.5.3.4; and 8.3.5.7 as 8.3.5.3.5.
Substantiation: The current structure in this section is confusing. The pass/fail criteria should have a separate section title so it's easy to find, and it stands out when searching the document. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #233 Final Action:
(8.3.5.3 and 8.3.5.7)

Submitter: James M. Feld, University of California
Recommendation: Revise text to read as follows:
8.3.5.3 The fire pump assembly shall be considered acceptable if either of the following conditions is shown during the test provided the pump is capable of supplying the system demand using unadjusted flow rates and pressures as provided by the owner:
(1)* The unadjusted test results are ~~test is~~ no less than 95 percent of the pressure at rated flow and rated speed of the initial unadjusted field acceptance test curve, provided that the original acceptance test curve matches the original certified pump curve by using the correction procedure identified in NFPA 20 ~~theoretical factors~~.
(2) ~~The fire pump is~~ The unadjusted test results are no less than 95 percent of the performance characteristics as indicated on the pump nameplate.
~~8.3.5.7 The pump performance shall be evaluated using the unadjusted flow rates and pressures to ensure the pump can supply the system demand as supplied by the owner.~~
Substantiation: It is important that the fire pump is capable of supplying the system demand whether it is a fire sprinkler system, standpipe system, fire hydrants, etc. If the test results are within 95% of the initial acceptance test (unadjusted data) but less than the system demand, the test must be considered a failure and in need of correction. "Theoretical factors" is not defined. Section 8.3.5.7 is deleted because it is incorporated into Section 8.3.5.3.

25- Log #51 Final Action:
(8.3.5.3(1))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
8.3.5.3(1)* The test is no less than 95 percent of the pressure at rated flow and rated speed of the initial unadjusted field acceptance test curve, ~~provided that the original acceptance test curve matches the original certified pump curve by using theoretical factors.~~
Substantiation: Modification removes the use of theoretical factors when reviewing the results of the annual performance test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #203 Final Action:
(8.3.5.6)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
… at the motor starter output terminals shall be with 5% below…
Substantiation: The section needs to be modified to match the action taken by the NFPA #20 TC.

25- Log #204 Final Action:
(8.5.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
…manufacturer's recommendations and table 8.1.2.
Substantiation: Adds clarification

25- Log #250 Final Action:
(8.5.4 and A.8.5.4.1 (New))

Submitter: John Whitney, Clarke Fire Protection Products, Inc.
Recommendation: Add text to read as follows:

8.5.4 Fuel Maintenance.

8.5.4.1* The diesel fuel stored in the fuel supply tank shall be maintained to insure the quality of the fuel does not degrade while in storage.

A.8.5.4.1 Commercial distillate fuel oils used in modern diesel engines are subject to various detrimental effects from storage. The origin of the crude oil, refinement processing techniques, time of year, and geographical consumption location all influence the determination of fuel blend formulas. Naturally occurring gums, waxes, soluble metallic soaps, water, dirt, blends and temperature all contribute to the degradation of the fuel as it is handled and stored. These effects begin at the time of fuel refinement and continue until consumption. Proper maintenance of stored distillate fuel is critical for engine operation, efficiency, and longevity.

Storage tanks should be kept water-free. Water contributes to steel tank corrosion and the development of microbiological growth where fuel and water interface. This and the metals of the system provide elements that react with fuel to form certain gels or organic acids, resulting in clogging of filters and system corrosion.

Scheduled fuel maintenance helps to reduce fuel degradation. Fuel maintenance filtration can remove contaminants and water and maintain fuel conditions to provide reliability and efficiency for standby fire pump engines. Fuel maintenance and testing should begin the day of installation and first fill.

8.5.4.1.1 Where environmental or fuel quality conditions result in degradation of the fuel while stored in the supply tank, from items such as water, micro-organisms and particulates, or destabilization, a listed active fuel maintenance system shall be retrofit installed to maintain fuel quality.

8.5.4.1.1.1 When an external active fuel maintenance system is retrofit installed per paragraph 8.5.4.1.1 or NFPA 20 paragraph 11.6.4 it shall be installed in accordance with NFPA 20 paragraph 11.6.4.

8.5.4.2 Fuel shall be tested at minimum annually to insure the quality of the fuel.

8.5.4.3 Fuel additives and EPA Registered biocide shall be added as recommended by the fuel supplier and active fuel maintenance system supplier, or as a result of test results, to insure the quality of the fuel maintained while in storage.
Add new item in Table 8.1.2 under *Fuel*; 'Fuel Condition' and put an X in the Test column and put 'Annually' in the Frequency column

Substantiation: The characteristics of diesel fuel are changing and proper storage is becoming extremely important to insure reliable operation of engines. Even when the proper fuel has been purchased and put into the fuel storage tank long term reliability can not be assumed. For reasons as explained in the proposed annex text, and governmental mandated addition of various blends of bio-fuel, diesel fuel is requiring additional attention to insure reliable use in diesel engines for stand-by service.

This Proposal is in concert with actions taken by NFPA 20 TC for the 2013 revision which will require an active fuel maintenance system on all new installations. It is only appropriate that maintenance programs for existing installations test fuel for degradation and where degradation is found to be present an appropriate active system maintenance system as define by NFPA 20 be installed.

25- Log #3 Final Action:
(8.6.1)

Note: This proposal appeared as Comment 25-79 (Log #65) which was held from the Annual 2010 ROC on Proposal 25-146.
Submitter: William F. Stelter, Master Control Systems, Inc
Recommendation: Revise text to read as follows:
Accept ROP wording with the following changes:
Electrical System/Controller
Critical electronic component or module that can prevent the controller from starting or running.
Non-critical electronic component or module
Substantiation: Clarifies what is meant by a critical or non-critical component.

25- Log #205 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Cooling system [Repair] [Rebuild] [Replace] Perform test in accordance with ~~8.3.2~~ 8.3.3
Substantiation: The engine cooling rate varies as the load on the diesel driver changes. If the diesel engine is only operated at churn we are not truly testing to ensure that the heat transfer from the engine to the cooling water is acceptable. 30-minutes of operation is adequate to bring the engine up to running temperature. However, without loading the driver we can never know if the engine can stay cool while fighting a fire at load.

25- Log #206 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Fuel injector pump [Adjust] [Replace] Perform test in accordance with ~~8.3.2~~ 8.3.3
Substantiation: The fuel injector pump varies the amount of fuel supplied as the load on the driver changes. If the injector pump is adjusted or replaced the proper test is an annual flow test where the load on the driver will change and the speed can be verified to be within NFPA 20 11.2.4.1.1 tolerance (10% droop).

25- Log #207 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Incomming power conductors [Replace] Perform a 1-hour full-load current test including six starts at peak load
Substantiation: The load carrying wiring builds heat as energy passes through. The wirign can only be truely tested after energy has passed through the conductors and they have achieved a higher than ambient temperature. The largest amperage draw on the conductors would be at fire pump start-up. The most strict test of the conductors would be starting under peak load six times after 1-hour of run time.

25- Log #208 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Electric motor [Repair] [Rebuild] [Replace] Perform acceptance test in accordance with NFPA 20 with alignment check
Substantiation: When the electric motor is bolted down to the structural steel base the driver and pump shafts could be as much as 1/8" off. The holes through the feet of the motor allow for some movement. A dial indicator or laser alignment check should be required in addition to acceptance test to ensure proper installation.

25- Log #209 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Circuit breaker [Replace] Perform 1-hour full-load current test including six starts at peak load
Substantiation: The circuit breaker internal components build heat as energy passes through the device. The circuit breaker can only be truely tested after the device has been operated. The largest amperage draw that the circuit breaker would realize would be at fire pump start-up. The most strict test of the circuit breaker would be starting under peak load after 1-hour of run time.

25- Log #210 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Main contactor [Repair] ~~Perform test in accordance with 8.3.2~~
Main contactor [Repair] [Replace] Perform acceptance test in accordance with NFPA 20
Substantiation: A repair of the main contactor could be a magnetic coil or contacts. The magnetic coil within the main contactor and the contacts when replaced or cleaned should be checked at peak load to be tested thoroughly. An acceptance test ensures that the fire pump is operated for at least an 1-hour duration and tested at peak load.

25- Log #211 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Power monitor [Replace] ~~Perform test in accordance with 8.3.2~~ Perform six operations of the circuit breaker / isolation switch disconnect (cycle the power on/off)
Substantiation: The churn test requirement per 8.3.2 doesn't require the control panel power to be cycled on/off. A churn test in accordance with 8.3.2 does not test functionality of this device.

25- Log #212 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Start relay [Replace] ~~Perform test in accordance with 8.3.2~~ Perform six momentary starts in accordance with NFPA 20
Substantiation: The churn test requirement per 8.3.2 requires the control panel to automatically start just one time. A more thorough test of the start relay when replaced should require several sequential successful starts to ensure reliability.

25- Log #213 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Pressure transducer [Adjust] [Replace] ~~Perform acceptance test in accordance with NFPA 20~~ Perform six automatic no-load starts
Substantiation: The acceptance test requirement for adjusting / changing the pressure transducer adds no value over a churn test with automatic starts. The pressure transducer is a non-load carrying component and a proper test can be conducted without water flow.

25- Log #214 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Transfer switch – load carrying parts [Repair] [Rebuild] [Replace] Perform a 1-hour full-load current test, six momentary starts at peak load, and transfer from normal power to emergency power and back one time
Substantiation: The load carrying transfer switch parts now include a circuit breaker per the new FM requirement in 2010. The internal components of the circuit breaker build heat as energy passes through the device. The circuit breaker can only be truely tested after the device has been operated. The largest amperage draw that the circuit breaker would realize would be at fire pump start-up. The most strict test of the circuit breaker would be starting under peak load six times after 1-hour of run time in addition to one power transfer.

25- Log #215 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Entire controller ~~[Repair] [Rebuild]~~ [Replace] Perform acceptance test in accordance with NFPA 20
Substantiation: The terms repair an entire controller or rebuild an entire controller are too vague. The balance of the Electrical System / Controller section goesnto more detail about the testing required for individual controller component repair or rebuild.

25- Log #216 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Casing [Repair] [Replace] Perform acceptance test in accordance with NFPA #20 with alignment check
Substantiation: When the fire pump casing is bolted down to the structural steel base the driver and pump shafts could be as much as 1/8" off. The holes through the feet of the fire pump allow for some movement. A dial indicator or laser alignment check should be required to ensure proper installation.

25- Log #217 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Pump room suction / discharge pipe [Repair] [Replace] Perform visual inspection and a test in accordance with ~~8.3.3.7~~ 8.3.3 with alignment check
Substantiation: 8.3.3.7 is a broken reference. When piping is repaired or replaced it can relax when uncoupled from adjacent flanges or fittings. When the piping is reconnected it could pull the fire pump out of alignment with the driver. A visual inspection is not enough to determine if the pump has moved out of place. A dial indicator or laser alignment check should be required in addition to annual test to ensure proper installation.

25- Log #218 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Pump room suction / discharge valves [Repair] [Rebuild] [Replace] Perform visual inspection and a test in accordance with ~~8.3.3.7~~ 8.3.3 with alignment check
Substantiation: 8.3.3.7 is a broken reference. When valves are repaired, rebuilt or replaced they can allow the adjacent piping to relax when uncoupled. When the piping is reconnected it could pull the fire pump out of alignment with the driver. A visual inspection is not enough to determine if the pump has moved out of place. A dial indicator or laser alignment check should be required in addition to annual test to ensure proper installation.

25- Log #219 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Pump room suction / discharge valves [Repair] [Rebuild] [Replace] Perform visual inspection and a test in accordance with ~~8.3.3.7~~ 8.3.3 and 13.3.3.1 with alignment check
Substantiation: 8.3.3.7 is a broken reference. When valves are repaired, rebuilt or replaced they can allow the adjacent piping to relax when uncoupled. When the piping is reconnected it could pull the fire pump out of alignment with the driver. A visual inspection is not enough to determine if the pump has moved out of place. A dial indicator or laser alignment check should be required in addition to annual test to ensure proper installation. A test of the full range of motion of the valve(s) should also be completed to ensure that the internal components of the valve(s) are not binding up against the adjacent fittings.

25- Log #220 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Base plate [Repair] [Replace] Perform test in accordance with ~~8.3.2~~ 8.3.3 with alignment check
Substantiation: The fire pump and driver while operating under load will create more axial and radial thrusts than when operating at churn. The true test of the base plate should include some degree of load testing.

25- Log #221 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Base plate [Repair] [Replace] Perform test in accordance with ~~8.3.2~~ 8.3.3 with alignment check
Substantiation: The fire pump and driver while operating under load will create more axial and radial thrusts than when operating at churn. The true test of the base plate should include some degree of load testing.

25- Log #222 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Steam regulator or source upgrade [Repair] [Replace] Perform ~~annual~~ acceptance test in accordance with NFPA 20.
Substantiation: The steam regulator effects the way that the entire system operates. This is a critical component to the steam turbine and shall require an acceptance test to ensure reliability.

25- Log #228 Final Action:
(8.6.1)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Drive coupling [Adjust] ~~[Repair] [Rebuild] [Replace]~~ Perform test in accordance with 8.3.2
Drive coupling [Repair] [Rebuild] [Replace] Perform acceptance test in accordance with NFPA 20 with alignment check

Substantiation: When the drive coupling is adjusted it can be as simple as retightening a set screw through the t-hub into the shaft key. This service would not cause either shaft to move. However, if the coupling insert was repaired, if the coupling was rebuilt or replaced either the fire pump of driver would have to temporarily be moved to facilitate the removal of the t-hubs, grid or insert. A dial indicator or laser alignment check should be required to ensure proper installation.

25- Log #223 Final Action:
(8.6.2)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
…component replacement. The most stringent test requirements between NFPA 20 and 25 shall be followed.
Substantiation: Adds clarification

25- Log #224 Final Action:
(8.6.3)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Replacement parts shall be provided that will maintain the listing for the fire pump component assembly whenever possible. If the part is no longer available from the original equipment manufacturer than a like part that has been approved by a listing organization for a different manufacturer.
Substantiation: In most cases component replacement falls under the scope of NFPA 25. The pertinent information from NFPA 20 must be moved to NFPA 25.

25- Log #225 Final Action:
(8.6.4)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Revise text to read as follows:
Critical path components include the following features of the pump equipment: (1) Fire pumps (a) impeller, casing, shaft (b) Gear drives (2) Fire pump controllers (electric or diesel): total replacement (3) Electric motor, steam turbines, or diesel engine drivers (a) Electric motor replacement (b) Steam turbine replacement ro rebuild (c) Steam regulator or source upgrade (d) Engine replacement or engine rebuild.
Substantiation: In most cases component replacement falls under the scope of NFPA 25. The pertinent information from NFPA 20 must be moved to NFPA 25.

25- Log #226 Final Action:
(8.6.5)

Submitter: Damon T. Pietraz, Underwood Fire Equipment, Inc.
Recommendation: Add new text to read as follows:
Whenever replacement, change, or modification to a critical path component is performed on a fire pump, driver, or controller as described in table 8.6.1, a retest shall be conducted as indicated in the table by the pump manufacturer, factory authorized representative, or qualified persons acceptable to the authority having jurisdiction.
Substantiation: In most cases component replacement falls under the scope of NFPA 25. The pertinent information from NFPA 20 must be moved to NFPA 25 and the sections renumbered correctly.

25- Log #52 Final Action:
(8.8.4.2.1 (New))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Add new text to read as follows:
8.8.4.2.1 A copy of test results shall be posted on the pump controller.
Substantiation: Addition would provide a copy of previous tests at a specified location for comparison purposes. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #279 Final Action:
(9.2.1.1 and 9.2.1.2)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add new text to read as follows:
9.2.1.1* The water level in ~~T~~tanks equipped with . . .
9.2.1.2 The water level in ~~T~~tanks not equipped with . . .
Substantiation: It's the water level that needs to be inspected, not the tank.

25- Log #280 Final Action:
(9.2.2.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add "The air pressure in" to the beginning of 9.2.2.1 so that it reads as follows:
9.2.2.1 The air pressure in ~~P~~pressure tanks . . .
Substantiation: It's the air pressure that needs to be inspected, not the pressure tank. Section 9.2.2.2 got this correct and the previous section needs to be consistent.

25- Log #4 Final Action:
(9.2.4)

Submitter: James Whitehead, Los Alamos National Laboratory
Recommendation: Add new text as follows:
9.2.4.1 The temperature of water tanks shall not be less than 40°F (4.4°C).
9.2.4.2 The temperature of water tanks with low temperature alarms connected to a constantly attended location shall be inspected and recorded monthly during the heating season when the mean temperature is less than 40°F (4.4°C).
9.2.4.3 The temperature of water in tanks without low temperature alarms connected to a constantly attended location shall be inspected and recorded weekly during the heating season when the mean temperature is less than 40°F (4.4°C).
Substantiation: I propose that the committee agree on what is the acceptable temperature to heat water tanks 40°F or 42°F. It is obvious that 42°F would fulfill both requirements, but I find the lack of consistency to be absurd when considering the cost of these documents.
This is not original material; its reference/source is as follows:
The previous NFPA committee members that convened to revise NFPA 22 and NFPA 25 are the authors of this mistake.

25- Log #282 Final Action:
(9.3.3 and 9.3.5)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Change the word "alarms" to "signals" in both sections
Substantiation: Using the terminology of NFPA 72, an "alarm" is an indication of a condition where the only correct action is to call the fire department. For other indications of problems in a system, the correct term is a "signal". The correct action when a low temperature or low water condition occurs is not to call the fire department. Therefore, the term needs to be changed from "alarm" to "signal".

25- Log #281 Final Action:
(9.5.1.1 and Table 9.5.1.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise 9.5.1.1 to read as follows:
9.5.1.1 Automatic tank fill valves shall be inspected ~~weekly to ensure that the OS&Y isolation valves are in the normal open position~~ in accordance with Table 9.5.1.1. OS&Y isolation valves that are a part of the automatic fill valves shall be inspected in accordance with Chapter 13.
Also, in the first row of Table 9.5.1.1, "Strainers, filters, orifices (inspect and clean)", change the frequency from "Quarterly" to "5 years"
Substantiation: Current section 9.5.1.1 mixes up two different concepts. It has requirements for OS&Y valves and then sends the user to Table 9.5.1.1, but the table does not contain requirements for OS&Y valves. The weekly requirement for the OS&Y valves to be inspected is inappropriate. OS&Y valves with electronic supervision should be allowed to be inspected monthly as permitted by Chapter 13.
Within the table, the inspection requirements for filters, orifices and strainers are too onerous. These objects are inside the valve and it is not efficient to take these valves apart quarterly to inspect these internal parts. For alarm valves and quick opening devices, Chapter 13 allows these filters, orifices and strainers to be inspected once every 5 years and the same frequency should be used for tank fill valves.

25- Log #90 Final Action:
(10.2.5.1)

Submitter: Kevin Turay, SimplexGrinnell / Rep. Tyco/Simplex Grinnell
Recommendation: Propose revision of wording of 10.2.5.1 in Chapter 10 Water Spray Fixed Systems as follows:
10.2.5.1 Water spray nozzles shall be inspected and maintained to ensure that they are in place, continue to be aimed or pointed in the direction intended ~~in the system design~~, and are free from external loading and corrosion.
Substantiation: This proposed revision is to remove the reference about system design as Inspectors are not Designers and would not be knowledgeable of the design criteria. They can only inspect as installed and observe if there appears to be proper spray direction to furnish coverage. This proposal is being submitted by the Tyco Codes and Standards ITM Task Group.

25- Log #265 Final Action:
(10.3.4.4.3)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add "as provided by the owner" to 10.3.4.4.3 so that the sentence reads:
10.3.4.4.3 Readings shall be compared to the hydraulic design pressures as provided by the owner to ensure . . .
Substantiation: The person performing the test is not in a position to determine the original design pressure of the system. The owner needs to be responsible for providing this information.

25- Log #56 Final Action:
(11.3.5.3)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
11.3.5.3 Concentration shall be within 10 percent of the acceptance test results as provided by the owner, but in no case more than 10 percent below minimum design standards.
Substantiation: Standard references the acceptance test as a baseline and this modification requires the owner to provide this data for the comparison. The proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #89 Final Action:
(Table 12.1.2 and 12.2.4)

Submitter: Zachary L. Magnone, Tyco Fire Protection Products / Rep. Tyco/Simplex Grinnell
Recommendation: Table 12.1.2 and 12.2.4 should be combined and reorganized to be consistent with the general style of the other chapters in the standard – e.g. Table 5.1.1.2. The related chapter entries should be updated in accordance with the change, and the revised table should be renumbered and renamed similar to the following:
Table 12.1.1.2 Summary of Water Mist System Inspection, Testing, and Maintenance
In addition, references to the applicable chapters should be identified and added into the table for the various components – e.g. chapter 8 for fire pumps, chapter 9 for tanks, etc.

Substantiation: Water mist systems are being utilized in lieu of standard sprinkler and fixed water spray systems for various applications. Considering that in many ways, water mist systems are functionally similar to the systems they are replacing, they should still adhere to – at a minimum – and identical level of inspection, testing, and maintenance. Being a direct import from NFPA 750, the current design of chapter 12 is confusing, difficult to use, and does not adequately address the required inspection, testing, and maintenance procedures of many parts and pieces of the system. As a result, the tables in Chapter 12 should be updated to follow the same architecture as the rest of the standard. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #334 Final Action:
(Table 12.1.2 - (Pump))

Submitter: Scott J. Harrison, Marioff Inc.
Recommendation: Revise table to read as follows:

****Insert Table 12.1.2 Log #334 Here****

Substantiation: The frequency posted in Table 12.1.2 for inspecting the Standby Pump moisture trap and oil injection (pneumatic) is not adequate. It should be increased from quarterly to monthly to reduce the possibility of any moisture building up. The text "and empty" should be added so not only is the moisture trap inspected but any moisture should be required to be emptied as well.

Table 12.1.2 Maintenance of Water Mist Systems

Item	Task	Weekly	Monthly	Quarterly	Semi-Annually	Annually	Other
Standby Pump	Inspect and empty the moisture trap, inspect oil injection (pneumatic)		X	~~X~~			

25- Log #333 Final Action:
(Table 12.1.2 - (Tanks))

Submitter: Scott J. Harrison, Marioff Inc.
Recommendation: Revise table to read as follows:

****Insert Table 12.1.2 Log #333 Here****

Substantiation: The frequency posted in Table 12.1.2 for checking the water level in Water Storage Tanks (unsupervised) as “weekly” is excessive and unnecessary. It should be changed to a “monthly” basis.

25- Log #332 Final Action:
(Table 12.1.2 - (Valve))

Submitter: Scott J. Harrison, Marioff Inc.
Recommendation: Revise table to read as follows:

****Insert Table 12.1.2 Log #332 Here****

Substantiation: The frequency posted in Table 12.1.2 for testing the solenoid release of master release valves should be increased from Annually to Semi-Annually. The integrity of these valves should be tested more frequently to confirm successful operation of these devices during a fire.

25- Log #69 Final Action:
(Table 13.1.1.2)

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Table 13.1.1.2 - add reference to gauges under "Testing" Frequency and Reference.

Insert Table 13.1.1.2 Here

Substantiation: This requirement is intended to be consistent with other sections in this document.

Table 12.1.2 Maintenance of Water Mist Systems

Item	Task	Weekly	Monthly	Quarterly	Semi-Annually	Annually	Other
Water Storage Tanks	Check water level (unsupervised)	~~X~~	X				

Table 12.1.2 Maintenance of Water Mist Systems

Item	Task	Weekly	Monthly	Quarterly	Semi-Annually	Annually	Other
Pneumatic Valves	Test solenoid release of master release valves				X	~~X~~	

Table 13.1.1.2 Summary of Valves, Valve Components, and Trim Inspection, Testing, and Maintenance *Continued (Remainder of Table omitted for brevity)*

Item	Frequency	Reference
Testing		
Main Drains	Annually/quarterly	13.2.5, 13.2.5.1, 13.3.3.4
Gauges	5 Years	13.2.7.2
Waterflow Alarms	Quarterly/semiannually	13.2.6
Control Valves		
Position	Annually	13.3.3.1
Operation	Annually	13.3.3.1
Supervisory	Semiannually	13.3.3.5
Preaction/Deluge Valves		
Priming water	Quarterly	13.4.3.2.1
Low air pressure alarms	Quarterly/annually	13.4.3.2.13, 13.4.3.2.14
Full flow	Annually	13.4.3.2.2
Dry Pipe Valves/ Quick-Opening Devices		

25- Log #125 Final Action:
(Table 13.1.1.2)

Submitter: Roland J. Huggins, American Fire Sprinkler Association, Inc.
Recommendation: Under testing add:
Preaction/Deluge Valves
Air leakage 3 years 13.4.3.2.6
Dry Pipe Valves/Quick-Opening Devices
Air leakage 3 years 13.4.4.2.9

Substantiation: Incorporates change from last cycle.

25- Log #195 Final Action:
(Table 13.1.1.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add the 3 year air leakage test to table 13.1.1.2 as described below.
Under *Preaction/Deluge Valves* add:
Preaction air leakage 3 years 13.4.3.2.6
Under *Dry Pipe Valves/Quick Opening Devices* add:
Air leakage test 3 years 13.4.4.2.9
Substantiation: The requirement for the air leakage test was added during the last couple of cycles, but the reference was never added to Table 13.1.1.2. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #196 Final Action:
(Table 13.1.1.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise the references in table 13.1.1.2 for inspecting control valves and the tamper switches that go with them as shown.

Sealed	Weekly	13.3.2.1
Locked or supervised	Monthly	13.3.2.1.1
Tamper switches	~~Monthly~~ Quarterly	13.3.2.1.~~1~~ 2

Substantiation: These changes clarify the requirements in chapter 13 for inspecting the control valves themselves as well as the tamper switches that supervise them. The valves are to be inspected monthly if they are locked or supervised. The switch itself is required to be inspected quarterly. Making this distinction is necessary when a sprinkler service company is inspecting the valves, and a fire alarm service company is only inspection the alarm system devices. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #135 Final Action:
(13.2.5)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a new 13.2.5 as shown and renumber the rest of section 13.2.
13.2.5 Notification to Supervisory Service. To avoid false alarms where a supervisory service is provided, the alarm receiving facility shall be notified by the property owner or designated representative as follows:
(1) Before conducting any test or procedure that could result in the activation of an alarm
(2) After such tests or procedures are concluded
Substantiation: This new text should be added in every chapter 6 through 13 to be consistent with chapters 4 and 5. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
Current NFPA 25 Section 5.1.5

25- Log #91 Final Action:
(13.2.5 and A.13.2.5)

Submitter: Howard G. Clay, VSC Fire & Security, Inc.
Recommendation: Revise text to read as follows:
A main drain test shall be conducted ~~annually~~ quarterly at each water-based fire protection system riser to determine whether there has been a change in the condition of the water supply piping and control valves.

Substantiation: Note: This proposal dovetails with the need to cycle control valves on a quarterly basis; they are not mutually exclusive.
According to NFPA research, closed control valves account for over 35% of why sprinkler systems fail. After multiple years in the industry performing inspections and testing, our experience has shown that the annual main drain requirement is too long between testing cycles. The 13.3.3.1 requirement embodies within its own text that the drain test may determine a change in the condition of the control valves. 3.3.7.1 NFPA 25 Handbook commentary claims “the intent of the main drain test is to verify that the water supply valves are open or to reveal any changes in the condition of the water supply…” Even though NFPA requires the visual inspection of control valves on a more frequent basis, history reveals that these types of inspections are purported to be performed in-house. That claim notwithstanding, we know that in-house personnel may close and reopen control valves throughout the year for various reasons and never perform the required drain test as stated in 13.3.1.2.1 and 13.3.3.4. In addition, upon inspection to in-house personnel, those valves may appear to be open but, in reality, are not. Furthermore, we also know that construction and service work performed outside the facility could lead to a closed property valve that would not be caught on a visual inspection as those valves are neither indicating nor supervised. The provisions made in 13.3.1.2.1 are said to not apply to underground valves because these valves are confirmed by opening a hydrant. Opening a hydrant will only confirm the position of a street valve entering the property if that hydrant is private and coming off the fire line after the meter. Otherwise, the pressure looks normal, but the system is without a water supply. Additionally, 13.2.5.1 requires a quarterly test of the main drain be performed on at least one system downstream of a BFP to ensure the seats in the BFP are freely moving. Why leave out other systems main drains that may be controlled by a valve that is unsupervised and has been closed over the last year? It doesn't make sense, especially if those valves are remote from the BFP feeding individual buildings of apartments or condominiums. A.13.2.5 states that “drains also are used to determine whether there is a major reduction in waterflow to the system such as could be caused by a major obstruction, a dropped gate, a valve that is almost fully closed, or a check valve clapper stuck to the valve seat.” If "the inspections required by NFPA 25 are specifically intended to reveal damage or normal aging of the system and components with the goal to verify that the system will function as intended."(body of 1.1.2), then logic would deduct that the number 1 cause of system failures should be tested more often than annually. The benefits of the quarterly main drain test far outweigh the risks.
This is not original material; its reference/source is as follows:
NFPA 25, 2008 Edition

25- Log #26 Final Action:
(13.2.5.1)

Submitter: Frank Monikowski, SimplexGrinnell
Recommendation: Add new text as follows:
13.2.5.1 Main drain piping shall be hard piped to a location that allows the main drain valve to be completely opened long enough to obtain an accurate residual pressure reading.
Revise 13.2.5.1 to become 13.2.5.2, 13.2.5.2 becomes 13.2.5.3.
Substantiation: Conducting a full flow main drain test is needed to more accurately determine if the water supply has degraded by 10% or more. A partial main drain test does little to accomplish this. In the appendix A.13.2.5 it clearly states in the last paragraph in item 3 that "Fully open the main drain valve" as part of the test procedure. Too often this is not possible due to inadequate drainage of the water as it is being discharged. When this occurs, we need to require piping modifications; otherwise the main drain test serves no purpose.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #324 Final Action:
(13.3.2.1.1)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Revise text to read as follows:
13.3.2.1.1 Valves secured with locks or supervised in accordance with applicable NFPA standards shall be permitted to be inspected quarterly ~~monthly~~.
Substantiation: Most, but not all sprinkler systems are under contract for the inspection requirements of this Standard to be performed. For those that are, a quarterly inspection should suffice. For those that are not, they are most likely not being performed by anyone at any period as specified by this Standard. As this is a minimum standard, for those properties that are having inspections performed by their personnel, they may still elect to perform a monthly inspection. Those systems that are connected to a supervising station would transmit a supervisory signal when the valve is turned two revolutions or 1/5th the travel distance of the valve.

25- Log #177 Final Action:
(13.3.2.1.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a new requirement 13.3.2.1.2 as shown and renumber subsequent sections as necessary.
13.3.2.1.2 Control valve supervisory alarm devices shall be inspected quarterly to verify that they are free of physical damage.
Substantiation: This requirement exists in chapter five, but also applies to control valves in other chapters of this standard, and should be included in Chapter 13 for continuity. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #178 Final Action:
(13.3.2.2(4))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change section 13.3.2.2 (4) as shown.
13.3.2.2 (4) Provided with correct wrenches for PIVs
Substantiation: This change clarifies that wrenches are only needed for PIVs. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #92 Final Action:
(13.3.3 and 13.3.3.1)

Submitter: Howard G. Clay, VSC Fire & Security, Inc.
Recommendation: Revise text to read as follows:
Each control valve shall be operated ~~annually~~ quarterly through its full range and returned to its normal position.
Substantiation: Note: This proposal dovetails with the need to perform main drain tests on a quarterly basis; they are not mutually exclusive.
According to NFPA research, closed control valves account for over 35% of why sprinkler systems fail. Even though NFPA requires the visual inspection of control valves on a more frequent basis, history reveals that these types of inspections are purported to be performed in-house. That claim notwithstanding, we know that in-house personnel may close and reopen control valves throughout the year for various reasons, and those valves may appear upon visual inspection to be open to them but, in reality, are not. Even worse, the unsupervised valve may be left partially or completely closed. OS&Y valves can break loose from their operating nut if tightened too much, and all though they can be opened after the break, they cannot be closed down again in the event of a need to close the water supply. The handle of butterfly valves can be operated and the indicator can rotate back and forth while the shaft of the valve is not even connected to the body gate. Furthermore, we also know that construction and service work performed outside the facility could lead to a closed property valve that would not be caught on a visual inspection as those valves are neither indicating nor supervised. 13.3.3.5.1 states the “valve supervisory switches shall be tested semiannually.” This test is for the switch and does not take into consideration the condition of the valve as it only has to be moved 1/5th the travel distance of the hand wheel or two revolutions. That rotation is not adequate enough to keep the valve stem lubricated well, the seat free of debris, or confirm the operational condition of the valve, especially on large valves. By cycling control valves fully at shorter intervals, more closed control valves will be identified and deposits will not have a chance to build up on the gate, wedge, or seat. If "the inspections required by NFPA 25 are specifically intended to reveal damage or normal aging of the system and components with the goal to verify that the system will function as intended."(body of 1.1.2), then logic would deduct that the number 1 cause of system failures should be tested more often than annually / semiannually (for those devices unsupervised). The benefits of the quarterly testing of control valves far outweigh the risks.
This is not original material; its reference/source is as follows:
NFPA 25, 2008 Edition

25- Log #179 Final Action:
(13.3.3.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise the text in 13.3.3.2 as shown, add next text as 13.3.3.2.1, and renumber current 13.3.3.2.1.
13.3.3.2* Post indicator valves shall be operated annually through its full range and reopened using the appropriate manufacturer’s wrench until spring or torsion is felt in the rod, indicating that the rod has not become detached from the valve.
13.3.3.2.1 If the post indicator valve cannot be operated or reopened using reasonable force with the appropriate manufacturer’s wrench, the valve and the post shall be lubricated and repaired as necessary until it can be opened without using unreasonable force.
13.3.3.2.2 This test shall be conducted every time the valve is closed.
Substantiation: This change clarifies that a proper wrench needs to be used for this test. Using an improper wrench such as a pipe wrench has resulted in damage to the operating nut. The use of break over bars and extensions on the wrench can damage the valve and/or the post. If the valve cannot be closed and reopened using the proper wrench with reasonable force, then some maintenance and/or repairs are necessary so the valve can be operated when needed in a fire event. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #268 Final Action:
(13.4.3.1.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise text to read as follows:
Delete 13.4.3.1.1
Delete 13.4.3.1.1.1
Renumber the rest of 13.4.3.1
Revise existing 13.4.3.1.2 as follows:Low temperature alarms, if installed in valve enclosures, shall be inspected annually at the beginning of the heating season to ensure that the wires are connected and that the device appears to be in working order.
Substantiation: There is no way for the inspector to know (on any given day) whether the heating equipment is working. If the inspector goes into the enclosure on a day where the temperature is over 40 degrees, there is no way to determine if the heating equipment is operational. There is no way to simulate a cold condition to see if the heating comes on.
The building owner is already required under section 4.1.1.1 to make sure that adequate heat is provided in areas with water-filled piping. This is a more appropriate way to address this issue as an ongoing maintenance requirement rather than a periodic inspection.
The additional language at the end of the alarm inspection is just to tell the inspector what they are looking for during the inspection. Without this information, the inspector does not know what they are doing with the inspection.

25- Log #192 Final Action:
(13.4.3.2.2.1 and A.13.4.3.2.2.1 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Move annex section A.13.4.3.2.2.2 to the main body as 13.4.3.2.2.1 and revise as shown, and renumber subsequent sections.
~~A.~~13.4.3.2.2.~~2~~ 1 Full flow tests shall ~~should~~ incorporate full functionality of the system as a unit, including automatic detection and manual activation.
A.13.4.3.2.2.1 It is necessary that the full flow test incorporate the full functionality of the system which would include any solenoid valves or other actuation devices. It was a common practice in the past to test the detection system or manual pull station up to the solenoid valve or actuator, and to separately test the deluge valve and system after the solenoid valve or actuator. All of these components should be tested together to ensure the system will operate when the detector signals or manual pull station is initiated.
Substantiation: While this guidance is in the annex, it technically isn't enforceable. There have been both deluge and preaction systems tested for years without testing the proper integration of the detection system or the manual pull station with the system. In essence, solenoid valves were never actuated, and in a fire scenario the supposedly integrated system did not work. This requirement belongs in the body of the standard. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #180 Final Action:
(13.4.3.2.2.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 13.4.3.2.2.2 as shown.
13.4.3.2.2.2* Where the nature of the protected property is such that water cannot be discharged for test purposes, the trip test shall be conducted flowing at least the system demand as provided by the owner in a manner that does not necessitate discharge in the protected area.
Substantiation: This change clarifies that if an alternate test is performed the amount of water flowed still have to equal or exceed the system demand. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #262 Final Action:
(13.4.3.2.5 and 13.4.4.2.2.4 (New))

Submitter: Don Moeller/Chair/TC on Cultural Resources, The Fire Consultants, Inc.
Recommendation: Add new paragraphs 13.4.3.2.5 and 13.4.4.2.2.4 as follows:

13.4.3.2.5 Following the preaction system trip test where the control valve is completely open, and after an operation of a preaction system that introduces water into the system piping beyond the system riser, the system piping shall be dried before the system is returned to service.

13.4.4.2.2.4 Following the dry valve trip test where the control valve is completely open, and after an operation of the dry pipe valve that introduces water into the system piping beyond the system riser, the system piping shall be dried before the system is returned to service.

Substantiation: This proposal is being submitted by me as chair of the Technical Committee on Cultural Resources on behalf of the committee at its direction via a vote at its November 2011 meeting. The same proposal was balloted and submitted in the committee's name during the last revision cycle, but could not be balloted for this cycle due to timing restrictions.

The introduction of water into a system that is normally dry promotes general corrosion of the piping and increases the likelihood of MIC. The Technical Committee on Cultural Resources believes that pitching the system piping to allow water to drain back to the riser is insufficient to ensure that water is removed from the system piping. Various methods are available to remove water from the piping, such as the introduction of dry air or nitrogen.

25- Log #166 Final Action:
(13.4.3.2.6)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:

13.4.3.2.6 Double Interlock ~~P~~preaction systems shall be tested once every 3 years for air leakage using one of the following test methods:

Remainder of section to remain the same.

Substantiation: Double interlock systems are the only systems for which this test makes sense. Single interlock systems contain no air under pressure and non-lock systems have low air pressure--typically 7 to 10psi. Neither of these systems require an air test at system acceptance. To require a test after the system is in service that does not follow-up on a test done for the original installation makes no sense and is possibly punitive to the owner.

25- Log #245 Final Action:
(13.4.3.2.6)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Leadership in Education
Recommendation: Delete requirement as shown below::
~~13.4.3.2.6 Preaction systems shall be tested once every 3 years for air leakage, using one of the following test methods.~~
~~(1) A pressure test at 40 psi (3.2 bar) for 2 hours. The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test. Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.~~
~~(2) With the system at normal system pressure, shut off the air source (compressor or shop air) for 4 hours. If the low air pressure alarm goes off within this period, the air leaks shall be addressed.~~
Substantiation: This is a continuation of a discussion of Proposal 25-171 and Comment 25-93 of the last revision cycle that affects other like-minded users of this document: US General Services Administration, the US Department of Energy and the US Veteran's Hospital Administration. The education facilities industry agrees with the negative position, best written in the substantiation of the negative votes in the final ballot. That substantiation from the last cycle is reprinted here for the convenience of the committee:
LARRIMER, P.: A low air alarm provides continuous monitoring of the air pressure in a preaction system. There is no need to shut off the compressor to check for an arbitrary leakage rate as established by this new requirement for a great many of the preaction systems installed.
LEAVITT, R.: This text requires a test for all preaction systems that is only appropriate for double interlock systems. NFPA 25 should not mandate a test for maintenance that is not required for the system acceptance or is more stringent than that required for system acceptance. NFPA 13 24.2.2 requires an air test for dry pipe and double interlock preaction systems but no air test is specified for single and non-interlock systems. This test requirement will result in system modifications or repairs for single and non-interlock preaction systems that are unnecessary and punitive to the building owner.
ELVOVE, J.: Concur with Mr. Leavitt's statement. Unnecessary to subject all pre-action systems to this requirement.
SAIDI, J.: Do not agree with committee action. The submitter's substantiation was correct and should have been accepted.

25- Log #329 Final Action:
(13.4.3.2.6)

Submitter: Peter A. Larrimer, US Department of Veterans Affairs
Recommendation: Delete 13.4.3.2.6.
Substantiation: If the low air alarm doesn't provide a supervisory signal that the preaction system is leaking, then the leakage itself will be self evident as the system will trip and send an alarm. There has been no justification to add this test.
Deleting this requirement to test for pipe leakage when the pipe is already monitored will not affect the operation of any system.

25- Log #181 Final Action:
(13.4.3.2.7)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change title to 13.4.3.2.7 as shown.
13.4.3.2.7 Deluge System Pressure Readings.
Substantiation: This change clarifies that this section only applies to deluge systems and not to a preaction system. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #267 Final Action:
(13.4.4.1.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise text to read as follows:
Delete 13.4.4.1.1
Delete 13.4.4.1.1.1
Renumber 13.4.4.1.1.2 as 13.4.4.1.1 as follows:
13.4.4.1.1 ~~13.4.4.1.1.2~~ Low temperature alarms, if installed in valve enclosures, shall be inspected annually at the beginning of the heating season to ensure that the wires are connected and that the device appears to be in working order.
Substantiation: There is no way for the inspector to know (on any given day) whether the heating equipment is working. If the inspector goes into the enclosure on a day where the temperature is over 40 degrees, there is no way to determine if the heating equipment is operational. There is no way to simulate a cold condition to see if the heating comes on.
The building owner is already required under section 4.1.1.1 to make sure that adequate heat is provided in areas with water-filled piping. This is a more appropriate way to address this issue as an ongoing maintenance requirement rather than a periodic inspection.
The additional language at the end of the alarm inspection is just to tell the inspector what they are looking for during the inspection. Without this information, the inspector does not know what they are doing with the inspection.

25- Log #287 Final Action:
(13.4.4.1.2)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise 13.4.4.1.2 so that it is only a title as follows:
13.4.4.1.2 Gauges ~~shall be inspected weekly~~.
Substantiation: The section is redundant with 13.4.4.1.2.5 and contradicts 13.4.4.1.2.4. It needs to just be an introduction to the fact that gauges will be discussed in the following sections.

25- Log #182 Final Action:
(13.4.4.2.2.4 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new requirement 13.4.4.2.2.4 as shown.
13.4.4.2.2.4 When refilling a dry system, the air supply shall be capable of restoring normal air pressure in the system within 30 minutes.
Substantiation: NFPA 13 requires that the air supply be sufficient to fill the system in 30 minutes or less. NFPA 25 should also include this requirement when refilling the system after performing the annual or three year trip test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #270 Final Action:
(13.4.4.2.9)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise the section as follows:
13.4.4.2.9 Dry pipe systems shall be tested once every 3 years for ~~air~~ gas leakage, using one of the following test methods:
(1) A gas (air or nitrogen) pressure test at 40 psi (3.2 bar) shall be performed for 2 hours
(a) The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test.
(b) ~~Air~~ Gas leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during the test.
(2) With the system at normal system pressure, the ~~air~~ gas source (nitrogen supply, compressor or shop air) shall be shut off for 4 hours. If the low ~~air~~ pressure alarm goes off within this period, the ~~air~~ leaks shall be addressed.
Substantiation: Nitrogen is recognized as a legitimate gas to use in dry-pipe systems and is gaining popularity due to its ability to prevent corrosion within the piping. Where nitrogen is used, the system integrity needs to be maintained, just as with air.

25- Log #5 Final Action:
(13.5.2)

Submitter: James Everitt, Western Regional Fire Code Development Committee
Recommendation: Revise text as follows:
13.5.2 Hose Connection Pressure Regulating Devices ~~Reducing Valves~~
13.5.2.1 All ~~valves~~ devices shall be inspected annually to verify the following:
• (1) The handwheel is not broken or missing.
• (2) The outlet hose threads are not damaged.
• (3) No leaks are present.
• (4) The reducer and the cap are not missing.
13.5.2.2* A full flow test shall be conducted on each ~~valve~~ device at 5-year intervals and shall be compared to previous test results.
13.5.2.2.1 Adjustments shall be made in accordance with the manufacturer's instructions.
13.5.2.3 A partial flow test adequate to move the device ~~valve~~ from its seat shall be conducted annually.
Substantiation: NFPA 14 requires a permanently installed drain riser to be provided adjacent to each standpipe equipped with pressure-regulating devices to facilitate tests of each device. The drain riser is required to be sized large enough to handle the full flow required from the largest pressure-regulating device (NFPA 14: 7.11.1). A proposal to change the requirement in NFPA 14 to replace the phrase "pressure-regulating device" with "pressure reducing valve" so that the drain riser requirement would be eliminated was rejected by the technical committee. In their justification the committee stated that their intent was for all pressure-regulating valves to be tested at full flow. Currently, NFPA 25 does not include a requirement to test all pressure-regulating devices at full flow, only pressure reducing valves. The two standards should be consistent.

25- Log #94 Final Action:
(13.5.6.2 and 13.5.6.2.1)

Submitter: Howard G. Clay, VSC Fire & Security, Inc.
Recommendation: Revise text to read as follows:
Class I and Class III standpipe system hose valves shall be tested annually by fully opening and closing the valves and partially flowing water.
Substantiation: A partial flow of water should become a part of this requirement for the purpose of protecting the seat by ensuring there are no obstructions within the valve body after fully opening the valve. A tapped cap and ball valve will suffice to meet this requirement through a partial flow into a bucket to confirm the hose valve is not completely obstructed while allowing the technician to view the quality of the water discharged from the standpipe. 6.3.1.5. of NFPA 25, 2008 edition reads, "the test [main drain] shall be performed at the low point drain for each standpipe or the main drain test connection where the supply main enters the building (where provided)." Since this drain test is not required to be performed from the low point drain of the standpipe, it is not uncommon to find the lower level hose valve obstructed with packed debris. The partial flow of the hose valve annually may reveal this.

25- Log #183 Final Action:
(13.5.7.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a title to section 13.5.7.1 as shown.
13.5.7.1 Circulation Relief Valves. All circulation relief valves shall be inspected weekly.
Substantiation: This change highlights that this section applies to circulation relief valves. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #184 Final Action:
(13.5.7.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add a title to section 13.5.7.2 and revise as shown.
13.5.7.2 Main Pressure Relief Valves . All main pressure relief valves shall be inspected weekly.
Substantiation: This change highlights that this section applies to main pressure relief valves. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #283 Final Action:
(13.6.1.2, 13.6.1.2.1, and 13.6.1.2.2)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise the sections as follows:

13.6.1.2* Reduced pressure assemblies (RPA) and reduced pressure detector assemblies (RPDA) that do not comply with 13.6.1.2.1 shall be inspected weekly to ensure that the differential-sensing valve relief port is not continuously discharging and the OS&Y isolation valves are in the normal open position.

13.6.1.2.1 ~~Valves~~ Reduced pressure assemblies (RPA) and reduced pressure detector assemblies (RPDA) that are secured with locks or electronically supervised in accordance with applicable NFPA standards shall be inspected monthly to ensure that the differential-sensing valve relief port is not continuously discharging and the OS&Y isolation valves are in the normal open position.

~~13.6.1.2.2~~ 13.6.1.3 After any testing or repair . . .

Substantiation: The original intent of NFPA 25 was to match the inspection rules for backflow devices with the inspection rules for control valves (since there are two control valves as a part of each backflow assembly). But the rules have never quite matched up. Although the inspection of the valves is okay, the inspection of the relief port is required to be weekly, regardless of the supervision on the valve. So, even if you supervise the control valves, you need to inspect the relief port weekly, which is onerous.
The renumbering of section 13.6.1.2.2 is suggested because this rule should apply to all backflow preventers, not just RDA assemblies. In its currently location, it only applies to RPA's.

25- Log #185 Final Action:
(13.6.1.3 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the charging paragraph in section 13.6.1 and add new requirement for backflow prevention assemblies as shown.

13.6.1 Inspection. Inspection of backflow prevention assemblies shall be as described in 13.6.1.1 through 13.6.1.~~2~~2 3.

13.6.1.3 Backflow prevention assemblies shall be inspected internally every 5 years to verify that all components operate correctly, move freely, and are in good condition.

Substantiation: Backflow preventers have the same problems that check valves have over time. Although they are required to be exercised at least once a year with a forward flow test, the interiors of these valves still need to be inspected periodically and maintained in accordance with the manufacturer's instructions. Having these devices on the same inspection cycle as other check valves, strainers, orifices, and internal pipe makes the best use of time and resources to perform this inspection. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #266 Final Action:
(13.6.2.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add “as provided by the owner” to 13.6.2.1 and split the section into two sentences so that they read as follows:
13.6.2.1 All backflow preventers installed in fire protection system piping shall be tested annually by conducting a forward flow test of the system at the ~~designed~~ system flow rate as provided by the owner. The flow rate shall include ~~including~~ hose stream demand where hydrants or inside hose stations are located downstream of the backflow preventer.
Substantiation: The person performing the test is not in a position to determine the original design flow rate of the system. The owner needs to be responsible for providing this information.
The sentence needs to be split into two sentences because of the placement of the comma after “demand”. This makes it appear that the test only needs to be run if there are hydrants or inside hose stations downstream of the backflow device. Actually, the intent of NFPA 25 is to run the test on all backflow devices, but only include the flow for hose demands if these additional components are there.

25- Log #121 Final Action:
(13.6.2.1.1)

Submitter: Roland J. Huggins, American Fire Sprinkler Association, Inc.
Recommendation: Delete the following text:
~~13.6.2.1.1 For backflow preventers sized 2 in. (50 mm) and under, the forward flow test shall be acceptable to conduct without measuring flow, where the test outlet is of a size to flow the system demand.~~

Substantiation: This section implies that a measured flow is required for Backflow preventers (BFP) larger than 2 in when nothing in 13.6.2.1 states such a requirement. There are other means to identify that the system demand is flowing through the BFP as discussed in A.13.6.2.1 It also needs to be kept in mind that we are simply exercising the BFP to ensure it will fully open at approximately the system demand. A high degree of accuracy regarding the volume of water is not warranted. Additionally, BFP’s are subjected to an annual internal inspection as part of the cross connection protection program.

25- Log #122 Final Action:
(13.6.2.1.3)

Submitter: Roland J. Huggins, American Fire Sprinkler Association, Inc.
Recommendation: Delete the following text:
~~13.6.2.1.3 Where connections do not permit a full flow test, tests shall be completed at the maximum flow rate possible.~~

Substantiation: The text is redundant with 13.6.2.2 except one says “tests shall be completed” and the other says “conducted”.

25- Log #285 Final Action:
(13.6.2.1.4)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise 13.6.2.1.4 as follows:
13.6.2.1.4 The forward flow test shall not be required where annual fire pump testing causes the system ~~demand~~ flow rate as provided by the owner to flow through the backflow preventer device.
Substantiation: The use of the term “demand” is being interpreted by some AHJ’s as applying to both flow and pressure. There is no intent here on measuring or dealing with pressure. The only reason for this test is to create flow in order to exercise the internally loaded check valves. Replacement of the term “demand” helps to clarify the standard.

25- Log #284 Final Action:
(13.6.2.2)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Delete 13.6.2.2.
Substantiation: Redundant with 13.6.2.1.3.

25- Log #167 Final Action:
(13.6.3.1)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Revise as follows:
13.6.3.1 Maintenance of all backflow assemblies shall be conducted by a ~~trained~~ qualified individual following the manufacturer's instructions in accordance with the procedure and policies of the authority having jurisdiction.
Substantiation: The word "qualified" is defined by the standard and is appropriate term for use in this section.

25- Log #168 Final Action:
(13.6.3.2)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete entire section.
~~13.6.3.2 Rubber parts shall be replaced in accordance with the frequency required by the authority having jurisdiction and the manufacturer's instructions.~~
Substantiation: This section is redundant based on the wording of 13.6.3.1 which stipulates that all maintenance be in accordance with the AHJ and the manufacturer. The specificity of this section serves no purpose.

25- Log #8 Final Action:
(13.7.1)

Submitter: Robert Bourke, Northeastern Regional Fire Code Development Committee
Recommendation: Revise text to read as follows:
13.7.1 Fire department connections shall be inspected quarterly.
The inspection shall verify the following:
(1) The fire department connections are visible and accessible.
(2) Couplings or swivels are not damaged and rotate smoothly.
(3) Plugs or caps are in place and undamaged.
(4) Gaskets are in place and in good condition.
(5) Identification signs are in place.
(6) The check valve is not leaking.
(7) The automatic drain valve is in place and operating properly.
(8) The fire department connection clapper(s) is in place and operating properly.
(9) Interior of the connection shall be inspected for obstructions
~~13.7.2 If fire department connection plugs or caps are not in place, the interior of the connection shall be inspected for obstructions, and it shall be verified that the fire department connection clapper is operational over its full range.~~
Substantiation: The proposed edition of a new (9) does a few things, one makes the inspector remove the cap (especially locking) to ensure it can be removed and has not been damaged or oxidized to the connection, second no one is sure when the cap was placed on the FDC. It could have been off for weeks and placed on before the inspection, the inspector would then never perform Section 13.7.2 as a cap was in place. The interior should be inspected every quarter to see if debris has been introduced into the connection, thus making Section 13.7.2 no longer needed.

25- Log #276 Final Action:
(13.7.5 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add a new 13.7.5 as follows:
13.7.5 The piping from the fire department connection to the fire protection systems shall be hydrostatically tested at 150 psi for two hours at least once every five years.
Substantiation: The piping from the fire department connection to the fire protection system is dry most of the time and subject to corrosion due to the moist atmosphere. Failures of this piping have occurred when fire departments pump into the connections.
The 150 psi pressure was selected since this is the pressure most frequently used in the standard operating procedure of fire departments when supporting fire protection systems.

25- Log #288 Final Action:
(Chapter 14)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Change the title of Chapter 14 to “Internal Conditions”
Substantiation: This more accurately describes the entire contents of the chapter. “Obstruction Investigation” is just a portion of what is included in the chapter and is an inappropriate title.

25- Log #330 Final Action:
(Chapter 14)

Submitter: Peter A. Larrimer, US Department of Veterans Affairs
Recommendation: Rewrite Chapter 14 as follows:
Delete: A.14.2.1.6, A.14.2.2,
Move A.14.2.1.3 to A.14.3.1 and adding it to the existing annex not as the first paragraph.
Retain other annex notes.
Chapter 14 Obstruction Investigation
14.1* General. This chapter shall provide the minimum requirements for conducting investigations of fire protection system piping for possible sources of materials that could cause pipe blockage.
14.2 ~~Internal Inspection of Piping~~ Obstruction Investigation and Prevention.
~~14.2.1 Except as discussed in 14.2.1.1 and 14.2.1.4 an inspection of piping and branch line conditions shall be conducted every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.~~
~~14.2.1.1 Alternative nondestructive examination methods shall be permitted.~~
~~14.2.1.2 Tubercules or slime, if found, shall be tested for indications of microbiologically influenced corrosion (MIC).~~
~~14.2.1.3* If the presence of sufficient foreign organic or inorganic material is found to obstruct pipe or sprinklers, an obstruction investigation shall be conducted as described in Section 14.3.~~
~~14.2.1.4 Non-metallic pipe shall not be required to be inspected internally.~~
~~14.2.1.5 In dry pipe systems and pre-action systems, the sprinkler removed for inspection shall be from the most remote branch line from the source of water that is not equipped with the inspector's test valve.~~
~~14.2.1.6* Inspection of a cross main is not required where the system does not have a means of inspection.~~
~~14.2.2* In buildings having multiple wet pipe systems, every other system shall have an internal inspection of piping every 5 years as described in 14.2.1.~~
~~14.2.2.1 During the next inspection frequency required by 14.2.1, the alternate systems not inspected during the previous inspection shall have an internal inspection of piping as described in 14.2.1.~~
~~14.2.2.2 If the presence of foreign organic and/or inorganic material is found in any system in a building during the 5 year internal inspection of piping, all systems shall have an internal inspection.~~
~~14.3 Obstruction Investigation and Prevention.~~
14.3~~2~~.1* An obstruction investigation shall be conducted for system or yard main piping wherever any of the following conditions exist:
(1) Defective intake for fire pumps taking suction from open bodies of water
(2) The discharge of obstructive material during routine water tests
(3) Foreign materials in fire pumps, in dry pipe valves, or in check valves
(4)*Foreign material in water during drain tests or plugging of inspector's test connection(s)
(5) Plugged sprinklers
(6) Plugged piping in sprinkler systems dismantled during building alterations
(7) Failure to flush yard piping or surrounding public mains following new installations or repairs
(8) A record of broken public mains in the vicinity
(9) Abnormally frequent false tripping of a dry pipe valve(s)
(10) A system that is returned to service after an extended shutdown (greater than 1 year)
(11) There is reason to believe that the sprinkler system contains sodium silicate or highly corrosive fluxes in copper systems
(12) A system has been supplied with raw water via the fire department connection
(13)* Pinhole leaks
(14) A 50 percent increase in the time it takes water to travel to the inspector's test connection from the time the valve trips during a full flow trip test of a dry pipe sprinkler system when compared to the original system acceptance test.
14.3~~2~~.2* Systems shall be examined for internal obstructions where conditions exist that could cause obstructed piping.
14.3~~2~~.2.1 If the condition has not been corrected or the condition is one that could result in obstruction of the piping despite any previous flushing procedures that have been performed, the system shall be examined for internal obstructions every 5 years.
14.3~~.~~2.2 The ~~investigation shall be accomplished by i~~nternal examination ~~shall be performed~~ at the following four points:
(1) System valve

(2) Riser
(3) Cross main
(4) Branch line

14.3.2.2.3 Alternative nondestructive examination methods shall be permitted.

14.3.2.3* If an obstruction investigation carried out in accordance with 14.2.1 indicates the presence of sufficient material to obstruct pipe or sprinklers, a complete flushing program shall be conducted by qualified personnel.

14.43 Ice Obstruction. Dry pipe or preaction sprinkler system piping that protects or passes through freezers or cold storage rooms shall be inspected internally on an annual basis for ice obstructions at the point where the piping enters the refrigerated area.

14.43.1 Alternative nondestructive examinations shall be permitted.

14.43.2 All penetrations into the cold storage areas shall be inspected and, if an ice obstruction is found, additional pipe shall be examined to ensure no ice blockage exists.

Add New Annex Note: A.14.2.1 (13) Tubercules or slime, if found, should be tested for indications of microbiologically influenced corrosion (MIC).

Substantiation: 1) The requirement to open up a piping system every 5 years is not warranted and is has never been justified. The modifications will require systems to be investigated for obstructions only when there is a trigger that would require an investigation to do.

2) The reliability of sprinklers as shown in the paper by NFPA "U.S. EXPERIENCE WITH SPRINKLERS AND OTHER AUTOMATIC FIRE EXTINGUISHING EQUIPMENT" John Hall Jr. February 2010 found at: http://www.nfpa.org/assets/files/pdf/ossprinklers.pdf clearly shows that obstructions in piping are not a significant factor for the reliability of sprinkler systems. Costs to perform this onerous inspection of all systems is truly not warranted and thus the mandatory 5 year requirement has been removed. For one example, I have a campus where the contractor has provided a quote for ~$19,000 for an annual inspection to the requirements of NFPA 25 and ~$240,000 for a fire year inspection to NFPA 25. These types of exorbitant quotes for the five year inspection is not unusual.

3) The obstruction investigation requirements have been changed back to the same requirements as those that were in the 1998 Edition except that:

a) The manual of style changes that were made were kept.

b) Triggers #13 (Pin hole leaks) and #14 (A 50 percent increase in the time it takes water to travel to the inspector's test connection from the time the valve trips during a full flow trip test of a dry pipe sprinkler system when compared to the original system acceptance test) in Existing Section 14.3.1 that were added to the code since the 1998 Edition were also kept.

c) An annex note was added to Trigger #13 (Pin hole leaks) to address MIC. Since pin hole leaks was added as the trigger from MIC, the suggestion to check for MIC once pin hole leaks are found was added to the annex. This is important in that MIC is adequately addressed and explained in the Annex D material.

d) The existing annex note to 14.2.1.3 was deleted since it is covered in 14.2.3.

e) 14.2.1.4 was deleted because if there is a problem identified by a trigger, even plastic pipe needs to be inspected.

f) A.14.2.1.6 was deleted. The existing criteria mandated inspections of pipe, but only if the piping is accessible. This doesn't really make sense if there truly is a problem. If an obstruction investigation indicates that pipe has sufficient material to block it, then there is no exception for remedying the situation even if the pipe is not readily accessible or it doesn't have flushing connections.

g) 14.2.2 thru 14.2.2.2 and A14.2.2 was deleted since mandatory inspections of systems are not warranted unless there is a trigger.

4) Note that where a problem is identified, possibly such as MIC where pin hole leaks triggered an inspection, 14.3.2.1 would still require an investigation every 5 years even with flushing unless the condition could be corrected properly.

Note: Supporting material is available for review at NFPA Headquarters.

25- Log #145 Final Action:
(Chapter 14, Title)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the title of Chapter 14 as shown.
Internal Pipe Inspection and Obstruction Investigation
Substantiation: Chapter 14 involves more than just obstruction investigation. Internal pipe inspections are critical to assess the condition of fire protection system piping and should be included in the chapter title. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #140 Final Action:
(14.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise the title of section 14.2 as shown.
14.2 Periodic Internal Inspection of Piping.
Substantiation: This section describes internal pipe inspections that are to be performed on a periodic basis and not as needed. The revised section title clarifies this. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #141 Final Action:
(14.2.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 14.2.1 as shown.
14.2.1 Except as discussed in 14.2.1.1 and 14.2.1.4 an inspection of piping and branch line conditions shall be conducted every 5 years by visually examining the internal piping in at least the following two places for the purpose of inspecting for the presence of foreign organic and inorganic material.
(1) By opening a flushing connection at the end of one main ~~and~~
(2) ~~b~~By removing a sprinkler toward the end of one branch line or removing the end piece of one branch line
Substantiation: The additional wording clarifies that this requirement is for a visual examination of the condition of the system piping and that it may be desired to open more than two places in the system. Breaking the two places to be examined into separate sections is appropriate for clarity and to meet the NFPA manual of style. Adding the option of removing a piece of branch line instead of a sprinkler allows for a practice that is currently being used, and allows this inspection to be performed with having to replace the sprinkler being removed. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #260 Final Action:
(14.2.1)

Submitter: Don Moeller/Chair/TC on Cultural Resources, The Fire Consultants, Inc.
Recommendation: Revise 14.2.1 as follows:

14.2.1 Except as discussed in 14.2.1.1 and 14.2.1.4, ~~an~~ a thorough inspection of piping and branch line conditions shall be conducted every 5 years by opening a flushing connection at the end of one main, by examining a branch line interior along its entire length, and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.

Substantiation: This proposal is being submitted by me as chair of the Technical Committee on Cultural Resources on behalf of the committee at its direction via a vote at its November 2011 meeting. The same proposal was balloted and submitted in the committee's name during the last revision cycle, but could not be balloted for this cycle due to timing restrictions.

The Technical Committee on Cultural Resources is concerned the 5-year obstruction inspection is not thorough enough to discover corrosion that can obstruct sprinkler piping, reduce piping wall thickness, or create other potential leakage within the system. The examination of the branch line interior can be accomplished by various means, including noninvasive, ultrasonic means.

25- Log #257 Final Action:
(14.2.1, 14.2.1.4, 14.2.2, and A.14.2.1)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Revise 14.2.1 as follows:

14.2.1* Except as discussed in 14.2.1.1 and 14.2.1.4, an inspection of piping and branch line conditions shall be conducted on dry pipe and pre-action systems every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.

Add new annex A.14.2.1 as follows:

A.14.2.1 Internal inspections are designed to look for signs of corrosion, including microbiologically influenced corrosion. See Annex D2.6. Systems containing air are prone to corrosion more quickly than systems filled with water. Therefore, these systems need to be inspected at regular intervals. Wet systems are also subject to corrosion, but should only be inspected internally if evidence of corrosion is noted via other inspection means. Subjecting wet systems to regularly internal inspections where no evidence is noted could actually increase the corrosion rate by introducing air each time the system is drained and refilling.

Delete 14.2.1.4 and Section 14.2.2 in its entirety, including its subsections and annex.

Substantiation: This proposal builds on the technical committee's nearly successful effort during ROC to forge a compromise on the frequency and applicability of internal inspections of pipe, and only require a periodic internal inspection for those systems where corrosion is highly likely, such as pre-action and dry pipe systems that contain air/water interfaces. Section 14.2 addresses internal inspections of piping and the purpose of this section should be to inspect those systems where the presence of corrosion, including microbiologically influenced corrosion is likely. That's why paragraph 14.2.1.4 exempts non-metallic pipe from this requirement. Section 14.3 is geared for investigating for obstructions which applies to all systems and all piping.

The annex note has been provided to explain this rationale and to present the option for conducting internal inspections on wet systems where evidence of corrosion has been noted through other inspection means. Frequent (re)introduction of air after removal of a sprinkler can actually increase the risk of corrosion; hence, such inspections should be evidence based, and not needlessly applied to every single wet pipe system. Pin hole leaks, if noted on wet pipe systems, would still require an obstruction investigation be conducted, which is more extensive than internal inspections of pipe.

Paragraph 2.1.4 is proposed for deletion since dry pipe and pre-action systems don't use non-metallic pipe. Section 14.2.2 is no longer needed since there should be no permission to extend an internal inspection beyond 5 years, when evidence of corrosion is noted in any part of a system.

Note: this proposal maintains the existing 5 year inspection interval even though it was never substantiated when this requirement was first introduced into NFPA 25 back in 2002 (it was said that the 5 year interval was chosen simply to match an existing 5 year requirement for inspecting the interior of check valves). Hence, if a more frequent interval is deemed necessary for inspecting dry and pre-action type sprinklers (i.e., 3 years), I am not adverse to reducing the inspection frequency accordingly.

25- Log #235 Final Action:
(14.2.1.2)

Submitter: Michael Cabral, Cabral Consulting Services
Recommendation: Add new text to read as follows:

14.2.1.2 If a corrosion monitoring station is present inspection of the conditions present in the corrosion monitoring station shall meet the intent of 14.2.1.

Renumber remainder of Section 14.2.

Substantiation: A corrosion monitoring station is intended to represent the conditions inside the sprinkler system.

25- Log #236 Final Action:
(14.2.1.2)

Submitter: Michael Cabral, Cabral Consulting Services
Recommendation: Revise text to read as follows:
14.2.1.2 Tubercules or slime if found, shall be tested for ~~indications~~ presence of microbiologically influenced corrosion (MIC) causing bacteria.
Substantiation: Testing of slime Tubercules or sludge needs to find specific bacteria known to cause a reduction in the wall thickness of pipe and/or a expected continued build-up of sludge tubercules or slime.

25- Log #142 Final Action:
(14.2.1.5)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise 14.2.1.5 as shown.
14.2.1.5 In dry pipe systems and pre-action systems, the sprinkler or branch line piece removed for inspection shall be from the most remote branch line from the source of water that is not equipped with the inspector's test valve.
Substantiation: This change matches the change proposed to 14.2.1. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #173 Final Action:
(14.2.1.6 (New))

Submitter: Frank Monikowski, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: Add new text to 14.2.1.6 and eliminate the old text entirely. 14.2.1.6 Where systems cross mains are not easily accessible, or cross main caps or flushing connections not easily removed, other means of inspections and locations to inspect may be employed.
Substantiation: The importance of providing internal inspections of piping is now well documented by what has been observed In sprinkler piping globally regarding obstructions, corrosion, and MIC colonies. To allow for some systems to be neglected due to convenience is not necessary since other means are available to perform these inspections without too much difficulty. An Annex A.14.2.1.6 will be added to explain possible procedures.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #273 Final Action:
(14.2.1.7 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Insert a new section as follows:
14.2.1.7 In lieu of removing a single sprinkler toward the end of one branch line, a fitting shall be permitted to be removed from the branch line so that the branch line can be internally inspected.
Substantiation: NFPA 13 has been clarified to state that when sprinklers are removed, they need to be replaced with new sprinklers. This has the effect of discouraging the removal of a sprinkler. Rather than removing a sprinkler for the internal inspection, an easily removable connection could be placed on the end of branch lines to facilitate the internal inspection. While this is not a common practice now, it could become so in the future and NFPA 25 should begin to allow this better method of performing the internal inspection. We consider this to be better since the opening would be a minimum of 1-inch for the inspection rather than the ½ inch opening from a typical sprinkler.

25- Log #243 Final Action:
(14.2.2.1)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Leadership in Education
Recommendation: Strike the mandatory 5-year open pipe inspection interval as shown below:
14.2.2.1 An inspection of piping and branch line conditions shall be ~~conducted every 5 years~~ by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.

Substantiation: The education facilities industry would like to re-join a discussion begun last cycle by the US General Services Administration, the US Department of Energy, the US Veteran's Hospital Administration and other large users of this document on the issue of the existing mandatory 5-year sprinkler piping inspection requirement that tracks in Proposal 25-185 and Comment 25-101.
We are as interested in life and property protection as any sector of the US economy but the manner and degree to which we accomplish that objective has to take into consideration the full range of risk aggregations unique to our industry. Over-spending in property protection systems is likely to result in under-spending in life safety systems, for example. All inspection, testing and maintenance requirements in this document and others can and should be informed by the condition-based, reliability centered operations and maintenance methods described in other NFPA documents; NFPA 70B, for example, which contains an Annex N. in which the following definition appears:
…"N.1.4 Reliability-Centered Maintenance (RCM). A logical, structured framework for determining the optimum mix of applicable and effective maintenance activities needed to sustain the operational reliability of systems and equipment while ensuring their safe and economical operation and support."…
Our $200 billion (annual) industry is a significant part of the US gross domestic product and we would like to see the fire protection industry innovate upon sprinkler systems so that they perform more reliably and at much lower cost. There are a range of technologies and methods already available for detecting obstructions in wet and dry piping systems that may simply need a little tweaking, and need some upward scaling in availability by manufacturers and/or installers that would accomplish the same goal as the existing 5-year open pipe inspection requirement.

25- Log #237 Final Action:
(14.3(13))

Submitter: Michael Cabral, Cabral Consulting Services
Recommendation: Add new text to read as follows:
13 Pinhole leaks <u>or evidence of replaced pipe</u>
Substantiation: Inspector may not be aware of all events since last inspection. Evidence of pipe replacement such as unpainted pipe in a system that is otherwise painted should trigger an internal inspection in accordance with 14.3.2.2 even if less than 5 years since last internal inspection.

25- Log #136 Final Action:
(14.3.1(1))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add to the list of conditions as shown and renumber the remainder of the list.
(1) <u>The presence of sufficient foreign organic or inorganic material is found when conducting the periodic internal inspection of piping described in section 14.2.</u>
Substantiation: Although it has been assumed that an additional obstruction investigation is needed when obstructing material is found during the internal inspection required by section 14.2, it has never been stated in the list of conditions prompting one. Although section 14.2.1.3 requires an obstruction investigation, by adding this to the list puts the requirement in both sections so there is no confusion. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #143 Final Action:
(14.3.2.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise section 14.3.2.2 as shown.
14.3.2.2 Internal examination shall be performed at the following four points in the affected system or yard main piping:
(1) System valve
(2) Riser
(3) ~~C~~ Each cross main
(4) ~~B~~ Ten percent of the branch lines
Substantiation: The change in the charging sentence is needed to clarify that only the affected system or yard main piping needs to have this investigation performed and not all systems or piping in the facility or building. Making the change to require more than one crossmain and more than one branch line be examined is a best practice to make sure all parts of the system have been sufficiently examined to determine the extent of the obstructed piping, and to plan for correction action such as flushing or pipe replacement. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #289 Final Action:
(15.4.2)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add water mist systems to the list in 15.4.2 as number 9 and then renumber fire service control valves as number 10.
Substantiation: Water mist systems are covered by NFPA 25.

25- Log #6 Final Action:
(15.5.2)

Submitter: James Everitt, Western Regional Fire Code Development Committee
Recommendation: Revise text to read as follows:
(4) Where a ~~required~~ fire protection system is out of service for more than 4 hours in a 24-hour period, the impairment the impairment coordinator shall arrange for one of the following:
Substantiation: Once fire protection systems are installed they must be maintained to perform as designed or properly removed. Building occupants gain an expectation that these systems will work and are unaware if the systems are required or not. The impairment procedures outlined in this section should be conducted for both required and non-required systems. Four hours is more in line with requirements in NFPA 1 Fire Code.

25- Log #290 Final Action:
(15.5.2(3))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Revise 15.5.2(3) as follows:
(3) Recommendations have been submitted to management or the property owner or designated representative for interim fire mitigation strategies.
Substantiation: Explains what kind of recommendations are supposed to be submitted.

25- Log #32 Final Action:
(15.6.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise text to read as follows:
15.6.1 Emergency impairments shall include, but are not limited to, system leakage, interruption of water supply, frozen or ruptured piping, ~~and~~ equipment failure, or conditions found during inspection, testing or maintenance activities.
Substantiation: Most impairments are discovered while performing inspection, testing, and/or maintenance on the system, and yet this standard doesn't clearly state that this condition is considered an emergency impairment once it's discovered. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #186 Final Action:
(A.1.1.3.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add text to annex section A.1.1.1.2 as shown.
A.1.1.3.1 The requirement to evaluate the adequacy of the design of the installed system is not a part of the periodic inspection, testing, and maintenance requirements of this standard. However, an inspector may observe a condition that appears to warrant an evaluation of the system, and such observations can be reported to the owner or designated representative as a recommendation for an evaluation. ~~s~~Such evaluation is the responsibility of the property owner or designated representative as indicated in 4.1.5 and 4.1.6.
Substantiation: This additional annex text is needed to differentiate between what's required to be recorded in an inspection report as a deficiency or impairment and something that the inspector thinks should be investigated. Although the inspector is under no obligation in accordance with this standard to report observations that could trigger an evaluation, a recommendation should at least be addressed. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #187 Final Action:
(A.4.1.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change this annex reference from A.4.1.1 to A.4.1.2.
Substantiation: The reference in the current edition is wrong. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #169 Final Action:
(A.4.1.1 and A.4.1.2)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Renumber as follows:
Existing A.4.1.1 should be renumbered A.4.1 .2
Existing A.4.1.2 should be renumbered A.4.1.1
Substantiation: This is editorial.

25- Log #188 Final Action:
(A.4.1.1.1.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the annex reference from A.4.1.1.1.1 to A.4.1.1.1.
Substantiation: The reference to the section in the main body is wrong and should be changed as described. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #189 Final Action:
(A.4.1.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change the annex reference from A.4.1.2 to A.4.1.1.2.
Substantiation: The reference to the section in the main body is wrong and should be changed as described. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #299 Final Action:
(A.4.1.2)

Submitter: Tracey D. Bellamy, Telgian Corporation
Recommendation: Revise text to read as follows:
A.4.1.2 Any portion or all of the inspection, testing, and maintenance can be permitted to be contracted with an inspection, testing, and maintenance service.
Substantiation: As written the provisions of A.4.1.2 can infer that the contracting of the inspection, test and maintenance activities is an all or nothing proposition. Adding the clarifying language provides that any portion or all such activities can be contracted.

25- Log #313 Final Action:
(A.4.1.2)

Submitter: Shane M. Clary, Bay Alarm Company
Recommendation: Delete text to read as follows:
~~A.4.1.2 Inspection, testing, and maintenance can be permitted to be contracted with an inspection, testing, and maintenance service.~~
Substantiation: Text in Annex does not correlate with text in Standard regarding accessibility.

25- Log #258 Final Action:
(A.4.1.4)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Add the following at the end of A.4.1.4:
When specifically requested by the property owner or designated representative, conditions noted that are not in compliance with the applicable installation standard should be reported to the property owner or designated representative. These conditions may be reported separately from those deficiencies typically noted during normal inspection, testing and maintenance activities.
Substantiation: Owner's have the prerogative of including a review to determine whether conditions are noted that deviate from original installation standards as part of their ITM program. The purpose of the new annex text is to make it clear that in such cases, such conditions are reported so the owner knows what remedial action needs to be taken and this report may be separate from a typically ITM report.

25- Log #251 Final Action:
(Figure A.4.3.1)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Delete Figure A.4.3.1

Substantiation: The figure has nothing to do with the section it's attached to as paragraph 4.3.1 pertains to Records. But more importantly, all questions aside from question C are irrelevant from the "inspector's" perspective. This form is for an owner. As an owner, we see no value to this form. Therefore, in deference to those whom these forms are supposed to serve, it should be deleted.

25- Log #259 Final Action:
(Figure A.4.3.1)

Submitter: Joshua Elvove, U.S. General Services Administration
Recommendation: Delete Figure A.4.3.1.
Substantiation: The figure has nothing to do with the section it's attached to as paragraph 4.3.1 pertains to Records. But more importantly, all questions aside from question C are irrelevant from the "inspector's" perspective. This form is for an owner. As an owner, we see no value to this form. Therefore, in deference to those whom these forms are supposed to serve, it should be deleted.

25- Log #194 Final Action:
(Figure A.4.3.1 B.)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Change item B in the sample Owner's Section on Inspection Report as shown.
B. Has the occupancy and hazard of contents remained the same since system installation or since the last ~~inspection~~ system evaluation?
Substantiation: It's important to ask the proper question of the owner or the owners designated representative. A change could have been made prior to the previous inspection that was never identified or an evaluation was never performed. The question should always be asked in the context of the original installation or the latest evaluation. If the owner or designated representative is unsure, then an investigation should be performed and an evaluation may be necessary. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #62 Final Action:
(A.5.2.1.1.x (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.5.2.1.1.x The inspection of sprinklers from the floor level may be aided by using a flashlight and or binoculars.

Substantiation: This guidance is already in the commentary text of the handbook as is the relative substantiation and should be moved into the appendix material. Paragraph 5.2.1.1 requires a visual signs of damage. The inspection is done from the floor level, because to reveal as it is usually impractical to get closer to the sprinklers for a more detailed inspection, and the use of ladders is of limited benefit when compared to the cost. A flashlight or binoculars can assist in the inspection of the sprinklers (or piping) in buildings with high ceilings. When other work is being done at the ceiling level using ladders or lifts, personnel could take advantage of the opportunity of being closer to the sprinklers and inspect the system.

25- Log #79 Final Action:
(A.5.2.1.1.6)

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Add text to existing annex material for clarification.
Examples include some floor/ceiling or roof/ ceiling assemblies, whether the ceilings are lay-in tile or drywall, areas under theater stages, pipe chases, and other inaccessible areas: even if access panels or hatches are provided into the areas.

Substantiation: It is often misunderstood that any entry point through an access panel or hatch will automatically make the space accessible thus eliminating it from being categorized as a concealed space. Expanding the definition will provide clarification with respect to what would be considered a concealed space.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #63 Final Action:
(A.5.2.2.x (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.5.2.2.x The inspection of pipe and fittings from the floor level may be aided by using a flashlight and or binoculars.

Substantiation: This guidance is already in the commentary text of the handbook as is the relative substantiation and should be moved into the appendix material. See proposed Paragraph 5.2.1.1.X.

25- Log #64 Final Action:
(A.5.2.3.x (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.5.2.3.X The inspection of hangers and seismic braces from the floor level may be aided by using a flashlight and or binoculars.

Substantiation: This guidance is already in the commentary text of the handbook as is the relative substantiation and should be moved into the appendix material. See proposed Paragraph 5.2.1.1.X.

25- Log #65 Final Action:
(A.5.2.4.1)

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Revise text to read as follows:
A.5.2.4.1 Due to the ~~high~~ probability of a buildup of excess pressure, ~~gridded~~ wet pipe systems ~~should~~ shall be provided with a relief valve not less than ~~1/4 in. (6.3 mm)~~ 1/2 in. (12 mm) in size in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.*

Substantiation: This change in relief valve size reflects the recent change in NFPA 13 2011 requiring all wet systems to have a minimum 1/2 in. relief valve.

25- Log #106 Final Action:
(A.5.2.6)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Revise A.5.2.6 as follows:
A.5.2.6 The hydraulic design information sign should be secured to the riser with durable wire, chain, or equivalent. When the sign needs to be replaced or added, the owner is to supply the information for the sign based on the records from the original installation, or from the most recent system evaluation.
Substantiation: There is always a question about the need for a hydraulic design information sign when none is present on the system riser. The proposed changes make it clear that if a sign isn't present, one needs to be provided, either to replace the one that's missing, or to retrofit a sign if the system is a pipe schedule. When a sign needs to be replaced or added, the owner is to supply the information for the sign based on the records from the original installation, or from the most recent system evaluation. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #123 Final Action:
(A.5.3.1.2)

Submitter: Roland J. Huggins, American Fire Sprinkler Association, Inc.
Recommendation: Delete the following text:
Within a building or portion thereof exposed to the same air quality ~~an environment~~, similar sidewall, upright, and pendent sprinklers produced by the same manufacturer could be considered part of the same sample, but additional sprinklers would be included within the sample if produced by a different manufacturer.
Substantiation: This is mainly meant to clarify the intent for "environment" but it also identifies the extent of the building that a single sample can cover.

25- Log #66 Final Action:
(A.5.3.2.2 (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.5.3.2.2 The testing of a pressure gauge shall be conducted in comparison to a calibrated gauge over its full range, with readings taken going both up and down the range at not less than three points on the gauge and shall be accurate over the full range to plus or minus 3 percent of the maximum gauge pressure. The calibrated gauge used for this test shall be at least three times more accurate than the gauge being tested.

Substantiation: This appendix verbiage is intended to provide guidance as to how the test over the range is to be conducted.

25- Log #77 Final Action:
(A.5.5.2 (New))

Submitter: John T. Johnson, Tyco Fire Protection Products
Recommendation: Add Annex material as follows:
A.5.5.2 The waterflow test may not provide an assurance of proper flow or pressure, but a means to verify that the operated valve has been returned to a full open position.
Substantiation: Upstream valves may not be main drains, so the term waterflow test would be inclusive to all drain tests, main or sectional.
Many systems with floor or zone control valves are not provided with pressure gauges to verify pressure readings while conducting waterflow tests. The inspector is unable to measure or record pressure readings from current waterflow tests, or compare flows to previous tests. The inspector can only estimate the flow provided is coming from a fully open or partially open valve.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #67 Final Action:
(A.6.3.4.2 (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.6.3.4.2 The testing of a pressure gauge shall be conducted in comparison to a calibrated gauge over its full range, with readings taken going both up and down the range at not less than three points on the gauge and shall be accurate over the full range to plus or minus 3 percent of the maximum gauge pressure. The calibrated gauge used for this test shall be at least three more accurate than the gauge being tested.

Substantiation: This appendix verbiage is intended to provide guidance as to how the test over the range is to be conducted.

25- Log #78 Final Action:
(A.6.5.3 (New))

Submitter: John T. Johnson, Tyco Fire Protection Products / Rep. Tyco/SimplexGrinnell
Recommendation: Add Annex material as follows:
A.6.5.3 The waterflow test may not provide an assurance of proper flow or pressure, but a means to verify that the operated valve has been returned to a full open position.

Substantiation: Upstream valves may not be main drains, so the term waterflow test would be inclusive to all drain tests, main or sectional.
Many systems with floor or zone control valves are not provided with pressure gauges to verify pressure readings while conducting waterflow tests. The inspector is unable to measure or record pressure readings from current waterflow tests, or compare flows to previous tests. The inspector can only estimate the flow provided is coming from a fully open or partially open valve.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #53 Final Action:
(A.8.3.3.5)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Revise text to read as follows:
A.8.3.3.5 It is not the intent to verify that all the alarm conditions required NFPA 20 (e.g., low oil pressure, high coolant temperature, failure of engine to start, engine overspeed, loss of phase, phase reversal) transmit individually to a remote location, as long as these alarms can be individually verified or simulated at the pump controller.
Substantiation: Modifying this section would provide viable methods (simulation) to comply with the requirement of Joint Commission. Factor such as phase reversal or loss cannot be achieved in a safe (realistic) manner. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #133 Final Action:
(A.8.3.5.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Delete the following text as shown and add the rest of this annex section to A.8.3:
~~A.8.3.5.1 Where the information is available, the test plot should be compared with the original acceptance test plot. It should be recognized that the acceptance test plot could exceed the minimum acceptable pump requirements as indicated by the rated characteristics for the pump. While a reduction in output is a matter of concern, this condition should be evaluated in light of meeting the rated characteristics for the pump.~~ ~~*[See Figure A.8.3.5.3(1)(a).]*~~
Substantiation: There's no need to compare pump test results with the original acceptance test curve as long as the name plate data is available. The name plate data will always represent a lower curve that the original acceptance test one, and the only time the original acceptance test curve should be used is when the name plate data is missing. The rest of this annex section describes the quality and accuracy of the test equipment and belongs as explanatory material to 8.3 not 8.3.5.1. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #54 Final Action:
(Figure A.8.3.5.3(1)(a) and (b))

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Take the following action in Figures A.8.3.5.3(1)(a) and (b):
Delete Figure A.8.3.3.5.3(1)(a) in its entirety.
Remove the "(b)" from Figure A.8.3.5.3(1).
Substantiation: Removal of figure (a) removes the adjusted curve as proposed in 8.3.5.2.1 using theoretical factors. The "(b)" is no longer necessary since only one figure will remain in the annex. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #55 Final Action:
(A.8.4.2)

Submitter: Robert S. Bartosh, SimplexGrinnell
Recommendation: Delete text to read as follows:
~~A.8.4.2 See 8.3.3.4~~
Substantiation: Referenced code has no direct relationship to 8.4.2 Reports. 8.3.3.4 only indicates transfer switch data not all recordable data necessary to complete an annual flow test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #130 Final Action:
(A.9.2.6.1.2 (New))

Submitter: Raymond Brown, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: Add new annex note to 9.2.6.1.2 as follows:
A.9.2.6.1.2 If written verification of interior corrosion protection for a tank per NFPA 22 Standard for Water Tanks for Private Fire Protection cannot be provided by the building owner, the interior of the tank should be inspected every 3 years.
Substantiation: Without written verification of corrosion protection the inspector would not know if the tank required a 5 year inspection or a 3 year inspection. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #126 Final Action:
(A.9.3.6 (New))

Submitter: Mark T. Conroy, Brooks Equipment Company
Recommendation: Add the following as a new A.9.3.6:
A.9.3.6 See A.5.3.2
Substantiation: Section 9.3.6 is identical to 5.3.2. Referencing A.5.3.2 in paragraph A.9.3.6 is therefore appropriate.

25- Log #27 Final Action:
(A.13.2.5)

Submitter: Frank Monikowski, SimplexGrinnell
Recommendation: Add new text to the end of the 3rd subparagraph of A.13.2.5 that starts with "A large drop" as follows:
In addition to comparing the residual pressure to previous test results [which may not be available], the test results should be compared to the hydraulic placard residual pressure [when present] to further help determine if water supply degradation may have occurred. A residual pressure reading from the main drain tests that is equal to or lower than the designed residual pressure requires further investigation the same as a 10% degradation. This will also helpful when a 2% degradation may occur over an extended period of time that would go unnoticed and not be reported.
Substantiation: 1.25 in. and 2 in. drain tests cannot possibly flow enough water to meet the sprinkler system demand [3D exempt and not required]. If residual pressure readings from the drain tests are lower than that indicated on the placard, a serious problem most likely exists as t what water supply either being inadequate or a blockage or shut valve of some kind may be present. A study published in Q4 2010 edition of SFPE magazine indicated ineffective performance of sprinkler systems 9% of the time is attributed to not enough water being discharged.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
2010 Q4 Edition of SFPE magazine

25- Log #190 Final Action:
(A.13.2.5(6))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Delete A.13.2.5(6) as shown.
~~(6) Record the time taken for the supply water pressure to return to the original static (nonflowing) pressure.~~
Substantiation: There is no requirement in the installation standards to record this time so there's no baseline for comparison. Because it's in the annex of NFPA 25 some AHJs have reviewed inspection reports to make sure this time has been recorded. Those that have attempted to measure this time indicate that it's practically instantaneous. If there's a blockage in the supply piping that would affect the static pressure, it will certainly be discovered when performing the main drain test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #68 Final Action:
(A.13.2.7.3 (New))

Submitter: Gordon Farrell, Tyco Fire Protection Products
Recommendation: Add new text to read as follows:
A.13.2.7.3 The testing of a pressure gauge shall be conducted in comparison to a calibrated gauge over its full range, with readings taken going both up and down the range at not less than three points on the gauge and shall be accurate over the full range to plus or minus 3 percent of the maximum gauge pressure. The calibrated gauge used for this test shall be at least three more accurate than the gauge being tested.

Substantiation: This appendix verbiage is intended to provide guidance as to how the test over the range is to be conducted.

25- Log #191 Final Action:
(A.13.3.3.2)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new text in A.13.3.3.2 as shown, before the existing text. All other existing text to remain.
A.13.3.3.2 A proper wrench needs to be used for this test. Using an improper wrench such as a pipe wrench has resulted in damage to the operating nut. The use of break over bars and extensions on the wrench can damage the valve and/or the post. If the valve cannot be closed and reopened using the proper wrench with reasonable force, then some maintenance and/or repairs are necessary so the valve can be operated when needed in a fire event.

Substantiation: This change clarifies that a proper wrench needs to be used for this test. Using an improper wrench such as a pipe wrench has resulted in damage to the operating nut. The use of break over bars and extensions on the wrench can damage the valve and/or the post. If the valve cannot be closed and reopened using the proper wrench with reasonable force, then some maintenance and/or repairs are necessary so the valve can be operated when needed in a fire event. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #124 Final Action:
(A.13.6.2.1)

Submitter: Roland J. Huggins, American Fire Sprinkler Association, Inc.
Recommendation: Delete the following text:
~~The tests required by 13.6.2 typically test only for operation of the device under backflow conditions. Forward-flow test conditions are required by other portions of this standard.~~

Substantiation: This statement is incorrect since NFPA 25 tests are only concerned with forward flow and not backflow.

25- Log #193 Final Action:
(A.13.6.2.1)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add, revise, and delete explanatory text in A.13.6.2.1 as shown.
A.13.6.2.1 The full flow test of the backflow prevention valve can be performed with a test header or other connections downstream of the valve. A bypass around the check valve in the fire department connection line with a control valve in the normally closed position can be an acceptable arrangement. Whatever means are used for the forward flow test, the flow through all used outlets should be measured to determine if system demand flow was realized or not. When flow to a visible drain cannot be accomplished, closed loop flow can be acceptable if a flowmeter or ~~sight glass~~ is incorporated into the system to ~~ensure~~ measure flow. ~~The tests required by 13.6.2 typically test only for operation of the device under backflow conditions. Forward-flow test conditions are required by other portions of this standard.~~

Substantiation: These changes are necessary to explain how the forward flow test can be accomplished. Measuring the flow even if it's through multiple outlets is necessary. A sight glass doesn't meet the needs of this test and adds nothing to it. The last two sentences were left over from when the backflow test was required by this standard and should have been deleted in previous editions. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #286 Final Action:
(A.13.6.2.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Replace the second paragraph of A.13.6.2.1 with the following:
~~The tests required by 13.6.2 typically test only for operation of the device under backflow conditions. Forward-flow test conditions are required by other portions of this standard.~~
The forward flow test of a backflow preventer only evaluates the flow through the device, not the pressure. However, the pressure at the system flow rate could provide important information about the condition of the internal check valves, similar to the main drain test.
Substantiation: The current paragraph is not longer correct. The backflow test is gone from NFPA 25 and the forward flow test is in this section, not others.
The replacement paragraph reinforces the requirement and makes some suggestions about additional data that could be collected, but is not required.

25- Log #170 Final Action:
(A.13.7.2 (New))

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Add new text to read as follows:
A.13.7.2 It is not the intent of this section for all fire department connection piping to be inspected for obstructions but rather the interior of the connection itself.
Substantiation: There is some confusion in the industry as to the extent of this inspection. This annex material should clear this up.

25- Log #172 Final Action:
(A.14.2.1.4)

Submitter: Frank Monikowski, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: Add the following new section to the Annex.
A.14.2.1.4 Should any of the items found in 14.3.1 be observed where non metallic piping is present, an inspection and investigation as outlined in both 14.2.1 and in 14.3.2 should be performed.
Substantiation: Non metallic piping can be subject to obstructions the same as metallic pipe for many of the line items listed In 14.3.1. For this, reason, it needs to be clarified further inspections and investigations need to take place in all piping when warranted.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #174 Final Action:
(A.14.2.1.6)

Submitter: Frank Monikowski, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: Delete existing A.14.2.1.6 in its entirety and replace with the following new text:
A.14.2.1.6 Accessing ends of cross mains and removing flushing connections can sometimes be difficult. The important thing is that we observe at least the interior of cross mains at some point in the system. This can be done by providing access panels in Gypsum Board ceilings, or by using a snake camera from a sprinkler riser or branch line to view the inside of a cross main. Also mechanical tees can be cut into the piping when caps are too difficult to remove. Alternatively 14.2.1.1 may also be followed.
Substantiation: Providing options to inspect the internal conditions of sprinkler cross mains is imperative. To allow an excuse as to why it might not be done is irrelevant and not good fire protection maintenance practices especially with today's modem technology available.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #144 Final Action:
(A.14.3.1(4))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Move the annex text of A.14.3.1 (4) to the main body as shown and renumber the rest of the list.
~~A.~~14.3.1~~(4)~~ (5) If unknown materials are heard in the system piping during draining, refilling, or otherwise flowing water through the system.
Substantiation: This annex text needs to be in the body of the standard. Many times rocks and other obstructing material can be heard entering a system when refilling after performing routine ITM activities or after system modifications are made. An obstruction investigation should not be recommended or suggested in the annex, but should be required by the standard. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.
This is not original material; its reference/source is as follows:
Is in current A.14.3.1(4) of NFPA 25

25- Log #97 Final Action:
(A.15.6.1 (New))

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Add new Annex wording with attachment as follows:
A.15.6.1 When one or more impairments are discovered during inspection, testing, and maintenance activities the owner or owner's authorized representative should be notified in writing. See Figure A.15.6.1 for an example of written notification.
Extract exhibit 15.2 from the 2008 NFPA 25 handbook and label it Figure A.15.6.1. Make the following changes to the extracted exhibit:
1. Change reference in the second paragraph from "Chapter 11" to "Chapter 15".
2. Delete "dry pipe valve is obsolete and was not tested" from the checklist.
3. Delete "jockey pump is out of service" from the checklist.
4. Add any other findings designated as an impairment in annex E to the checklist.
Substantiation: Most impairments are discovered while performing inspection, testing, and/or maintenance on the system, and the building owner or representative should be notified so proper procedures can be implemented per Chapter 15. The proposed form has been in the NFPA 25 handbook since 2002 and is an example of what the written notification might look like. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #275 Final Action:
(A.15.7 (New))

Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.
Recommendation: Add a new annex note as follows:
A.15.7 Restoring Systems to Service After Disuse
Occasionally, fire protection systems in idle or vacant buildings are shut off and drained. When the equipment is eventually restored to service after a long period of not being maintained, it is recommended that a responsible and knowledgeable contractor perform the work. The following procedure is recommended:
(1) All piping should be traced from the extremities of the system to the main connections with a careful check for blank gaskets in flanges, closed valves, corroded or damaged sprinklers, nozzles or piping, insecure or missing hangers and insufficient support. Proper repairs or adjustments should be made and needed extensions or alterations for the equipment should be completed.
(2) An air test at low pressure (40 psi) should be conducted prior to allowing water to fill the system. When the piping has been proven tight by passing the air test, water can be introduced slowly into the system with proper precautions against damage by escape of water from previously undiscovered defects. When the system has been filled under normal service pressure, drain valve tests should be made to detect any closed valve that possible could have been overlooked. All available pipes should be flushed and an obstruction investigation completed to make sure that the system is clear of debris.
(3) Where the system was known to have been damaged by freezing or where other extensive damage may have occurred, a full hydrostatic test can be performed in accordance with NFPA 13 to determine whether the system integrity has been maintained.
(4) Dry-pipe valves, quick opening devices, alarm valves and all alarm connections should be examined, put in proper condition and tested.
(5) Fire pumps, pressure and gravity tanks, reservoirs and other water supply equipment should receive proper attention before being placed in service. Each supply should be tested separately; and then together if they are designed to work together.
(6) All control valves should be operated from the closed to fully open position and should be left sealed, locked or equipped with a tamper switch.
Substantiation: Guidance on returning systems to service that have long been out of service is helpful. This material used to be in NFPA 13A and was lost when information was converted into NFPA 25.
This is not original material; its reference/source is as follows:
Paraphrased from NFPA 13A-1982 Section 6-5.

25- Log #7 Final Action:
(Annex D)

Submitter: James Everitt, Western Regional Fire Code Development Committee
Recommendation: Add new section D 1.1 While this chapter provides minimum requirements for the investigation and prevention of obstructions, AHJ's must also consider regional, local and project specific propensities and histories to determine reasonable testing and obstruction mitigation measures.
Substantiation: Various regions of the country may not experience certain obstruction problems. Referring to the provisions of this chapter as a minimum, may imply to some that this must be adhered to regardless of regional or local conditions. This will add to the expense of system maintenance without a commensurate in performance.

25- Log #175 Final Action:
(D.4.1)

Submitter: Frank Monikowski, SimplexGrinnell / Rep. Tyco/SimplexGrinnell
Recommendation: D.4.1 item (3) needs deleted in its entirety
~~Piping that has been galvanized internally for new dry pipe and preaction sprinkler system installations should be used. Fittings, couplings, hangars, and other appurtenances are not required to be galvanized. Copper or stainless steel piping also is permitted.~~
Substantiation: Studies by corrosion engineers have proven that Galvanized piping does not prevent corrosion. Same is true with all metallic piping.
For this reason, item 3 should be deleted.
This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

25- Log #171 Final Action:
(Annex E)

Submitter: Russell B. Leavitt, Telgian Corporation
Recommendation: Delete Annex E.
Substantiation: The list is incomplete and subject to much misinterpretation. If it is to remain, it must undergo a complete rewrite.

25- Log #293 Final Action:
(Table E.1)

Submitter: George W. Stanley, Wiginton Fire Systems
Recommendation: Revise text to read as follows:
Move the entire contents of Table E.1 to a new Table A.4.1.4 and delete the entire Annex E.
Revised the last sentence of A.4.1.4 as followed: A table showing classifications of needed corrections and repairs is shown in ~~section E.1~~ Table A.4.1.4.
Substantiation: Moving Table E.1 to a new Table A.4.1.4 changes it from an example to explanatory material which will give more clarity to the inspecting contractor and direction to the owner.

25- Log #241 Final Action:
(E.1 and Table A.4.1.4)

Submitter: Terry L. Victor, Tyco/SimplexGrinnell
Recommendation: Move Table E.1 to annex A as new Table A.4.1.4 titled "~~Examples of~~ Classifications of Needed Corrections and Repairs".

Move E.1 to annex A and add at the end of existing A.4.1.4 text as follows:

~~E.1~~ A.4.1.4 Table ~~E.1 is an example of~~ A.4.1.4 shows classifications (e.g., impairment, critical deficiency, or noncritical deficiency) of ~~some~~ many of the needed corrections and repairs that are identified during the inspection, testing, and maintenance of ~~some~~ systems. This table is not all-inclusive but is included in this annex to provide ~~some~~ guidance in responding to needed corrections and repairs. The table does not take into account the nature of the hazard or the life safety exposure of the occupancy and should be used with good judgment.

Make changes to the new Table A.4.1.4 as shown in the supporting material.

Incorporate all new requirements into new Table A.4.1.4.

Substantiation: The current table E.1 has excellent and much needed guidance for classifying impairments, critical deficiencies, and noncritical deficiencies. While there are still some gray areas which would prevent it from being in the body of the standard, it does cover most of the findings from an inspection and/or test. This proposal is being submitted by the Tyco Codes and Standards NFPA 25 Task Group.

Note: Supporting material is available for review at NFPA Headquarters.

25- Log #246 Final Action:
(Annex X (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Leadership in Education
Recommendation:

INCLUDE 25_L246_R

Substantiation: The education facilities industry is interested in reducing total owning cost. One approach may be to begin a migration from generic, fixed-interval IT&M methods, to more numerate and risk-informed methods that other NFPA committees have developed

Add New Annex X (re-purposed from Annex N: Reliability-Centered Maintenance from NFPA 70B) as shown below. Note that some graphics may not appear due to the objects embedded in the electronic version of NFPA 25):

Annex X Reliability Centered Maintenance (Extracted from NFPA 70B for use by the NFPA 25 Technical Committees)

N.1 Definitions. These definitions are referenced in several reliability publications and the formulas can be verified in MIL-STD-339, *Wiring and Wiring Devices for Combat and Tactical Vehicles, Selection and Installation of*, or in IEEE 100, *Authoritative Dictionary of IEEE Standards Terms*.

N.1.1 Availability. The probability that a system or product will be available to perform its intended mission or function when called upon to do so at any point in time. It can be measured in one of several ways.

N.1.1.1 Function of Uptime. Availability can be considered as the percent of total time that a system is available. It is measured using Equation 1 (note that the period of time over which this measure of availability is made must be defined). Downtime includes administrative time and delays, as well as time for maintenance and repair.

INSERT 25_L246_R_EQ1

[Eq 1]

N.1.1.2 Operational Availability.

N.1.1.2.1 Another equation for availability directly uses parameters related to the reliability and maintainability characteristics of the item as well as the support system. Equation 2 reflects this measure.

INSERT 25_L246_R_EQ2

[Eq 2]

N.1.1.2.2 In Equation 2, MTBM includes all maintenance required for any reason, including repairs of actual design failures, repairs of induced failures, cases where a failure cannot be confirmed, and preventive maintenance.

N.1.1.3 Inherent Availability. When only maintenance required to correct design failures is counted and the effects of the support system are ignored, the result is inherent availability, which is given by Equation 3.

INSERT 25_L246_R_EQ3

[Eq 3]

N.1.2 RCM Maintenance. Those activities and actions that directly retain the proper operation of an item or restore that operation when it is interrupted by failure or some other anomaly. (Within the context of RCM, proper operation of an item means that the item can perform its intended function.) These activities and actions include removal and replacement of failed items, repair of failed items, lubrication, servicing (includes replenishment of consumables such as fuel), and calibrations. Other activities and resources are needed to support maintenance. These include spares, procedures, labor, training, transportation, facilities, and test equipment. These activities and resources are usually referred to as logistics. Although some organizations might define maintenance to include logistics, it is used in this section in the more limited sense and

does not include logistics.

N.1.2.1 Corrective Maintenance. Actions required to restore a failed item to proper operation. Restoration is accomplished by removing the failed item and replacing it with a new item, or by fixing the item by removing and replacing it with a new item, or by fixing the item by removing and replacing internal components or by some other repair action.

N.1.2.2 Preventive Maintenance. Scheduled activities based on an interval to ensure safety, reduce the likelihood of operational failures, and obtain as much useful life as possible from an item.

N.1.2.3 Condition-Based Maintenance. Actions performed on the basis of observed wear or on predicting when the risk of failure is excessive.

N.1.2.3.1 Some items exhibit wear as they are used. If the probability of failure can be related to a measurable amount of wear, it might be possible to prescribe how much wear can be tolerated before the probability of failure reaches some unacceptable level. If so, then this point becomes the criterion for removal or overhaul. Measurement can be done using a variety of techniques depending on the characteristic being measured. ~~The temperature of electrical equipment, for example, can be measured using infrared thermography.~~

N.1.2.3.2 In predictive maintenance, a given operating characteristic of the item, current, or temperature, for example, is trended and compared with the known "normal" operating levels. An acceptable range is established with either upper and lower limits or some maximum or minimum level. As long as the trend data remain inside the acceptable values, any variation is considered to be normal deviation due to variances in materials, operating environment, and so forth. When the trend line intersects the "unacceptable" limit line, preventive maintenance is required to avoid a failure in the future. The limits are based on knowledge of the normal operating characteristics and the level of risk of failure that is acceptable.

N.1.3 Reliability. The probability that an item will perform its intended function(s) without failure for a specified time under stated conditions.

N.1.4 Reliability-Centered Maintenance (RCM). A logical, structured framework for determining the optimum mix of applicable and effective maintenance activities needed to sustain the operational reliability of systems and equipment while ensuring their safe and economical operation and support.

N.2 Benefits of RCM.

N.2.1 Reduced Costs. Savings have been achieved by industries for equipment when going from a traditional to an RCM-based PM program. It is important to note that these costs savings were achieved with no reduction in safety.

N.2.2 Increased Availability. For many systems, availability is of primary importance. The level of availability achieved in actual use of a product is a function of how often it fails and how quickly it can be restored to operation. The latter, in turn, is a function of how well the product was designed to be maintainable, the amount of PM required, and the logistics resources and infrastructure that have been put in place to support the product. RCM directly contributes to availability by reducing PM to that which is essential and economic.

N.3 Relationship of RCM to Other Disciplines.

N.3.1 Reliability. Much of the analysis needed for reliability provides inputs necessary for performing an RCM analysis. The fundamental requirement of the RCM approach is to understand the failure characteristics of an item. As used herein, failure characteristics include the consequences of failure, and whether or not the failure manifests itself and, if it does, how. Reliability is measured in different ways, depending on one's perspective: inherent reliability, operational reliability, mission (or functional) reliability, and basic (or logistics) reliability. RCM is related to operational reliability.

N.3.1.1 Inherent Versus Operational Reliability. From a designer's perspective, reliability is measured by "counting" only those failures that are design-related. When measured in this way, reliability is referred to as "inherent reliability." From a user's or operator's perspective, any event that causes the system to stop performing its intended function is a failure event. These events include all design-related failures that affect the systems' function. Also included are maintenance-induced failures, no-defect-found events, and other anomalies that might have been outside the designer's contractual responsibility or technical control. This type of reliability is called "operational reliability."

N.3.1.2 Mission-Critical or Functional Reliability Versus Basic or Logistics Reliability. Any failure that causes the product to fail to perform its function or critical mission is counted in "mission-critical reliability." Redundancy improves mission-critical reliability. Consider a case where one part of a product has two elements in parallel where only one is needed (redundant). If a failure of one element of the redundant part of the product fails, the other continues to function, allowing the product to do its job. Only if both elements fail will a mission-critical failure occur.

N.3.1.3 Basic Reliability. In "basic" reliability, all failures are counted, whether or not a mission-critical or functional failure has occurred. This measure of reliability reflects the total demand that will eventually be placed on maintenance and logistics.

N.3.1.3.1 Safety. RCM specifically addresses safety and is intended to ensure that safety is never compromised.

N.3.1.3.2 Environmental Concerns. In the past several years, environmental concerns and issues involving regulatory bodies have been accorded importance in the RCM approach for some items that are equal (or nearly so) to safety. Failures of an item that can cause damage to the environment or that result in some federal or state law being violated can pose serious consequences for the operator of the item. So the RCM logic can be modified to specifically address environmental or other concerns.

N.3.1.3.3 Maintainability. RCM is a method for prescribing PM that is effective and economical. Whether or not a given PM task is effective depends on the reliability characteristics of the item in question. Whether or not a task is economical depends on many factors, including how easily the PM tasks can be performed. Ease of maintenance, corrective or preventive, is a function of how well the system has been designed to be maintainable. This aspect of design is called maintainability. Providing ease of access, placing items requiring PM where they can be easily removed, providing means of inspection, designing to reduce the possibility of maintenance-induced failures, and other design criteria determine the maintainability of a system.

N.4 Supporting Data. Data are critical to the success of an RCM analysis. Since conducting an RCM analysis requires an extensive amount of information, and much of this information is not available early in the design phase, RCM analysis for a new product cannot be completed until just prior to production. The data fall into four categories: failure characteristics, failure effects, costs, and maintenance capabilities and procedures. Table N.4 illustrates reliability and maintainability information crucial to an RCM analysis.

Table N.4 Reliability and Maintainability Information for RCM Analysis

Calculated Data	Formula for Calculation
Ao, Operational Availability	Ao = MTBM/(MTBM+MDT)
Ai, Inherent Availability	Ai = MTBF/(MBTF+MTTR)
R(t), Reliability (for time interval t)	$R(t) = e^{-\lambda t}$
MTBF, Mean Time Between Failures (h)	MTBF = Tp/Tf
BTTR, Mean Time To Repair (h)	MTTR = Rdt/Tf

MTTM, Mean Time To Maintain (h)	MTTM = Mdt/Tma
MDT, Mean Downtime (h)	MDT = (Rdt + Rlt + Mdt)/Tde
Probability of satisfactory start, prob_s_s	Prob_s_s = total_start/total_attempt
Probability of failure to start, prob_f_s	Prob_f_s = total_fail_start/total_attempt
Hrdt/Year, Hours Downtime per Year	Hrdt/Year = (1 − Ao) × 8760

Table N.4

Reliability and Maintainability Information for RCM Analysis

N.5 Reliability, Inherent Availability, and Operational Availability Data. Table N.5 is provided to help you understand and properly apply the data categories in your analysis. The summary information calculated from the individual equipment records is also included. Calculation formulas for each category are given in Table N.4. These definitions are referenced in several reliability publications, and the formulas can be verified in MIL-STD-339 or in the IEEE standard definition publication.

Table N.5 Reliability, Inherent Availability, and Operational Availability Data

Roll Up Report by Category, Class, and Item				
CATEGORY[a]	**CLASS[b]**	**Reliability[c]**	**Inherent Availability[d]**	**Operational Availability[e]**
Accumulator		0.993467721	0.999993849	0.999884828
	Accumulator, Pressurized.	0.993913727	0.999992102	0.999841861
	Accumulator, Unpressurized.	0.992345933	0.999998246	0.999992983
Air Compressor		0.964395571	0.999966392	0.999377084
	Air Compressor, Electric.	0.926805720	0.999919556	0.999207149
	Air Compressor, Fuel.	0.989726301	0.999996935	0.999487902
Air Dryer		0.997716217	0.999998695	0.999926162
	Air Dryer, All Types.	0.997716217	0.999998695	0.999926162
Air Handling Unit		0.989056337	0.999997032	0.999875595

	Air Handling Unit, Non-humid wo/Drive.	0.989056337	0.999997032	0.999875595
Arrester		0.998679474	0.999999397	0.999999397
	Arrester, Lightning.	0.998679474	0.999999397	0.999999397
Battery		0.993006248	0.999990299	0.999969547
	Battery, Gel Cell-Sealed, Strings.	0.980061731	0.999995402	0.999967422
	Battery, Lead Acid, System.	0.992563514	0.999972627	0.999968207
	Battery, Nickel-Cadmium.	0.999399558	0.999999292	0.999971403
Blower		0.999825378	1.000000000	0.999960812
	Blower, wo/Drive.	0.999825378*	1.000000000	0.999960812
Boiler		0.878642210	0.999360697	0.995132436
	Boiler, Hot Water, Gravity and Circulated.	0.959008598	0.999985268	0.999501894
Steam		0.842870823	0.999064090	0.993057393
	Boiler, Steam, High Pressure.	0.928026957	0.999619462	0.991492148
	Boiler, Steam, Low Pressure.	0.719936234	0.998154400	0.995621239
Bus Duct		0.999696290	1.000000000	1.000000000
	Bus Duct, All types, (100 ft).	0.999696290*	1.000000000	1.000000000
Cabinet Heaters		0.999897930	0.999999994	0.999978224
	Cabinet Heaters, Forced Air Flow, Steam or Hot Water.	0.999897930	0.999999994	0.999978224
Cable		0.998149212	0.999998818	0.999987869
Above Ground		0.999509398	0.999999527	0.999998357
	Cable, Above Ground, In Conduit, ≤600V, Per 1000 ft.	0.999932074	0.999999938	0.999990264
	Cable, Above Ground, In Conduit, >600V ≤5kV, Per 1000 ft.	0.999463225	0.999999476	0.999998707
	Cable, Above Ground, No Conduit, ≤600V, Per 1000 ft.	0.999879838	0.999999966	0.999999904
	Cable, Above Ground, No Conduit, >600V ≤5kV, Per 1000 ft.	0.999244433	0.999999655	0.999999655
	Cable, Above Ground, Trays, ≤600V, Per 1000 ft.	0.968468243*	1.000000000	1.000000000
	Cable, Above Ground, Trays, >600V ≤5kV, Per 1000 ft.	0.997171966*	1.000000000	1.000000000
Aerial		0.988381339	0.999997295	0.999997259
	Cable, Aerial, ≤15kV, Per Mile.	0.953928762	0.999990218	0.999990218
	Cable, Aerial, >15kV, Per Mile.	0.995896395	0.999998806	0.999998762

Below Ground		0.994225869	0.999995527	0.999928197
	Cable, Below Ground, Duct, ≤600V, Per 1000 ft.	0.999875009	0.999999766	0.999999697
	Cable, Below Ground, Duct, >600V ≤5kV, Per 1000 ft.	0.987125021*	1.000000000	1.000000000
	Cable, Below Ground, In Conduit, ≤600V, Per 1000 ft.	0.997994901	0.999997428	0.999991686
	Cable, Below Ground, In Conduit >600V ≤5kV, per 1000 ft.	0.997646877	0.999995779	0.999987126
	Cable, Below Ground, Insulated, >5kV, Per 1000 ft.	0.980031515	0.999988193	0.999674546
	Cable, Below Ground, Insulated, ≤600V, Per 1000 ft.	0.973653295	0.999976836	0.999976836
Insulated		0.992748496	0.999998338	0.999998338
	Cable, Insulated, DC, Per 100 ft.	0.992748496	0.999998338	0.999998338
Cable Connection		0.999629261	0.999999968	0.999999968
Capacitor Bank		0.839937440	0.999954142	0.999942075
	Capacitor Bank, Power Factor Corrector, (in kVAR).	0.839937440	0.999954142	0.999942075
Charger		0.992621004	0.999999577	0.999986472
	Charger, Battery.	0.992621004	0.999999577	0.999986472
Chiller		0.888515818	0.999829779	0.997620632
	Chiller, Absorption.	0.841986658	0.999769437	0.995132437
	Chiller, Centrifugal, 600 - 1000 Tons.	0.955142622	0.999923928	0.997604888
	Chiller, Reciprocating, Closed, w/Drive, 50 - 200 Tons.	0.879941865	0.999809524	0.998734968
	Chiller, Reciprocating, Open, wo/Drive, 50 - 200 Tons.	0.826705884	0.999775088	0.999312485
	Chiller, Rotary, 600 - 1000 Tons.	0.986993503	0.999964132	0.996197991
	Chiller, Screw, >300 Tons.	0.956286690	0.999510164	0.996566046
Circuit Breaker, 600V		0.999996752	0.999999582	0.999983888
3 Phase, Fixed		0.999996551	0.999999899	0.999992732
	Circuit Breaker, 600V, 3 Phase, Fixed, Including molded case, ≤600 amp, Normally Closed, Trp. Ckt. Incl.	0.999984307*	1.000000000	0.999997443
	Circuit Breaker, 600V, 3 Phase, Fixed, Including molded case, ≤600 amp, Normally Open, Trp. Ckt. Incl.	0.999887215	0.999999760	0.999990187
	Circuit Breaker, 600V, 3 Phase, Fixed,	0.999994218*	1.000000000	0.999992509

	Including molded case, >600 amp, Normally Closed, Trp. Ckt. Incl.			
	Circuit Breaker, 600V, 3 Phase, Fixed, Including molded case, >600V ≤5kV	0.996576534	0.999985320	0.999880051
Drawout (Metal Clad)		0.998892235	0.999999605	0.999837990
	Circuit Breaker, 600V, Drawout (Metal Clad), <600 amp, Normally Closed, Trp. Ckt. Incl.	0.999792091	0.999999858	0.999798004
	Circuit Breaker, 600V, Drawout (Metal Clad), <600 amp, Normally Open, Trp. Ckt. Incl.	0.997456731	0.999998256	0.999860901
	Circuit Breaker, 600V, Drawout (Metal Clad), >600 amp, Normally Closed, Trp. Ckt. Incl.	0.998150509	0.999999894	0.999954301
	Circuit Breaker, 600V, Drawout (Metal Clad), >600 amp, Normally Open, Trp. Ckt. Incl.	0.994487152	0.999998738	0.999927638
Vacuum		0.980129686	0.999975385	0.999852780
	Circuit Breaker, 5kV, Vacuum, <600 amp, Normally Closed, Trp. Ckt. Incl.	0.997191564	0.999997432	0.999960511
	Circuit Breaker, 5kV, Vacuum, <600 amp, Normally Open, Trp. Ckt. Incl.	0.998887668*	1.000000000	0.999983060
	Circuit Breaker, 5kV, Vacuum, >600 amp, Normally Closed, Trp. Ckt. Incl.	0.976752059	0.999960259	0.999619774
	Circuit Breaker, 5kV, Vacuum, >600 amp, Normally Open, Trp. Ckt. Incl.	0.961020019	0.999957368	0.999854272
Compressor		0.986548811	0.999986587	0.999865676
	Compressor, Refrigerant, >1 Ton.	0.995193627	0.999998075	0.999907183
	Compressor, Screw Type.	0.946328222	0.999931777	0.999667651
Condensers		0.900083857	0.999913810	0.999583534
	Condensers, Double Tube.	0.973573588	0.999992357	0.999758971
	Condensers, Propeller Type Fans/Coils, DX.	0.733621551	0.999734138	0.999393134
	Condensers, Shell and Tube.	0.998878743*	1.000000000	0.999614286
Control Panel		0.994698171	0.999998908	0.999800824
	Control Panel, Generator, wo/Switchgear.	0.988952766	0.999997330	0.999980962
	Control Panel, HVAC/Chillers/AHUs, wo/Switchgear.	0.999848787*	1.000000000	0.999982209
	Control Panel, Switchgear controls.	0.980568763	0.999997149	0.998160003

Convectors		0.999913016	1.000000000	0.999998481
	Convectors, Fin Tube Baseboard, Electric.	0.999582861*	1.000000000	0.999999626
	Convectors, Fin Tube Baseboard, Steam or Hot Water.	0.999890105*	1.000000000	0.999998180
Cooling Tower		0.968333522	0.999702865	0.997170520
	Cooling Tower, Atmospheric Type, wo/fans, motors, pumps, valves, etc.	0.928543791	0.999247479	0.994184363
	Cooling Tower, Evaporative Type, wo/fans, motors, pumps, valves, etc.	0.994195540	0.999988924	0.999046330
Damper Assembly		0.999971953	0.999999975	0.999990131
	Damper Assembly, Motor.	0.999966919*	1.000000000	0.999989337
	Damper Assembly, Pneumatic.	0.999277503	0.999999835	0.999994555
Diesel Engine Generator		0.589772164	0.998540049	0.993985981
Packaged		0.775917369	0.999329810	0.997272882
	Diesel Engine Generator, Packaged, 250kW-1.5MW, Continuous.	0.558396351	0.998287624	0.996927250
	Diesel Engine Generator, Packaged, 250kW-1.5MW, Standby.	0.883822868	0.999742312	0.997409685
Unpackaged		0.317735957	0.996759289	0.986574653
	Diesel Engine Generator, Unpackaged, 750kW-7MW, Continuous.	0.162719469	0.994801067	0.980739869
	Diesel Engine Generator, Unpackaged, 750kW-7MW, Standby.	0.531004159	0.998262059	0.991052357
Drive		0.978172315	0.999958316	0.999925947
	Drive, Adjustable Speed.	0.978172315	0.999958316	0.999925947
Evaporator		0.995968933	0.999993228	0.999908962
Coil		0.995812835	0.999992633	0.999899263
	Evaporator, Coil, Direct Expansion.	0.995812835	0.999992633	0.999899263
Shell Tube		0.997036799	0.999997290	0.999975270
	Evaporator, Shell Tube, Direct Expansion.	0.997036799	0.999997290	0.999975270
Fan		0.987559807	0.999971610	0.999351118
	Fan, Centrifugal.	0.981021428	0.999946483	0.999770440
	Fan, Propeller/Disc.	0.989640193	0.999957798	0.999093547
	Fan, Tubeaxial.	0.989938879	0.999990870	0.999055744
	Fan, Vaneaxial.	0.996408668*	1.000000000	1.000000000

Filter		0.999898973	1.000000000	0.999903911
	Filter, Electrical Tempest.	0.998510134*	1.000000000	1.000000000
Mechanical		0.999891630	1.000000000	0.999896927
	Filter, Mechanical, Air Regulator Set.	0.999840000*	1.000000000	0.999981949
	Filter, Mechanical, Fuel Oil.	0.999271146*	1.000000000	0.999910729
	Filter, Mechanical, Lube Oil.	0.999377566*	1.000000000	0.999554311
Fuse		0.997969725	1.000000000	1.000000000
	Fuse, >5kV ≤15kV.	0.999341365*	1.000000000	1.000000000
	Fuse, 0-5kV.	0.998627456*	1.000000000	1.000000000
Gas Turbine Generator		0.647849145	0.998890863	0.990692798
Packaged		0.587787144	0.998689955	0.989043771
	Gas Turbine Generator, Packaged, 750kW-7MW, Continuous.	0.177710554	0.994598022	0.983584136
	Gas Turbine Generator, Packaged, 750kW-7MW, Standby.	0.829472916	0.999868149	0.990615770
Unpackaged		0.994155201	0.999775158	0.997950995
	Gas Turbine Generator, Unpackaged, 750kW-7MW, Continuous.	0.994155201	0.999775158	0.997950995
Gauge		0.999042094	1.000000000	0.999999785
	Gauge, Fluid level.	0.999042094*	1.000000000	0.999999785
Heat Exchanger		0.989034610	0.999997303	0.998935596
	Heat Exchanger, Boiler System, Steam.	0.971835048	0.999998369	0.997231137
	Heat Exchanger, Lube Oil.	0.996596565	0.999995330	0.999740960
	Heat Exchanger, Water to Water.	0.996130029*	1.000000000	0.999861134
Heater		0.947826981	0.999984168	0.994164558
	Heater, Electric, Lube/Fuel Oil or Jacket.	0.947826981	0.999984168	0.994164558
Humistat		0.984575905	0.999998226	0.999998226
	Humistat, Assembly.	0.984575905	0.999998226	0.999998226
Inverters		0.995190512	0.999985691	0.999598793
	Inverters, All Types.	0.995190512	0.999985691	0.999598793
Meter		0.998913484	0.999993988	0.999993961
	Meter, Electric.	0.999635167	0.999999958	0.999999958
	Meter, Fuel.	0.946014073	0.999543853	0.999543853
	Meter, Water.	0.999621152	0.999999870	0.999999697

Motor Generator Set		0.975052652	0.999978501	0.993070544
	Motor Generator Set, 3 Phase, 400 Hz.	0.995075131	0.999995491	0.999628032
	Motor Generator Set, 3 Phase, 60 Hz.	0.957963867	0.999963722	0.987366458
Motor Starter		0.999147052	0.999995416	0.999944527
	Motor Starter, ≤600V.	0.998167781*	1.000000000	0.999984223
	Motor Starter, >600V.	0.996875738	0.999991427	0.999909983
Motor, Electric		0.999032041	0.999973300	0.999930849
	Motor, Electric, DC.	0.985531708	0.999031729	0.998182336
Induction		0.981918899	0.999992950	0.999724259
	Motor, Electric, Induction, ≤600V.	0.988992708	0.999998736	0.999957372
	Motor, Electric, Induction, >600V.	0.974689985	0.999986993	0.999484292
Single Phase		0.999980411	0.999999987	0.999988267
	Motor, Electric, Single Phase, ≤5 amp.	0.999979878*	1.000000000	0.999996192
	Motor, Electric, Single Phase, >5 amp.	0.998550210	0.999999503	0.999696847
Synchronous		0.998653401	0.999978284	0.999857033
	Motor, Electric, Synchronous, ≤600V.	0.996555656*	1.000000000	0.999777580
	Motor, Electric, Synchronous, >600V.	0.991366824	0.999964367	0.999907948
Motor, Mechanical		0.195448823	0.999809717	0.998810724
Diesel		0.904562026	0.999953538	0.991433654
	Motor, Mechanical, Diesel.	0.904562026	0.999953538	0.991433654
Gas		0.161029030	0.999791533	0.999743425
	Motor, Mechanical, Gas.	0.161029030	0.999791533	0.999743425
Pipe		0.981888041	0.999994337	0.999991952
	Pipe, Flex, Non-Reinforced, >4 inch.	0.985560776	0.999994466	0.999990038
	Pipe, Flex, Reinforced, >4 inch.	0.977618384	0.999994186	0.999994186
Piping		0.999960899	0.999998770	0.999676366
Refrigerant		0.999954550	0.999999430	0.999990919
	Piping, Refrigerant, <1 inch.	0.999925556*	1.000000000	0.999993884
	Piping, Refrigerant, <2 inch.	0.997181886	0.999996564	0.999986684
	Piping, Refrigerant, >2 inch.	0.999822269*	1.000000000	1.000000000
	Piping, Refrigerant, 1-3 inch.	0.993176045	0.999993747	0.999895362
Water		0.999720116	0.999994706	0.997739077
	Piping, Water, ≤2 inch.	0.998834378*	1.000000000	1.000000000
	Piping, Water, >12 inch.	0.939385452*	1.000000000	1.000000000
	Piping, Water, >2 ≤4 inch.	0.979679275	0.999966994	0.999966994

	Piping, Water, >4 ≤8 inch.	0.998103531*	1.000000000	1.000000000
	Piping, Water, >8 ≤12 inch.	0.999374866*	1.000000000	0.994961083
Pressure Control		0.993091820	0.999995568	0.999938101
	Pressure Control, Assembly.	0.993091820	0.999995568	0.999938101
Pressure Regulator		0.999163441	1.000000000	0.999993069
Hot Gas		0.999163441	1.000000000	0.999993069
	Pressure Regulator, Hot Gas.	0.999163441*	1.000000000	0.999993069
Pump		0.993705867	0.999994889	0.999826613
Centrifugal		0.994206434	0.999995523	0.999903450
	Pump, Centrifugal, Integral Drive.	0.992515450	0.999993654	0.999897429
	Pump, Centrifugal, wo/Drive.	0.995791244	0.999997272	0.999909083
	Pump, Positive Displacement.	0.991821538	0.999992500	0.999537023
Radiators		0.987545587	0.999977760	0.999934189
	Radiators, Small Tube.	0.987545587	0.999977760	0.999934189
Rectifiers		0.995540658	0.999991837	0.998972976
	Rectifiers, All Types.	0.995540658	0.999991837	0.998972976
Sending Unit		0.999566658	0.999999536	0.999999258
Air Velocity		0.998867884	0.999998707	0.999997599
	Sending Unit, Air Velocity.	0.998867884	0.999998707	0.999997599
	Sending Unit, Pressure.	0.997916028	0.999997883	0.999997089
	Sending Unit, Temperature.	0.999980697*	1.000000000	1.000000000
Software Con. ADAS Sys.		0.642221250	0.999854564	0.999658784
	Software Con. ADAS Sys., ≤1000 Acquisition Points.	0.777690112	0.999954199	0.999888246
	Software Con. ADAS Sys., >1000 Acquisition Points.	0.428800729	0.999644282	0.999174503
Strainer		0.999943310	1.000000000	0.999916767
	Strainer, Coolant.	0.998861684*	1.000000000	0.999333463
	Strainer, Duplex Fuel/Lube Oil.	0.995679886*	1.000000000	0.999861421
	Strainer, Fuel Oil.	0.998766615*	1.000000000	0.999924447
	Strainer, Lube Oil.	0.999529759*	1.000000000	0.999881981
Water		0.999926442	1.000000000	0.999960363
	Strainer, Water, ≤4 inch.	0.999920044*	1.000000000	0.999999893
	Strainer, Water, >4 inch.	0.999081068*	1.000000000	0.999505864
Switch		0.993744427	0.999996988	0.999960651

Automatic Transfer		0.950118163	0.999976051	0.999857315
	Switch, Automatic Transfer, >600 amp., ≤600V.	0.968631015	0.999994046	0.999809981
	Switch, Automatic Transfer, 0-600 amp., ≤600V.	0.917774618	0.999943753	0.999942269
Disconnect		0.999846881	0.999999966	0.999961037
	Switch, Disconnect, Enclosed, ≤600V.	0.999394569*	1.000000000	0.999938186
	Switch, Disconnect, Enclosed, >5kV.	0.998257804	0.999999801	0.999939288
	Switch, Disconnect, Enclosed, >600V ≤5kV.	0.997942528*	1.000000000	0.999867230
	Switch, Disconnect, Fused, DC, >600 amp., ≤600V.	0.999408178*	1.000000000	1.000000000
	Switch, Disconnect, Fused, DC, 0-600 amp., ≤600V.	0.999367257*	1.000000000	0.999987568
	Switch, Electric, On/Off Breaker Type, Non-knife., ≤600V.	0.999358198	0.999999927	0.999999780
Float		0.997716932	0.999999478	0.999985388
	Switch, Float, Electric.	0.997716932	0.999999478	0.999985388
Manual Transfer		0.999129111	1.000000000	0.999966262
	Switch, Manual Transfer, ≤600 amp., ≤600V.	0.997919138*	1.000000000	0.999952908
	Switch, Manual Transfer, >600 amp., ≤600V.	0.998503402*	1.000000000	0.999975863
	Switch, Oil Filled, ≥5kV.	0.998241979*	1.000000000	0.999996849
Static		0.997748999	0.999996656	0.999919287
	Switch, Static, >1000 amp., ≤600V.	0.996326697	0.999989918	0.999739539
	Switch, Static, >600 ≤1000 amp., ≤600V.	0.992336720	0.999998244	0.999994731
	Switch, Static, 0-600 amp. ≤600V.	0.998950665*	1.000000000	0.999999648
Switchgear		0.991916417	0.999974462	0.999585725
Bare Bus		0.989863408	0.999968286	0.999579123
	Switchgear, Bare Bus, ≤600V, All Cabnets,Ckt. Bkrs. Not Included.	0.990554799	0.999992098	0.999455269
	Switchgear, Bare Bus, >5kV, All Cabnets,Ckt. Bkrs. Not Included.	0.982216877	0.999995342	0.999839597
	Switchgear, Bare Bus, >600V ≤5kV, All Cabnets,Ckt. Bkrs. Not Included.	0.997007868	0.999872746	0.999607036
Insulated Bus		0.999613608	0.999989619	0.999601929

	Switchgear, Insulated Bus, ≤600V, All Cabnets,Ckt. Bkrs. Not Included.	0.998420947*	1.000000000	0.999468794
	Switchgear, Insulated Bus, >5kV, All Cabnets,Ckt. Bkrs. Not Included.	0.995913049	0.999982547	0.999626621
	Switchgear, Insulated Bus, >600V ≤5kV, All Cabnets,Ckt. Bkrs. Not Included.	0.996224761	0.999996546	0.999696028
Tank		0.995965564	0.999991636	0.999971186
Day		0.994810377	0.999997030	0.999974756
	Tank, Day, Genset Fuel.	0.994810377	0.999997030	0.999974756
Fuel		0.993549151	0.999955673	0.999872929
	Tank, Fuel.	0.993549151	0.999955673	0.999872929
Receiver		0.997280535	0.999997824	0.999996891
	Tank, Receiver, Air.	0.997280535	0.999997824	0.999996891
Water		0.996377265	0.999999793	0.999989539
	Tank, Water.	0.996377265	0.999999793	0.999989539
Thermostat		0.998319168	0.999999398	0.999997565
	Thermostat, Radiator.	0.998319168	0.999999398	0.999997565
Transducer		0.999978470	0.999999933	0.999998552
Flow		0.996713345	1.000000000	0.999986736
	Transducer, Flow.	0.996713345*	1.000000000	0.999986736
Pressure		0.997477750	0.999999423	0.999987243
	Transducer, Pressure.	0.997477750	0.999999423	0.999987243
Temperature		0.998242572	0.999999950	0.999999026
	Transducer, Temperature.	0.998242572	0.999999950	0.999999026
Transformer, Dry		0.999953743	0.999995817	0.999971899
Air Cooled		0.999882198	1.000000000	0.999944571
	Transformer, Dry, Air Cooled, ≤500kVA.	0.999775100*	1.000000000	0.999995570
	Transformer, Dry, Air Cooled, >1500kVA ≤3000kVA.	0.999393210*	1.000000000	0.999745124
	Transformer, Dry, Air Cooled, >500kVA ≤1500kVA.	0.999582527*	1.000000000	0.999987102
Isolation		0.997166548	0.999993113	0.999989567
	Transformer, Dry, Isolation, Delta Wye, <600V.	0.997166548	0.999993113	0.999989567
Transformer, Liquid		0.994797669	0.999950735	0.998990580

Forced Air		0.989259891	0.999836759	0.996601877
	Transformer, Liquid, Forced Air, ≤10,000kVA.	0.992879584	0.999797696	0.990915913
	Transformer, Liquid, Forced Air, ≤5,000kVA.	0.987452327	0.999994736	0.999987215
	Transformer, Liquid, Forced Air, >10,000kVA ≤50,000kVA.	0.994329760	0.999065253	0.985856760
Non-Forced Air		0.997113141	0.999998203	0.999985412
	Transformer, Liquid, Non-Forced Air, ≤3000kVA.	0.998891114	0.999999367	0.999996102
	Transformer, Liquid, Non-Forced Air, >10000kVA ≤50000kVA.	0.982624792	0.999987813	0.999893406
	Transformer, Liquid, Non-Forced Air, >3000kVA ≤10000kVA.	0.994771048	0.999999402	0.999985038
UPS		0.999078297	0.999998349	0.999951289
Rotary		0.995983397	1.000000000	0.999895500
	UPS, Rotary.	0.995983397*	1.000000000	0.999895500
Small Computer Room Floor		0.990661925	0.999997858	0.999967870
	UPS, Small Computer Room Floor.	0.990661925	0.999997858	0.999967870
Valve		0.999995192	0.999999568	0.999977752
3-way		0.999727982	1.000000000	0.999987577
	Valve, 3-way, Diverting/Sequencing.	0.999257278*	1.000000000	0.999999501
	Valve, 3-way, Mixing Control.	0.999570876*	1.000000000	0.999980689
Ball		0.999807822	0.999999957	0.999999204
	Valve, Ball, N.C.	0.999516658*	1.000000000	0.999998106
	Valve, Ball, N.O.	0.998749718	0.999999929	0.999999929
Butterfly		0.998692271	0.999999513	0.999995506
	Valve, Butterfly, N.C.	0.991788585	0.999996931	0.999990199
	Valve, Butterfly, N.O.	0.999965510*	1.000000000	0.999996507
Check		0.999742108	0.999999971	0.999980199
	Valve, Check.	0.999742108	0.999999971	0.999980199
Control		0.999937125	0.999999943	0.999996490
	Valve, Control, N.C.	0.999922211	0.999999929	0.999997478
	Valve, Control, N.O.	0.999832761*	1.000000000	0.999992325
Expansion		0.999742991	1.000000000	1.000000000
	Valve, Expansion.	0.999742991*	1.000000000	1.000000000

Gate		0.999827547	0.999999888	0.999999642
	Valve, Gate, N.C.	0.999421886	0.999999934	0.999998647
	Valve, Gate, N.O.	0.999872337	0.999999883	0.999999752
Globe		0.999980570	1.000000000	0.999921533
	Valve, Globe, N.C.	0.999975654*	1.000000000	0.999901776
	Valve, Globe, N.O.	0.999903788*	1.000000000	0.999999612
Plug		0.990331504	0.999997992	0.999997984
	Valve, Plug, N.C.	0.986191497	0.999997832	0.999997819
	Valve, Plug, N.O.	0.996093704	0.999998213	0.999998213
Reducing		0.998490771	1.000000000	0.999972616
	Valve, Reducing, Makeup Water.	0.998490771*	1.000000000	0.999972616
Relief		0.998671145	0.999999696	0.999994763
	Valve, Relief.	0.998671145	0.999999696	0.999994763
Suction		0.998214603	0.999998521	0.999994094
	Valve, Suction.	0.998214603	0.999998521	0.999994094
Valve Operator		0.992808232	0.999991177	0.999971677
	Valve Operator, Electric.	0.990159307	0.999979209	0.999934083
Hydraulic		0.915817948	0.999969884	0.999601804
	Valve Operator, Hydraulic.	0.915817948	0.999969884	0.999601804
Pneumatic		0.995224402	0.999998361	0.999997541
	Valve Operator, Pneumatic.	0.995224402	0.999998361	0.999997541
Voltage Regulator		0.964377637	0.999690405	0.999644857
	Voltage Regulator, Static.	0.964377637	0.999690405	0.999644857
Water Cooling Coil		0.999577258	0.999999879	0.999993176
Fan Coil Unit		0.999577258	0.999999879	0.999993176
	Water Cooling Coil, Fan Coil Unit.	0.999577258	0.999999879	0.999993176

Table N.5

Reliability, Inherent Availability, and Operational Availability Data

N.6 FMECA Procedure as Part of an RCM Program.

N.6.1 Part of an effective RCM program is to determine the failure modes effects and conduct criticality analysis of all systems (FMECA), determine the risk priority based on the product of the severity level of a component, failure occurrence level, and detection level.

N.6.2 Determine the failure modes associated with each system (i.e. chilled water supply can have no water flow or degraded flow). Assign a failure mechanism to each failure mode (i.e. degraded flow can be the result of leaky gasket, low supply voltage to motor) and determine the failure effects on system (i.e. no effect, decrease in chiller water temperature). Severity levels are assigned along with probability of failure and a risk priority is determined. This provides for greater emphasis and funding to be assigned to systems that have a greater risk of failure. Therefore systems with higher risk priority would receive more preventive and predictive maintenance than systems with lower risk priorities.

N.6.3 Risk priority is classified with a number, risk priority number (RPN). This is equal to the product of severity level of a component, occurrence level, and detection level as noted below with the sum of RPN's for each component within a critical system:

INSERT 25_L246_R_EQ4

N.6.4 The purpose of preventive maintenance is not to prevent every component failure from occurring but to prevent the system operational failure. Critical components/sub-systems that compromises system operation should receive a high degree of preventive and predictive maintenance. These are critical components or sub-systems. A component/sub-system that represents a single point failure that does not compromise the system would receive less preventive and predictive maintenance or even just run to failure.

N.6.5 There are several FMECA methods that can be used to categorize components and sub-systems. This depends on how much data is available for the particular systems. A basic block diagram of the RCM process is shown in Figure N.6.5.

INSERT FIGURE N.6.5 HERE

FIGURE N.6.5

Basic Block Diagram of the RCM Process.

N.6.5.1 Define the system: Identify each systems indenture levels. This identifies each system functional item and its associated failure modes for each functional output. These would be considered your different maintenance areas of concern.

N.6.5.2 Define ground rules and assumptions: The ground rules apply to mission system/equipment, analysis methods (what do we wish to prevent main power outage, operating time during mission stage, source of data).

N.6.5.3 Construct equipment tree. This is a block diagram of operation between indenture levels (function items) that provides different types of failure modes and effects.

N.6.5.4 Identify failure modes.

N.6.5.5 Analyze failure effects.

N.6.5.6 Classify effect severity

- (1) Identify detection method.
- (2) Perform criticality calculations
- (3) Identify critical items.
- (4) Assign maintenance focus based on criticality
- (5) Identify maintenance tasks.
- (6) Make recommendations and package final maintenance program or approach.

N.6.6 Example of FMECA.

N.6.6.1 Detection Method.

N.6.6.1.1 When system controls, automation configurations, and system safeguards are unknown, Detection Method Level can be assumed to be 1. This assumes and stresses that, for a mission critical facility, all item and system level function losses should and will be apparent.

N.6.6.1.2 Although this is an acceptable approach for initial analysis, and demonstration purposes, it should be understood that the presence, or absence, of detection method in a systems has a direct effect on the risk associated with the operation of that system. Therefore, consideration of detection method will provide more accurate and resolute analysis results and recommendations. Furthermore, an understanding of current detection method provisions, along with results of an analysis which considered detection method and component level failure modes, can and should be utilized to make recommendations on future detection method provisions.

N.6.6.2 Occurrence.

N.6.6.2.1 Equipment specific PREP database availability numbers will provide indication of failure frequency. These metrics will help to provide less subjective item and system risk assessments. However, they must be adjusted to account for system redundancy, and ranked into discrete occurrence levels to be used in qualitative equipment criticality calculations.

N.6.6.2.2 By design and purpose, a redundant system is more reliable and less vulnerable than a single point, with respect to system function and mission requirements. Therefore, the occurrence level for a single point function must be weighted to reflect the operation, presumed reliability, and severity of loss of function of the redundant component system as accurately as possible.

N.6.6.2.3 The following formula is used to calculate the adjusted availability of a given subsystem due to a level of component or subsystem redundancy.

INSERT 25_L246_R_EQ5

where:
Ai = Initial inherent component availability
Ai^{1} = Adjusted redundant component availability level
m = Minimum number of components needed
n = Number of components available
k = Current component in redundant system being analyzed

N.6.6.2.4 With availability metrics representative of system configuration now available, component availability is ranked to provide discrete subsystem occurrence levels, as shown in Table N.6.6.2.4.

Table N.6.6.2.4 Component Availability Rankings

Availability (nines)	Occurrence Rank	Occurrence Description
≥0.999999999	1	Almost Never
0.99999999	2	Remote
0.9999999	3	Very Slight
0.999999	4	Slight
0.99999	5	Low
0.9999	6	Medium
0.999	7	Moderately High
0.99	8	High
0.9	9	Very High
0	10	Almost Certain

Table N.6.6.2.4

Component Availability Rankings

N.6.6.3 Severity.

N.6.6.3.1 It is also important to consider the concept of failure severity. Severity pertains to and ranks the consequences of system level failure mode effects. For example, a highly probable failure may occur for a subsystem of a piece of critical equipment without severe consequences.

N.6.6.3.2 Severity rankings used are as shown in Table N.6.6.3.2.

Table N.6.6.3.2 Severity Rankings

Ranking	Effect	Comment
1	None	No reason to expect failure to have any effect on Safety, Health, Environment or Mission
2	Very Low	Minor disruption to mission.
3	Low	Minor disruption to mission.
4	Low to Moderate	Moderate disruption to mission.
5	Moderate	Moderate disruption to mission.
6	Moderate to High	Moderate disruption to mission.
7	High	High disruption to mission.
8	Very High	High disruption to mission.
9	Hazard	Extremely high disruption to mission
10	Hazard	Extremely high disruption to mission.

Table N.6.6.3.2

Severity Rankings

N.6.6.4 RPN Calculations and Ranking Methods for Flexible Analysis.

N.6.6.4.1 Severity, occurrence, and detection method levels are then utilized to produce a subsystem risk assessment as follows:

$$RPN = O \times S \times D$$

where:
RPN = Risk associated with failure mode (Risk Priority Number)
S = Severity level for failure mode
O = Occurrence level for failure mode
D = Detection method level (1)

N.6.6.4.2 This calculation will be performed for every subsystem item in the master equipment listing. With this information, Risk Priority Numbers for sub-systems and systems can be obtained as follows:

25_L246_R_EQ6

where:
RPN_S = Risk Priority Number for the current system being analyzed
RPN_c = Risk Priority Number for the current subsystem
n = The current subsystem being analyzed
j = Total number of components in the sub-system or system

N.6.6.4.3 Results — System X. Item and system risk assessments can now be utilized to apply RCM decision logic (see Table N.6.6.4.3), and to build maintenance tasking program. Items and systems assessed to be of high operational risk should, especially, be applied to the decision logic and should receive high levels of maintenance focus. Items having extremely low operation risk will receive low levels of maintenance focus, and may be allowed to run to failure.

Table N.6.6.4.3 Example of Risk Priority Number Calculation

Facility Identifier	Equipment Type	Parent System	M	N	PREP ID	A	A′	O′ Ranked	S	RPN
A-1	A	X	1	2	13	0.999988924	0.9999999999	1	1	9
A-2	A	X	1	2	13	0.999988924	0.9999999999	1	9	9
B-1	B	X	1	4	163	0.999993654	1.00000000000	1	9	9
B-2	B	X	1	4	163	0.999993654	1.00000000000	1	9	9
B-3	B	X	1	4	163	0.999993654	1.00000000000	1	9	9
B-4	B	X	1	4	163	0.999993654	1.00000000000	1	9	9

Table N.6.6.4.3

Example of Risk Priority Number Calculation

$$\text{Availability} = \frac{\text{Uptime}}{\text{Downtime+Uptime (Total time)}}$$

$$\text{Operational Availability} = \frac{\text{Mean Time Between Maintenance (MTBM)}}{\text{Mean Downtime} + \text{MTBM}}$$

$$\text{Inherent Availability} = \frac{\text{Mean Time Between Failures (MTBF)}}{\text{Mean Time to Repair+MTBF}}$$

$$\text{S (RPN)n;where RPN}=O\times S\times D$$

$$\text{sum}\frac{(\text{Occurrence }\times \text{Severity }\times \text{Detection})}{n=1}$$

$$\text{Ai1}Ai^{1} = \sum_{k-n}^{n} \frac{n!}{k{:}(n-k)!} (Ai)^{k} \, (1 - Ai)^{(n-k)}$$

$$RPNs = \sum_{n=1}^{j} (RPNc)\,\mathrm{n}$$

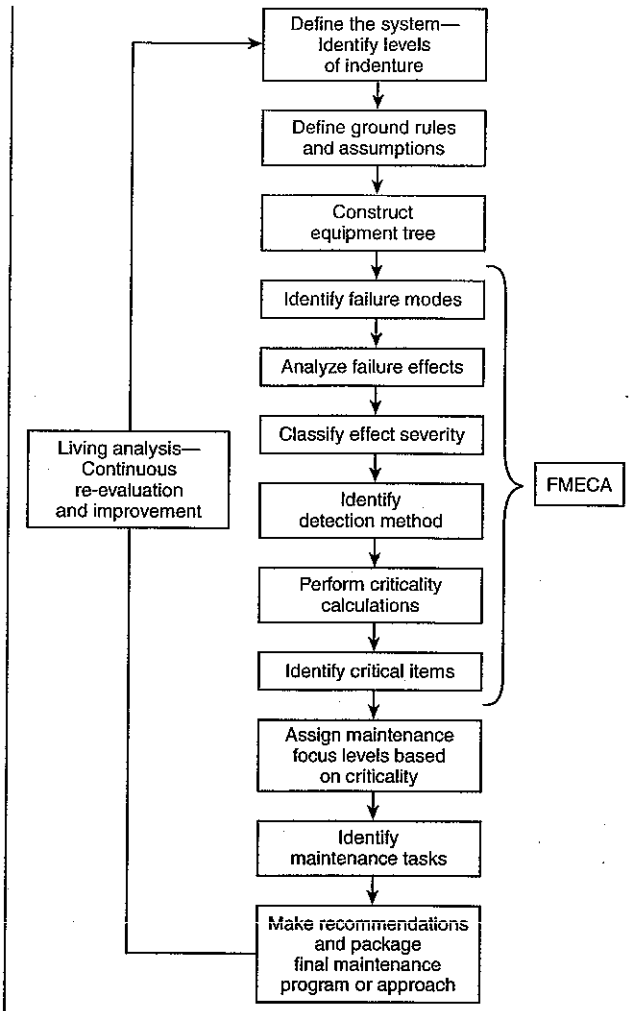


FIGURE N.6.5 Basic Block Diagram of the RCM Process.