NUCLEAR ENERGY INSTITUTE

Alan P Nelson
SENIOR PROJECT MANAGER,
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June 17, 2002

Dr. P.T. Kuo
Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Industry Response to "Proposed Staff Guidance on Aging Management of Fire Protection Systems for License Renewal

PROJECT NUMBER: 690

Dear Dr. Kuo:

On January 28, 2002, NEI received "Proposed Staff Guidance on Aging Management of Fire Protection Systems for License Renewal." This proposed guidance is the result of reviews performed by the NRC of license renewal applications. The NEI License Renewal Task Force met with the staff on April 10, to discuss proposed staff guidance on aging management of fire protection systems for license renewal. The staff proposed to revise the inspection criteria for two items: 1) wall thinning of piping due to corrosion and 2) valve line-up inspections for halon/carbon dioxide fire suppression systems. The staff plans to incorporate these changes into the improved renewal guidance documents in a future update. The industry has reviewed the proposed guidance and provides comments in line-in-line out format (attached).

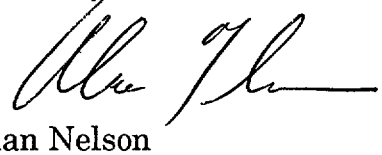
In summary the industry is in complete agreement regarding the staff position to eliminate Halon/Carbon Dioxide Fire Suppression System programs, as they are not aging management related. Regarding fire water systems the industry believes an applicant should have the choice to specify the appropriate inspection technique or should have the option to use visual inspections made during plant maintenance in lieu of periodic inspections. Also it is important to note the lifetime of the fire protection systems does not necessarily coincide with the plant license date.

D042

The fire protection system may have gone into service before or after the plant was licensed.

If you have any questions, please call me (202) 739- 8110 or by e-mail (apn@nei.org).

Sincerely,



Alan Nelson

Industry Comments 06/~~07~~ 14/02 January 28, 2002

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1776 I Street, NW., Suite 400
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Mr. David Lochbaum
Union of Concerned Scientists
1707 H Street, NW
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SUBJECT: PROPOSED STAFF GUIDANCE ON AGING MANAGEMENT OF FIRE PROTECTION SYSTEMS FOR LICENSE RENEWAL

Dear Messrs. Nelson and Lochbaum:

The purpose of this letter is to provide you with the opportunity to comment on the staff proposed guidance for aging management of fire protection systems as stated in NUREG-1801, "Generic Aging Lessons Learned Report," dated July 2001. The staff proposes to revise the inspection criteria for two items: 1) wall thinning of piping due to corrosion and 2) valve line-up inspections for halon/carbon dioxide fire suppression systems. The staff plans to incorporate these changes into the improved renewal guidance documents in a future update. Enclosure 1 contains the staff basis to support these changes. Enclosure 2 is a markup of the proposed changes for these aging management programs in NUREG-1801, Chapter XI.M26, "Fire Protection" and Chapter XI.M27, "Fire Water Systems." Enclosure 3 is a markup of how the proposed change would be incorporated into the standard review plan for license renewal, NUREG-1800, Table 3.3-2. This approach, for revising the guidance documents, is consistent with our goal to more efficiently resolve license renewal issues identified by the staff or the industry as outlined in NRR Office Letter No. 805, "License Renewal Application Review Process." The staff will consider your response to this letter in deciding how to finalize and implement this guidance.

The staff developed this guidance for the fire protection aging management programs on the basis of lessons learned from applications reviewed after issuance of NUREG-1801. The staff is requesting NEI to provide a schedule for comments on the proposed guidance. Should you have any questions or comment, please contact Jim Strnisha of my staff at 301-415-1092.

Sincerely,

/RA/

Christopher I. Grimes, Program Director
License Renewal & Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Project 690
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cc w/encls: See next page

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/RA/

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License Renewal & Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Project 690
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DOCUMENT NAME:G:\RLSB\Strnisha\Fire Protection\Fire Protection ltr to NEI.wpd

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NUCLEAR ENERGY INSTITUTE

Project No. 690

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NRC Staff Position on Aging Management of Fire Protection Systems

Introduction

The staff proposes to revise the Fire Protection system aging management program inspection criteria in NUREG-1801 for two items: 1) wall thinning of piping due to corrosion and 2) valve line-up inspections for halon/carbon dioxide fire suppression systems. The staff discussion and position for each issue is as follows:

1. Staff Position for Wall Thinning of Fire Protection Piping Due to Internal Corrosion

It is the understanding of the NRC Staff that Fire Protection (FP) piping is typically designed for a 50-year life in industrial applications. The limiting aging mechanism~~effect~~ is general corrosion. Because the general corrosion of FP piping is typically very uniform, loss of intended function as a result of catastrophic failure caused by wall thinning throughout the system is possible and needs to be managed. However, internal inspections (performed during each refueling cycle by disassembling portions of the FP piping), as stated in NUREG-1801, Chapter XI.M27, "Fire Water Systems," are not the best means to detect this aging effect. Each time the system is opened, oxygen is introduced into the system and this accelerates the potential for general corrosion. Therefore, the staff recommends that a non-intrusive means of ~~measuring~~ evaluating wall thickness, such as ~~ultrasonic~~ a volumetric inspection, or plant maintenance visual inspections may be used to detect this aging effect.

The staff initially considered that a one-time ultrasonic inspection performed near the end of the operating term would be sufficient to detect wall thinning. However, further evaluation determined that it may be difficult to justify a one-time ultrasonic inspection in light of the possibility of changes in operating conditions that may require the applicant to open the FP systems more frequently (e.g., for the 50-year service life sprinkler head testing) and allow oxygen in. National Fire Protection Association (NFPA) 25, 1999 Edition, Section 2.3.3.1, "Sprinklers," states that "where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing." NFPA 25 also contains guidance to perform this sampling every 10 years after the initial field service testing. Therefore, the staff is recommending that in addition to ~~an ultrasonic~~ a baseline wall thickness evaluation/inspection of the fire protection piping before exceeding the current license term, the applicant shall perform ~~ultrasonic~~ pipe wall thickness evaluations/inspections ~~immediately after the 50-year service life sprinkler head testing and at~~ at10-year intervals ~~thereafter~~during the period of extended operation.

~~The 50-year service life of sprinkler heads does not necessarily equal the 50th year of operation in terms of licensing. The service life is defined from the time the sprinkler system is installed and functional. In most cases, sprinkler systems are in place several years before the operating license is issued. The staff interpretation, in accordance with NFPA 25, is that testing should be performed at year 50 (or sooner) of sprinkler system service life, not at year 50 of plant operation. The staff position for this approach will typically result in an applicant performing three such inspections over a 60-year period; the first before the end of the current operating term, the second after the 50-year sprinkler head testing, and the third after the first 10-year follow-up sprinkler head testing.~~

As an alternative to ~~non-intrusive testing~~ pipe wall thickness evaluations, an applicant may use its ~~work control~~ plant maintenance process to include a visual inspection of the internal surface of the FP piping upon each entry to the system for routine or corrective maintenance, as long as the applicant can demonstrate that it will perform inspections (based on past maintenance history) on a representative number of locations on a reasonable periodic basis. As part of these inspections, applicants need to be sensitive to wall thickness to ensure against catastrophic failure~~, and the inner diameter of the piping as it applies to the flow requirements of the FP system~~.

As part of the review of this issue and the above stated approach, a concern was raised as to the inspection specifications of the internal surface of below grade FP piping. The staff acknowledges that some applicants may be able to demonstrate that the environmental and material conditions that exist on the interior surface of below grade FP piping are similar to the conditions that exist within the interior surface of the above grade FP piping. If an applicant makes such a demonstration, the staff agrees that the results of the interior inspections of the above grade FP piping can be extrapolated to evaluate the interior condition of the below grade FP piping. If not, additional inspection activities are needed to provide the reasonable assurance that the intended function of below grade FP piping will be maintained consistent with an applicant's current licensing basis for the period of extended operation.

2. Staff Position for Testing Period of Sprinkler Heads

The 50-year service life of sprinkler heads does not necessarily equal the 50th year of operation in terms of licensing. The service life is defined from the time the sprinkler system is installed and functional. In most cases, sprinkler systems are in place several years before the operating license is issued. However, sprinkler systems in some plants may have been installed after the plant was placed in operation. The staff interpretation, in accordance with NFPA 25, is that sprinkler head testing should be performed at year 50 of sprinkler system service life, not at year 50 of plant operation, with subsequent sprinkler head testing every 10 years there after.

~~2~~3. Staff Position for Valve Line-up Inspections of Halon/Carbon Dioxide Fire Suppression Systems

NUREG-1801, Chapter XI.M26, "Fire Protection," currently identifies the need to perform a functional test of the halon/carbon dioxide fire suppression systems to determine the suppression agent charge pressure and verify that the extinguishing agent supply valves are open and the system is in automatic mode. 10 CFR 54.21 specifies that an aging management review is to be performed for those structures and components that perform an intended function without moving parts or without a change in configuration or properties and that are not subject to replacement based on a qualified life or specified time period. The staff reviewed these items and determined that a valve lineup inspection, charging pressure inspection, and automatic mode of operation verification are operational activities pertaining to system or component configurations or properties that may change, and are not aging management related. Therefore, the staff position is to revise NUREG-1801 to eliminate the halon/carbon dioxide system inspections for charging pressure, valve lineups, and automatic mode of operation.

Division of Regulatory Improvement Programs
COVER PAGE

DATE: November 14, 2001

SUBJECT: Proposed Interim Staff Guidance on Fire Protection Systems

ORIGINATOR: J. Strnisha

SECRETARY: S. Chey

* See previous concurrence

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6.	OGC *	1/9/02
7.	CIGrimes	1/ /02

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Enclosure Name: G\RLSB\Strnisha\Fire Protection ltr to NEI - Enclosures 2,3.wpd

ADAMS ACCESSION NUMBER: ML DATE ENTERED: 01/ /02

FORM 665 ATTACHED and filled out: **YES** **NO**

COMMITMENT FORM ATTACHED: **YES** **NO**

XI.M26 FIRE PROTECTION

Program Description

For operating plants, the fire protection aging management program (AMP) includes a fire barrier inspection program and a diesel-driven fire pump inspection program. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The diesel-driven fire pump inspection program requires that the pump be periodically tested to ensure that the fuel supply line can perform the intended function. The AMP also includes periodic inspection and test of halon/carbon dioxide fire suppression system.

Evaluation and Technical Basis

1. ***Scope of Program:*** For operating plants, the AMP manages the aging effects on the intended function of the penetration seals, fire barrier walls, ceilings, and floors, and all fire rated doors (automatic or manual) that perform a fire barrier function. It also manages the aging effects on the intended function of the fuel supply line. The AMP also includes management of the aging effects on the intended function of the halon/carbon dioxide fire suppression system.

2. ***Preventive Actions:*** For operating plants, the fire hazard analysis assesses the fire potential and fire hazard in all plant areas. It also specifies measures for fire prevention, fire detection, fire suppression, and fire containment and alternative shutdown capability for each fire area containing structures, systems, and components important to safety.

3. ~~3.~~ ***Parameters Monitored/Inspected:*** Visual inspection of approximately 10% of each type of penetration seal is performed during walkdowns carried out at least once every refueling outage. These inspections examine any sign of degradation such as cracking, seal separation from walls and components, separation of layers of material, rupture and puncture of seals which are directly caused by increased hardness and shrinkage of seal material due to weathering. Visual inspection of the fire barrier walls, ceilings, and floors examines any sign of degradation such as cracking, spalling, and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates. Typically, ~~H~~hollow metal fire doors are visually inspected to verify integrity of door surfaces and for clearances. These inspections of fire doors are performed daily, weekly, and/or semiannually (which may be plant specific). ~~at least once bi-monthly for holes in the skin of the door. Fire door clearances are also checked at least once bi-monthly as part of an inspection program during the functional test of the hold-open, release and closing mechanism and latches but may be performed as part of the fire barrier inspection. Function tests of fire doors are performed daily, weekly, or monthly and/or semiannually (which may be plant specific) to verify the operability of automatic hold-open, release, closing mechanisms, and latches.~~

   The diesel-driven fire pump is under observation during performance tests such as flow and discharge tests, sequential starting capability tests, and controller function tests for detecting any degradation of the fuel supply line.

   Periodic visual inspection and function test at least once every six months

examines the signs of degradation of the halon/carbon dioxide fire suppression system. Material conditions that may affect the performance of the system, such as corrosion, mechanical damage, or damage to dampers, are observed during these tests.

4. ***Detection of Aging Effects:*** Visual inspection of penetration seals detects cracking, seal separation from walls and components, and rupture and puncture of seals. Visual inspection (VT-1 or equivalent) of approximately 10% of each type of seal in walkdowns is performed at least once every refueling outage. If any sign of degradation is detected within that sample ~~10%~~, the scope of the inspection ~~and frequency~~ is expanded to include additional seals. ~~ensure timely detection of increased hardness and shrinkage of the penetration seal before the loss of the component intended function.~~ Visual inspection (VT-1 or equivalent) of the fire barrier walls, ceilings, and floors performed in walkdown at least once every refueling outage ensures timely detection for concrete cracking, spalling, and loss of material. Visual inspection (VT-3 or equivalent) detects any sign of degradation of the fire door such as wear and missing parts. Function tests promptly detect deficiencies in operational conditions. Periodic visual inspection and function tests detect degradation of the fire doors before there is a loss of intended function.

Periodic tests performed at least once every refueling outage, such as flow and discharge tests, sequential starting capability tests, and controller function tests performed on diesel-driven fire pump ensure fuel supply line performance. The performance tests detect degradation of the fuel supply lines before the loss of the component intended function.

Visual inspections of the halon/carbon dioxide fire suppression system detect any sign of degradation, such as corrosion, mechanical damage, or damage to dampers. The periodic function test and inspection performed at least once every six months detects degradation of the halon/carbon dioxide fire suppression system before the loss of the component intended function.

5. ***Monitoring and Trending:*** The aging effects of weathering on fire barrier penetration seals are detectable by visual inspection and, based on operating experience, visual inspections performed at least once every refueling outage detect any sign of degradation of fire barrier penetration seals prior to loss of the intended function.

Concrete cracking, spalling, and loss of material are detectable by visual inspection and, based on operating experience, visual inspection performed at least once every refueling outage detects any sign of degradation of the fire barrier walls, ceilings, and floors before there is a loss of the intended function. Wear, missing parts, or holes in the fire door are detectable by visual inspection and, based on operating experience, the visual inspection and function test performed ~~bi-monthly which~~ detects degradation of the fire doors prior to loss of the intended function.

The performance of the fire pump is monitored during the periodic test to detect any degradation in the fuel supply lines. Periodic testing provides data (e.g., pressure) for trending necessary.

The performance of the halon/carbon dioxide fire suppression system is monitored during the periodic test to detect any degradation in the system. These periodic tests

provide data necessary for trending.

6. ***Acceptance Criteria:*** Inspection results are acceptable if there are no visual indications of cracking, separation of seals from walls and components, separation of layers of material, or ruptures or punctures of seals, no visual indications of concrete cracking, spalling and loss of material of fire barrier walls, ceilings, and floors, no visual indications of missing parts, holes, and wear and no deficiencies in the functional tests of fire doors. No corrosion is acceptable in the fuel supply line for the diesel-driven fire pump. Also, any signs of corrosion and mechanical damage of the halon/carbon dioxide fire suppression system are not acceptable.

7. ***Corrective Actions:*** For fire protection structures and components identified within scope that are subject to an aging management review for license renewal, the applicant's ~~is to expand the scope of the~~ 10 CFR Part 50, Appendix B, program ~~to include these in-scope structures and components to address~~ is used for corrective actions, confirmation process, and administrative controls for aging management during the period of extended operation. This commitment is documented in the final safety analysis report (FSAR) supplement in accordance with 10 CFR 54.21(d). As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address corrective actions, confirmation process, and administrative controls.

8. ***Confirmation Process:*** See Item 7, above.

9. ***Administrative Controls:*** See Item 7, above.

10. ***Operating Experience:*** Silicone foam fire barrier penetration seals have experienced splits, shrinkage, voids, lack of fill, and other failure modes (IN 88-56, IN 94-28, and IN 97-70). Degradation of electrical ~~racing way~~raceway fire barrier such as small holes, cracking, and unfilled seals are found on routine walkdown (IN 91-47 and GL 92-08). Fire doors have experienced wear of the hinges and handles. Operating experience with the use of this AMP has shown that no corrosion-related problem has been reported for the fuel supply line, pump casing of the diesel-driven fire pump, and the halon/carbon dioxide suppression system. No significant aging related problems have been reported of fire protection systems, emergency breathing and auxiliary equipment, and communication equipment.

References

NRC Generic Letter 92-08, *Thermo-Lag 330-1 Fire Barrier*, December 17, 1992.

NRC Information Notice 88-56, *Potential Problems with Silicone Foam Fire Barrier Penetration Seals*, August 14, 1988.

NRC Information Notice 91-47, *Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test*, August 6, 1991.

NRC Information Notice 94-28, *Potential problems with Fire-Barrier Penetration Seals*, April 5, 1994.

NRC Information Notice 97-70, *Potential problems with Fire Barrier Penetration Seals*, September 19, 1997.

XI.M27 FIRE WATER SYSTEM

Program Description

This aging management program applies to water-based fire protection systems that consist of sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, water storage tanks, and aboveground and underground piping and components that are tested in accordance with the applicable National Fire Protection Association (NFPA) codes and standards. Such testing assures the minimum functionality of the systems. Also, these systems are normally maintained at required operating pressure and monitored such that loss of system pressure is immediately detected and corrective actions initiated. In addition, a sample of sprinkler heads is to be inspected by using the guidance of NFPA 25, Section 2.3.3.1. This NFPA section states that "where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing." It also contains guidance to perform this sampling every 10 years after the initial field service testing. ~~In addition to NFPA codes and standards, which do not currently contain programs to manage aging, portions of the fire protection sprinkler system that are not routinely subjected to flow are to be subjected to full flow tests at the maximum design flow and pressure before the period of extended operation (and at not more than 5-year intervals thereafter).~~ Finally, portions of fire protection suppression piping that are exposed to water shall be ~~non-intrusively inspected~~ evaluated for wall thickness (e.g., ~~ultrasonic testing~~non-intrusive volumetric testing or plant maintenance inspections) to ensure that corrosion aging effects are managed and that wall thickness is within acceptable limits. These inspections are performed before the end of the current operating term, ~~after the 50-year sprinkler head testing~~, and at 10-year intervals thereafter during the extended period of operation. The purpose of the full flow testing and the wall thickness evaluations ~~internal visual inspections~~ is to ensure that loss of material and flow blockage ~~corrosion, microbiological-influenced corrosion (MIC), or biofouling~~ aging effects are managed such that the system function is maintained.

Evaluation and Technical Basis

1. ***Scope of Program:*** The aging management program focuses on managing loss of material due to corrosion, MIC, or biofouling of carbon steel and cast-iron components in fire protection systems exposed to water. Hose stations and standpipes are considered as piping in the AMP.

2. ***Preventive Actions:*** To ensure no significant corrosion, MIC, or biofouling has occurred in water-based fire protection systems, periodic flushing, system performance testing, ~~and~~ inspections and/or chemical analysis may be ~~are~~ conducted.

3. ***Parameters Monitored/Inspected:*** Loss of material due to corrosion and biofouling could reduce wall thickness of the fire protection piping system and result in system failure. Therefore, the parameters monitored are the system's ability to maintain pressure and internal system corrosion conditions. The NRC GL 89-13 recommends periodic flow testing of infrequently used loops of the fire water system at the maximum design flow to ensure that the system maintains its intended function.

4. ***Detection of Aging Effects:*** Fire protection system testing is performed to assure required pressures. ~~Inspections~~ Wall thickness evaluations of fire protection piping ~~and the smaller diameter fire suppression piping~~ are performed on system

components using non-intrusive techniques (e.g., ~~ultrasonic~~ volumetric testing) to identify evidence of loss of material due to corrosion. These inspections are performed before the end of the current operating term~~, after the 50-year sprinkler head testing~~, and at 10 year intervals thereafter during the period of extended operation. As an alternative to non-intrusive testing, the ~~work control~~ plant maintenance process may include a visual inspection of the internal surface of the fire protection piping upon each entry to the system for routine or corrective maintenance and/or chemical analysis to determine the presence of MIC, as long as it can demonstrated that inspections/analyses are performed (based on past maintenance history) on a representative number of locations on a reasonable basis. These inspections must be ~~cable of measuring~~ capable of evaluating (1) wall thickness to ensure against catastrophic failure and (2) the inner diameter of the piping as it applies to the flow requirements of the fire protection system. If the environmental and material conditions that exist on the interior surface of the below grade fire protection piping are similar to the conditions that exist within the above grade fire protection piping, the results of the inspections of the above grade fire protection piping can be extrapolated to evaluate the condition of below grade fire protection piping. If not, additional inspection activities are needed to ensure that the intended function of below grade fire protection piping will be maintained consistent with the current licensing basis for the period of extended operation. Repair and replacement actions are initiated as necessary. Continuous system pressure monitoring, periodic system flow testing performed, and inspections of piping are effective means to ensure that corrosion and biofouling are not occurring and the system's intended function is maintained. In addition, general requirements of existing fire protection programs include testing and maintenance of fire detection and protection~~suppression~~ systems and surveillance procedures to ensure that fire detectors, as well as fire protection~~suppression~~ systems and components, are operable.

Visual inspection of yard fire hydrants that typically are performed once every six months (plant specific requirement) ensures timely detection of signs of degradation, such as corrosion. Fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur.

Sprinkler systems are inspected before the end of the current operating term~~, after the 50-year sprinkler head testing,~~ and at 10-year intervals thereafter during the extended period of operation to ensure that loss of material is ~~signs of degradation, such as corrosion, are~~ detected in a timely manner.

5. ***Monitoring and Trending:*** System discharge pressure is monitored continuously. Results of system performance testing are monitored and trended as specified by the NFPA codes and standards. Degradation identified by non-intrusive or internal inspection is evaluated.

6. ***Acceptance Criteria:*** The acceptance criteria are (a) the ability of a fire protection system to maintain required pressure, (b) no unacceptable signs of degradation observed during non-intrusive or visual assessment of internal system conditions, and (c) that no biofouling exists in the sprinkler systems that could cause ~~corrosion~~ flow blockage in the sprinkler heads.

7. ***Corrective Actions:*** For fire water systems and components identified within

scope that are subject to an aging management review for license renewal, the applicant's ~~is to expand the scope of the~~ 10 CFR Part 50, Appendix B, program is used for ~~to include these in-scope systems and components to address~~ corrective actions, confirmation process, and administrative controls for aging management during the period of extended operation. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address corrective actions, confirmation process, and administrative controls.

8. **Confirmation Process:** See Item 7, above.

9. **Administrative Controls:** See Item 7, above.

10. ***Operating Experience:*** Water-based fire protection systems designed, inspected, tested and maintained in accordance with the NFPA minimum standards have demonstrated reliable performance.

References

NFPA 25: Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, 1998 Edition.

NRC Generic Letter 89-13, *Service Water System Problems Affecting Safety-Related Equipment*, July 18, 1989

Table 3.3-2. FSAR Supplement for Aging Management of Auxiliary Systems (continued)

Program	Description of Program	Implementation Schedule*
Compressed air monitoring (BWR/PWR)	The program consists of inspection, monitoring, and testing of the entire system, including (1) frequent leak testing valves, piping, and other system components, especially those made of carbon steel; and (2) preventive monitoring that checks air quality at various locations in the system to ensure that oil, water, rust, dirt, and other contaminants are kept within the specified limits. This program is in response to NRC GL 88-14 and INPO's Significant Operating Experience Report (SOER) 88-01. It also relies on the ASME OM Guide Part 17, and ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture.	Existing program
Fire protection (BWR/PWR)	The program includes a fire barrier inspection program and a diesel-driven fire pump inspection program. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The diesel-driven fire pump inspection program requires that the pump be periodically tested to ensure that the fuel supply line can perform the intended function. The AMP also includes periodic inspection and test of halon/carbon dioxide fire suppression system.	Existing program

Table 3.3-2. FSAR Supplement for Aging Management of Auxiliary Systems (continued)

Program	Description of Program	Implementation Schedule*
Fire water system (BWR/PWR)	To ensure no fouling has occurred in the fire protection system, periodic full flow flush test and system performance test are conducted to prevent corrosion from biofouling of components. Also, the system is normally maintained at required operating pressure and is monitored such that loss of system pressure is immediately detected and corrective actions initiated. The AMP relies on testing of water based fire protection system piping and components in accordance with applicable NFPA commitments. In addition, this program will be modified to ensure~~included (1) portions of the fire protection sprinkler system that are subjected to full flow tests prior to the period of extended operation and (2)~~ portions of the fire protection system exposed to water are internally, visually, or ~~ultrasonically~~ volumetrically inspected.	Program should be modified before the period of extended operation
Fuel oil chemistry (BWR/PWR)	The AMP relies on a combination of surveillance and maintenance procedures. Monitoring and controlling fuel oil contamination in accordance with the guidelines of ASTM Standards D1796, D2276, D2709, and D4057, maintains the fuel oil quality. Exposure to fuel oil contaminants such as water and microbiological organisms is minimized by periodic cleaning/draining of tanks and by verifying the quality of new oil before its introduction into the storage tanks.	Existing program