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November 11, 2005

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Supplemental Response to NRC Request for Additional Information (RAI 2.5.1.19-1), dated September 28, 2005, Related to Oyster Creek Generating Station License Renewal Application (TAC No. MC7624)

References:
(1) "Application for Renewed Operating License," Oyster Creek Generating Station, dated July 22, 2005

(2) "Request for Additional Information (RAI) for the Review of the Oyster Creek Generating Station, License Renewal Application (TAC NO. MC7624)"

(3) "Response to NRC Request for Additional Information (RAI 2.5.1.19-1), dated September 28, 2005, Related to Oyster Creek Generating Station License Renewal (TAC No. MC7624)

AmerGen submitted its application for a renewed operating license for Oyster Creek Generating Station in Reference (1). In Reference (2), the NRC requested additional information related to Section 2.5.1.19 of the Oyster Creek Generating Station License Renewal Application (LRA). Reference (3) provided the majority of information requested by the NRC staff, however, as noted in Reference (3), AmerGen planned to supplement that response with additional information describing the mechanical reviews and associated aging management programs for the Forked River Combustion Turbines. This submittal provides that additional information as well as an associated revision to the Structures Monitoring Program.

A summary of commitments, similar in format to that provided in Table A.5 of the Oyster Creek License Renewal Application, is presented in Appendix A of the Enclosure.

If you have any questions, please contact Fred Polaski, Manager License Renewal, at 610-765-5935.

A114

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

Executed on 11/4/2005

C. N. Swenson
Site Vice President,
Oyster Creek Generating Station
AmerGen Energy Company, LLC

Enclosure: Supplemental Response to Request for Additional Information 2.5.1.19-1

cc: Regional Administrator, USNRC Region I, w/o Enclosure
NRC Project Manager, NRR – License Renewal, Safety
NRC Project Manager, NRR – License Renewal, Environmental, w/o Enclosure
NRC Senior Project Manager, NRR – OCGS, Part 50
USNRC Senior Resident Inspector, OCGS, w/o Enclosure
Bureau of Nuclear Engineering, New Jersey Department of Environmental Protection
File No. 05040

Enclosure

Supplemental Response to
Request for Additional Information RAI 2.5.1.19-1
Oyster Creek Generating Station
License Renewal Application (TAC No. MC7624)

Note: Section numbers within the Appendices of this Enclosure match the numbering protocol used with the License Renewal Application for ease of comparison.

Enclosure – Table of Contents

SUMMARY OF SUPPLEMENTAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

RAI-2.5.1.19-1

The Combustion Turbine Power Plant was determined to be in scope for the purpose of license renewal. Table 3.6.2.1.2 refers to Section 2.5.1.19 for the purpose of Aging Management Evaluation. The NRC staff needs additional information to evaluate the long lived passive components of the Combustion Turbine Power Plant and any aging management programs and aging management reviews related to those components. You should use the same format and depth that you used in the diesel generator section of your application.

Supplemental Response

AmerGen has revised its approach to aging management for the Oyster Creek Station Blackout System, Combustion Turbine Power Plant. Specifically, AmerGen has taken a more detailed approach to scoping, screening/aging management reviews and aging management programs, for long lived passive components, than was previously presented in the Oyster Creek License Renewal Application submittal for the Oyster Creek Station Blackout System, Combustion Turbine Power Plant. On October 12, 2005, an initial response was provided to this RAI providing the following information:

- Summary of commitments in the RAI response
- Revised and new scoping text and tables for LRA subsections 2.5.1.19 and 2.5.2 for the Station Blackout System and Electrical Commodity Groups
- Revised text for LRA subsection 3.6.2.1.9 for materials, environment and aging effects requiring management for the Station Blackout System
- New summary of aging management evaluations (Table 1's) for electrical and structural components at the Forked River Combustion Turbine power plant, Table 3.6.1A, Summary of Aging Management Evaluations for the Station Blackout System - Electrical and Table 3.6.1.C, Summary of Aging Management Evaluations for the Station Blackout System - Structural
- New aging management review results (Table 2's) for electrical and structural components at the Forked River Combustion Turbine power plant, Table 3.6.2.1.2A, Station Blackout System - Electrical and Table 3.6.2.1.2.C, Station Blackout System - Structural
- Partial information for the new aging management review results (Table 2) for mechanical components at the Forked River Combustion Turbine power plant, Table 3.6.2.1.2B, Station Blackout System – Mechanical
- Revised and new text for aging management programs in LRA Appendix A, Final Safety Analysis Report Supplement, for electrical and structural components, A.1.31, A.1.36 and A.1.37
- Revised and new line items in LRA Table A.5, License Renewal Commitment List, for electrical and structural programs, line items 31, 36 and 43
- Revised and new text in LRA Appendix B, Aging Management Programs, for electrical and structural programs, B.1.31, B.1.36, and B.1.37. Deletion of the previously submitted program for the Station Blackout System, B.2.7.

The October 12, 2005 response identified that additional information for the mechanical systems and components at the Forked River Combustion Turbine power plant would be provided by November 11, 2005. This submittal provides the additional information as well as an associated revision to the Structures Monitoring Program.

The mechanical component aging management review has been completed. Table 2.5.1.19, Station Blackout System – Mechanical, Components Subject to Aging Management Review, was updated to delete a Gauge Snubber component that was not in scope, delete a Pump Casing (Hyd Oil) component that was consolidated with Pump Casing (Lube Oil), and add a component type for Closure bolting (Duct). Revisions to this table are italicized. The revised table, 2.5.1.19, for Forked River Combustion Turbine power plant mechanical components, is provided in Appendix B to this Enclosure.

A revision to the previously submitted Table 3.6.2.1.2B, Station Blackout System – Mechanical, has been prepared providing mechanical component table information for table columns entitled: Aging Management Programs, NUREG-1801 Volume 2 Item, Table 1 Item and Notes. Additionally, several revisions were made to the first 5 columns of Table 3.6.2.1.2B since it was submitted on 10/12/05. The changes are identified in the updated table with italicized font. The changes are summarized as follows:

- A new component "Closure bolting (Duct)" was added to uniquely identify this bolting that is included in the scope of the Structures Monitoring Program and is not included in the Bolting Integrity – FRCT program.

- The aging effect of "Crack Initiation and Growth" was added for the Combustion Turbine Casing based on recently identified plant operating experience.

- "Gauge Snubber" was deleted as it was determined not to be in scope.

- The aging effect of "Reduction of Heat Transfer" was added for copper, copper alloy and steel in a Closed Cooling Water environment (consistent with NUREG-1801, Revision 1, Item AP-80) for the following components:

    - Heat Exchangers (Atomizing Air)
    - Heat Exchangers (Cooling Tower)
    - Heat Exchangers (Diesel Jacket Cooling)
    - Heat Exchangers (Flame Detector)
    - Heat Exchangers (Generator)
    - Heat Exchangers (Lube Oil)
    - Heat Exchangers (Support Leg)

- The aging effect of "Loss of Material" was added for copper tubes in an Indoor Air environment (consistent with NUREG-1801, Revision 1, Item A-46) to account for potential aging effects due to surface condensation, for the Heat Exchangers (Generator) component.

- The pressure boundary components for the Heat Exchangers (Lube Oil) were categorized into shellside and tubeside components. The external environment for the shellside components was changed from Indoor Air to Lubricating Oil, as

these heat exchanger shells are physically mounted inside the combustion turbine lubricating oil reservoir. The Indoor Air environment was applied to the carbon steel tubeside components, as the channel head is located outside the lubricating oil reservoir.

- The component Pump Casing (Hyd Oil) was deleted, as the hydraulic oil and the lubricating oil are the same oil in the combustion turbine. This component is now included with Pump Casing (Lube Oil).

- The aging effect for the Restricting Orifice made of Stainless Steel and subject to an Indoor Air environment was changed from "Loss of Material" to "None," consistent with NUREG-1801, Revision 1, Item AP-17.

- The environment of "Soil" was added to the component Tanks (Fuel Oil) because it was determined that the tank bottom rests on a sand bed inside the concrete tank support foundation ring.

- The environment of "Closed Cooling Water" was added as an additional internal environment for stainless steel Valve Body component.

The aging management review results were subsequently rolled-up into a Table 1 format, resulting in the completion of a new Table 3.6.1B, Summary of Aging Management Evaluations for the Station Blackout System – Mechanical, for mechanical components at the Forked River Combustion Turbine power plant. Further evaluations for these mechanical aging management programs have been provided in the "Discussion/Further Evaluation" column of Table 3.6.1B. The new and revised tables, 3.6.1B and 3.6.2.1.2B, for Forked River Combustion Turbine power plant mechanical components, are provided in Appendix C to this Enclosure.

Aging management programs (AMPs) have been added and revised to incorporate the results of the more detailed aging management reviews. New mechanical aging management programs have been added to manage the effects of aging, of mechanical components, at the Forked River Combustion Turbine power plant. These new aging management programs are:

1.12A Bolting Integrity – FRCT
1.14A Closed-Cycle Cooling Water System – FRCT
1.21A Aboveground Steel Tanks – FRCT
1.22A Fuel Oil Chemistry – FRCT
1.24A One Time Inspection – FRCT
1.25A Selective Leaching of Materials – FRCT
1.26A Buried Piping Inspection – FRCT
1.38 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT
1.39 Lubricating Oil Analysis Program – FRCT
2.5A Periodic Inspection Program – FRCT

The new programs with program numbers ending in an "A" are the Forked River Combustion Turbine power plant counterparts to like numbered Oyster Creek aging management programs that were included in the Oyster Creek LRA. The Forked River

Combustion Turbine power plant programs are similar but not identical to the like numbered Oyster Creek aging management programs. Aging Management Program 1.31, Structures Monitoring Program for Oyster Creek Structures, was revised to include external surfaces of mechanical components at the Forked River Combustion Turbine power plant that are not covered by other aging management programs, including exterior surfaces of HVAC ducts, damper housings and HVAC closure bolting.

The Selective Leaching of Materials – FRCT, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT, and Periodic Inspection Program – FRCT aging management programs are condition monitoring programs that are based on scheduled inspection activities. The Forked River Combustion Turbine power plant will be approximately 21 years old when the Oyster Creek Nuclear Generating Station enters the period of extended operation. This is considered too early to perform selective leaching inspections. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT and Periodic Inspection Program – FRCT aging management programs are periodic inspection programs that require a major combustion turbine unit inspection outage to perform the required inspections. Therefore, the initial inspections associated with these aging management programs will not be performed prior to entering the period of extended operation. The schedule for these inspections is described in the associated program commitment.

Corresponding to these new and revised programs are new and revised text for (LRA Sections) Appendix A, including Table A.5, and Appendix B. This new and revised text is provided in Appendix D to this Enclosure.

Previously, AmerGen had proposed one high level Aging Management Program that focused on reliability as determined by existing maintenance and testing activities. The October 12, 2005 response identified two electrical and one structural aging management programs that utilize component-type aging management, for the electrical and structural components at the Forked River Combustion Turbine power plant. This supplemental response identifies 10 mechanical aging management programs that utilize component-type aging management, for the mechanical components at the Forked River Combustion Turbine power plant. This supplement also provides minor revision to the Structures Monitoring Program to account for external surfaces of mechanical components at the Forked Rived Combustion Turbine power plant. The methodologies used for these enhancements are consistent with Oyster Creek License Renewal project procedures. The revisions and supplements have been prepared and presented consistent with information presented in the Oyster Creek LRA submittal.

Enclosure
Appendix A

Summary of Commitments

The following table identifies and describes commitments made in this supplemental response. One commitment from the original LRA, commitment 31, has been updated to reflect the changes associated with this supplemental submittal as compared with the October 12, 2005 submittal. The updated aspects of commitment 31 are formatted in bold font for ease of identification. The additional commitments being made in this submittal (e.g., 51, 52, etc.) are new items associated with the new mechanical aging management programs for the FRCT. These new commitments are numbered to sequentially follow the commitments previously made in the original LRA.

Any other actions discussed in this submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
31) Structures Monitoring Program Existing program is credited. The program includes elements of the Masonry Wall Program and the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants aging management program. The Structures Monitoring Program will be enhanced to include: 1. Buildings, structural components and commodities that are not in scope of maintenance rule but have been determined to be in the scope of license renewal. These include miscellaneous platforms, flood and secondary containment doors, penetration seals, sump liners, structural seals, and anchors and embedment. 2. Component supports, other than those in scope of ASME XI, Subsection IWF. 3. Inspection of **Oyster Creek** external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the external surfaces will be the same as those specified for structural steel components and structural bolting. 4. The visual inspection of insulated surfaces will require the removal of insulation. Removal of insulation will be on a sampling basis that bounds insulation material type, susceptibility of insulated piping or component material to potential degradations that could result from being in contact with insulation,	Prior to period of extended operation	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
and system operating temperature. 5. Inspection of electrical panels and racks, junction boxes, instrument racks and panels, cable trays, offsite power structural components and their foundations, and anchorage. 6. Periodic sampling, testing, and analysis of ground water to confirm that the environment remains non-aggressive for buried reinforced concrete. 7. Periodic inspection of components submerged in salt water (Intake Structure and Canal, Dilution structure) and in the water of the fire pond dam, including trash racks at the Intake Structure and Canal. 8. Inspection of penetration seals, structural seals, and other elastomers for change in material properties. 9. Inspection of vibration isolators, associated with component supports other than those covered by ASME XI, Subsection IWF, for reduction or loss of isolation function. 10. The current inspection criteria will be revised to add loss of material, due to corrosion for steel components, and change in material properties, due to leaching of calcium hydroxide and aggressive chemical attack for reinforced concrete. Wooden piles and sheeting will be inspected for loss of material and change in material properties. 11. Periodic inspection of the Fire Pond Dam for loss of material and loss of form. 12. Inspection of Station Blackout System structures, structural components, and phase bus enclosure assemblies. **13. Inspection of Forked River Combustion Turbine power plant external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the external surfaces will be the same as those specified for structural steel components and structural bolting.**			
51) Bolting Integrity – FRCT The Bolting Integrity - FRCT aging management program is a new program that provides for condition monitoring of bolts and bolted joints within the scope of license renewal at the Forked River Combustion Turbine power plant. This program is based on the General Electric recommendations for proper bolting material selection, lubrication, preload application, installation and maintenance associated with the combustion turbine units and auxiliary systems. The program also includes periodic walkdown inspections for bolting degradation or bolted joint leakage at a frequency of at least once every four years. The program manages the loss of	Prior to period of extended operation	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
material and loss of preload aging effects. This new program will be implemented prior to entering the period of extended operation.			
52) Closed-Cycle Cooling Water System – FRCT The Closed-Cycle Cooling Water System – FRCT aging management program is a new program that manages aging of piping, piping components, piping elements and heat exchangers that are included in the scope of license renewal for loss of material and cracking, and are exposed to a closed cooling water environment at the Forked River Combustion Turbine power plant. The Closed-Cycle Cooling Water System – FRCT aging management program relies on preventive measures to minimize corrosion by maintaining water chemistry control parameters and by performing system monitoring and maintenance inspection activities to confirm that the aging effects are adequately managed. Chemistry control, performance monitoring and inspection activities are based on industry-recognized guidelines of EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," for closed-cycle cooling water systems. Chemical control parameters will be monitored by annual water chemistry sampling. System operational monitoring activities will be performed at a frequency of at least once every six months. This new program will be implemented prior to entering the period of extended operation.	Prior to period of extended operation	No	Yes
53) Aboveground Steel Tanks – FRCT The Aboveground Steel Tanks - FRCT aging management program is a new program that will manage corrosion of aboveground outdoor steel tanks. Paint coating is a corrosion preventive measure, and periodic visual inspections will monitor degradation of the paint coating and any resulting metal degradation of tank external surfaces. The aboveground tanks external surfaces will be visually inspected for coating degradation by walkdown at least once every two years. The Main Fuel Oil tank bottom is in contact with concrete and soil, and is inaccessible for visual inspection. Therefore, the program includes periodic Non-destructive wall-thickness examinations of the Main Fuel Oil tank bottom to verify that significant corrosion is not occurring. This program, including the initial tank external paint inspections, will be	Prior to period of extended operation	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
implemented prior to the period of extended operation. The recommended UT inspection of the Main Fuel Oil tank bottom was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections, and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional UT inspections will be performed prior to October 2020.			
54) Fuel Oil Chemistry – FRCT The Fuel Oil Chemistry - FRCT aging management program is a new program that provides assurance that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of Licensing Renewal. The Fuel Oil Storage Tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the American Society for Testing Materials (ASTM). Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The Fuel Oil Storage Tank will be periodically drained of accumulated water and sediment and will be periodically drained, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations. This new program will be implemented prior to entering the period of extended operation. The internal inspection of the Main Fuel Oil tank was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections and repairs, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional internal inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020.	Prior to period of extended operation	No	Yes
55) One Time Inspection – FRCT	Prior to period of	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
The One-Time Inspection – FRCT program will provide measures to verify that an aging management program is not needed, confirms the effectiveness of existing activities, or determines that degradation is occurring which will require evaluation and corrective action. The program will be implemented prior to the period of extended operation. Inspection methods will include visual examination or volumetric examinations. Should aging effects be detected, the program will initiate actions to characterize the nature and extent of the aging effect and determines what subsequent monitoring is needed to ensure intended functions are maintained during the period of extended operation.	extended operation		
56) Selective Leaching of Materials – FRCT The Selective Leaching of Materials - FRCT aging management program is a new program that will consist of inspections of components constructed of susceptible materials to determine if loss of material due to selective leaching is occurring. For the FRCT power plant, these are limited to copper alloy materials exposed to a closed cooling water environment. One-time inspections will be consist of visual inspections supplemented by hardness tests. If selective leaching is found, the condition will be evaluated to determine the ability of the component to perform its intended function until the end of the period of extended operation and for the need to expand inspections. This new program will be implemented in the time period after January 2018 and prior to January 2028.	This new program will be implemented in the time period after January 2018 and prior to January 2028.	No	Yes
57) Buried Piping Inspection – FRCT The Buried Piping Inspection - FRCT aging management program is a new program that manages the external surface aging effects of loss of material for carbon steel piping and piping system components in a soil (external) environment. The program activities consist of preventive and condition-monitoring measures to manage the loss of material due to external corrosion for piping and piping system components in the scope of license renewal that are in a soil (external) environment. The program scope includes buried portions of glycol cooling water piping located at the Forked River Combustion Turbine station. External inspections of buried components will occur opportunistically when they are	Prior to period of extended operation	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. This program will be implemented prior to entering the period of extended operation.			
58) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT aging management program is a new program that consists of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers and heat exchanger shells in the scope of license renewal at the Forked River Combustion Turbine power plant that are not covered by other aging management programs. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. These inspections will be performed during the major combustion turbine inspection outages and will be performed on a frequency of at least once every 10 years. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	No	Yes
59) Lubricating Oil Analysis Program – FRCT The Lubricating Oil Analysis Program – FRCT is a new program that includes measures to verify the oil environment in mechanical equipment is maintained to the required quality. The Lubricating Oil Analysis Program – FRCT maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction in heat transfer. Lubricating oil testing activities include sampling and analysis of lubricating	Prior to period of extended operation	No	Yes

Commitment	Committed Date or Outage	One-Time Action (Yes/No)	Programmatic (Yes/No)
oil for detrimental contaminants. The presence of water or particulates may also be indicative of inleakage and corrosion product buildup. This program is augmented by the One Time Inspection – FRCT (B.1.24A) program, to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT. The new program will be implemented prior to the period of extended operation.			
60) Periodic Inspection Program – FRCT The Periodic Inspection Program - FRCT is a new program that will consist of periodic inspections of selected components to verify the integrity of the system and confirm the absence of identified aging effects. Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years. The purpose of the inspection is to determine if a specified aging effect is occurring. If the aging effect is occurring, an evaluation will be performed to determine the effect it will have on the ability of affected components to perform their intended functions for the period of extended operation, and appropriate corrective action is taken. Inspection methods may include visual examination, surface or volumetric examinations. When inspection results fail to meet established acceptance criteria, an evaluation will be conducted to identify actions or measures necessary to provide reasonable assurance that the component intended function is maintained during the period of extended operation. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	No	Yes

Enclosure
Appendix B

Revised Table 2.5.1.19, Station Blackout System – Mechanical, Components Subject to Aging Management Review, for mechanical components at the Forked River Combustion Turbine power plant

Table 2.5.1.19 **Station Blackout System - Mechanical**
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Closure bolting (Duct)	*Mechanical Closure*
Combustion Turbine Casing	Pressure Boundary
Damper housing	Pressure Boundary
Ductwork	Pressure Boundary
Electric Heater (Fuel Forwarding Skid)	Heat Transfer
	Pressure Boundary
Exhaust Stack	Pressure Boundary
Expansion Joint	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Filter Housing (Fuel Forwarding Skid Outlet)	Pressure Boundary
Filter Housing (Lube Oil)	Pressure Boundary
Flexible Connection	Pressure Boundary
Flow Element (Fuel Forwarding Skid)	Pressure Boundary
Flow Meter	Pressure Boundary
Heat Exchangers (Atomizing Air)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Cooling Tower)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Diesel Jacket Cooling)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Flame Detector)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Generator)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Lube Oil)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Support Leg)	Heat Transfer
	Pressure Boundary
Louvers	Pressure Boundary
Muffler	Pressure Boundary
Piping and fittings	Pressure Boundary
Pump Casing (CCW)	Pressure Boundary
Pump Casing (Fuel Forwarding)	Pressure Boundary
Pump Casing (Lube Oil)	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Sight Glasses	Pressure Boundary
Strainer (Fuel Forwarding Skid Inlet)	Filter

Strainer Body	Pressure Boundary
Tanks (CCW)	Pressure Boundary
Tanks (Fuel Oil)	Pressure Boundary
Tanks (Lube Oil)	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.6.2.1.2B Station Blackout System - Mechanical -Summary of Aging Management Evaluation

Enclosure
Appendix C

New Oyster Creek LRA Table 1, Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical, for mechanical components at the Forked River Combustion Turbine power plant

Revised Oyster Creek 10/12/05 RAI response Table 2, Table 3.6.2.1.2B, Station Blackout System – Mechanical, for mechanical components at the Forked River Combustion Turbine power plant

TABLE 3.6.1B

SUMMARY OF

AGING MANAGEMENT EVALUATIONS

FOR THE

STATION BLACKOUT SYSTEM – MECHANICAL

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.2.1-6	Stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.2.2.2.3.4)	NUREG 1800, subsection 3.2.2.2.3.4 states: Loss of material from pitting and crevice corrosion could occur for stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil. The existing program relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. However, control of lube oil contaminants may not always have been adequate to preclude corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation to verify the effectiveness of the lubricating oil program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation. Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT, B.1.39, at managing the loss of material in copper alloy heat exchanger tubes exposed to a lubricating oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis Program - FRCT and One-Time Inspection - FRCT aging management program implementation.
3.2.1-9	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil	Reduction of heat transfer due to fouling	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.2.2.2.4.1)	NUREG 1800, subsection 3.2.2.2.4.1 states: Reduction of heat transfer due to fouling could occur for steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil. The existing AMP relies on monitoring and control of lube oil chemistry to mitigate reduction of heat transfer due to fouling. However, control of lube oil chemistry may not always have been adequate to preclude fouling. Therefore, the effectiveness of lube oil chemistry control should be verified to ensure that fouling is not occurring. The GALL Report recommends further evaluation of programs to verify the effectiveness of lube oil chemistry control. A one-time inspection of select components at susceptible locations is an acceptable method to determine whether an aging effect is not occurring or an aging effect is progressing very slowly such that the component's intended function will be maintained during the period of extended operation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion/Further Evaluation
					Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT, B.1.39, at managing the reduction of heat transfer in copper alloy heat exchanger tubes and fins exposed to a lubricating oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis Program - FRCT and One-Time Inspection - FRCT aging management program implementation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.2.1-41	Copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exceptions. The Selective Leaching of Materials - FRCT aging management program, B.1.25A, will be used to manage the loss of material due to selective leaching in copper alloy >15% Zn heat exchanger tubes exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Selective Leaching of Materials - FRCT aging management program implementation.
3.2.1-50	Aluminum piping, piping components, and piping elements exposed to air-indoor uncontrolled (internal/external)	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.3.1-6	Stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Cracking due to stress corrosion cracking	A plant specific aging management program is to be evaluated.	Yes, plant specific (See subsection 3.3.2.2.3.3)	NUREG 1800, subsection 3.3.2.2.3.3 states: Cracking due to SCC could occur in stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust. The GALL Report recommends further evaluation of a plant-specific aging management program to ensure that these aging effects are adequately managed. Acceptance criteria are described in Branch Technical Position RLSB-1 (Appendix A.1 of this SRP-LR.) Further Evaluation: The Periodic Inspection Program – FRCT, B.2.5A, will be used to manage cracking in stainless steel combustion turbine exhaust components exposed to a combustion turbine exhaust gas environment. The Periodic Inspection Program - FRCT will address systems in the scope of license renewal that require periodic monitoring of aging effects, and are not covered by other existing periodic monitoring programs. Activities will consist

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					of a periodic inspection of selected systems and components to verify integrity and confirm the absence of identified aging effects. The inspections will be condition monitoring examinations, intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of system intended functions.
3.3.1-11	Elastomer seals and components exposed to air – indoor uncontrolled (internal/external)	Hardening and loss of strength due to elastomer degradation	A plant specific aging management program is to be evaluated.	Yes, plant specific (See subsection 3.3.2.2.5.1)	NUREG 1800, subsection 3.3.2.2.5.1 states: Hardening and loss of strength due to elastomer degradation could occur in elastomer seals and components of heating and ventilation systems exposed to air – indoor uncontrolled (internal/external. The GALL Report recommends further evaluation of a plant-specific aging management program to ensure that these aging effects are adequately managed. Acceptance criteria are described in Branch Technical Position RLSB-1 (Appendix A.1 of this SRP-LR.). Further Evaluation: The Periodic Inspection Program – FRCT, B.2.5A, will be used to manage the change in material properties in elastomer flexible connections exposed to an indoor air (internal) environment. The Periodic Inspection Program - FRCT will address systems in the scope of license renewal that require periodic monitoring of aging effects, and are not covered by other existing periodic monitoring programs. Activities will consist of a periodic inspection of selected systems and components to verify integrity and confirm the absence of identified aging effects. The inspections will be condition monitoring examinations, intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of system intended functions.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.3.1-14	Steel piping, piping component, and piping elements exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.3.2.2.7.1)	NUREG 1800, subsection 3.3.2.2.7.1 states: Loss of material due to general, pitting, and crevice corrosion could occur in steel piping, piping components, and piping elements, including the tubing, valves, and tanks in the reactor coolant pump oil collection system, exposed to lubricating oil (as part of the fire protection system). The existing aging management program relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. However, control of lube oil contaminants may not always have been adequate to preclude corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the lubricating oil program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation. Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT, B.1.39, at managing the loss of material in carbon steel and cast iron piping, piping components, piping elements, and tanks exposed to a lubricating oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication,

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis Program - FRCT and One-Time Inspection - FRCT aging management program implementation.
3.3.1-18	Stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Loss of material/ general (steel only), pitting and crevice corrosion	A plant specific aging management program is to be evaluated.	Yes, plant specific (See subsection 3.3.2.2.7.3)	NUREG 1800, subsection 3.3.2.2.7.3 states: Loss of material due to general (steel only) pitting and crevice corrosion could occur for steel and stainless steel diesel exhaust piping, piping components, and piping elements exposed to diesel exhaust. The GALL Report recommends further evaluation of a plant-specific aging management program to ensure that these aging effects are adequately managed. Acceptance criteria are described in Branch Technical Position RLSB-1 (Appendix A.1 of this SRP-LR.) Further Evaluation: The Periodic Inspection Program – FRCT, B.2.5A, will be used to manage the loss of material in carbon steel and stainless steel combustion turbine casing and exhaust components exposed to a combustion turbine exhaust gas environment. The Periodic Inspection Program - FRCT will address systems in the

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					scope of license renewal that require periodic monitoring of aging effects, and are not covered by other existing periodic monitoring programs. Activities will consist of a periodic inspection of selected systems and components to verify integrity and confirm the absence of identified aging effects. The inspections will be condition monitoring examinations, intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of system intended functions. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT, B.1.38, will be used to manage the loss of material in carbon steel diesel exhaust components exposed to a diesel exhaust environment. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT, B.1.38, will include visual inspections of the internal surfaces of the Combustion Turbine starting diesel muffler and exhaust piping. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions.
3.3.1-19	Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	No Yes, detection of aging effects and operating experience	NUREG 1800, subsection 3.3.2.2.8 states: Loss of material due to general, pitting, crevice corrosion, and microbiologically-influenced corrosion (MIC) could occur for steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil. The buried piping and tanks inspection program relies on

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	*Discussion/Further Evaluation*
				are to be further evaluated (See subsection 3.3.2.2.8)	industry practice, frequency of pipe excavation, and operating experience to manage the effects of loss of material from general, pitting, and crevice corrosion and MIC. The effectiveness of the buried piping and tanks inspection program should be verified to evaluate an applicant's inspection frequency and operating experience with buried components, ensuring that loss of material is not occurring. Further Evaluation: Consistent with NUREG-1801 with exceptions. The Buried Piping Inspection - FRCT aging management program, B.1.26A, will be used to manage the loss of material in carbon steel piping exposed to a soil environment. The Buried Piping Inspection - FRCT aging management program includes preventive measures to mitigate corrosion and periodic inspection of external surfaces for loss of material to manage the effects of corrosion on the pressure-retaining capacity of piping in a soil (external) environment. Preventive measures are in accordance with standard industry practices for maintaining external coatings and wrappings. Exceptions apply to the NUREG-1801 recommendations for Buried Piping Inspection - FRCT aging management program implementation. The Aboveground Steel Tanks – FRCT aging management program, B.1.21A, will be used to manage the loss of material in steel tank bottoms exposed to a soil environment. The Aboveground Steel Tanks – FRCT aging management program includes periodic internal UT inspections on the bottom of the outdoor steel Main Fuel Oil tank supported by a earthen/concrete foundation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.3.1-20	Steel piping, piping components, piping elements, and tanks exposed to fuel oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fuel Oil Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.3.2.2.9.1)	NUREG 1800, subsection 3.3.2.2.9.1 states: Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel piping, piping components, piping elements, and tanks exposed to fuel oil. The existing aging management program relies on the fuel oil chemistry program for monitoring and control of fuel oil contamination to manage loss of material due to corrosion or fouling. Corrosion or fouling may occur at locations where contaminants accumulate. The effectiveness of the fuel oil chemistry control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation of programs to manage loss of material due to general, pitting, crevice, MIC, and fouling to verify the effectiveness of the fuel oil chemistry program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation. Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Fuel Oil Chemistry – FRCT aging management program, B.1.22A, at managing the loss of material in carbon steel and cast iron piping, piping components, piping elements, and tanks exposed to a fuel oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Fuel Oil Chemistry – FRCT and One-Time Inspection - FRCT aging management program implementation.
3.3.1-21	Steel heat exchanger components exposed to lubricating oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.3.2.2.9.2)	NUREG 1800, subsection 3.3.2.2.9.2 states: Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel heat exchanger components exposed to lubricating oil. The existing aging management program relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. However, control of lube oil contaminants may not always have been adequate to preclude corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the lube oil program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT, B.1.39, at managing the loss of material in carbon steel heat exchanger components exposed to a lubricating oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis Program - FRCT and One-Time Inspection - FRCT aging management program implementation.
3.3.1-25	Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes, plant specific (See subsection 3.3.2.2.10.3)	NUREG 1800, subsection 3.3.2.2.10.3 states: Loss of material due to pitting and crevice corrosion could occur for copper alloy HVAC piping, piping components, and piping elements exposed to condensation (external). The GALL Report recommends further evaluation of a plant-specific aging management program to ensure that these aging effects are adequately managed.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					Acceptance criteria are described in Branch Technical Position RLSB-1 (Appendix A.1 of this SRP-LR.) Further Evaluation: The Periodic Inspection Program – FRCT, B.2.5A, will be used to manage the loss of material in copper alloy heat exchanger tubes exposed to a condensation (external) environment. The Periodic Inspection Program - FRCT will address systems in the scope of license renewal that require periodic monitoring of aging effects, and are not covered by other existing periodic monitoring programs. Activities will consist of a periodic inspection of selected systems and components to verify integrity and confirm the absence of identified aging effects. The inspections will be condition monitoring examinations, intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of system intended functions.
3.3.1-32	Stainless steel, aluminum and copper alloy piping, piping components, and piping elements exposed to fuel oil	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Fuel Oil Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.3.2.2.12.1)	NUREG 1800, subsection 3.3.2.2.12.1 states: Loss of material due to pitting, crevice, and MIC could occur in stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to fuel oil. The existing aging management program relies on the fuel oil chemistry program for monitoring and control of fuel oil contamination to manage loss of material due to corrosion. However, corrosion may occur at locations where contaminants accumulate and the effectiveness of fuel oil chemistry control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation of programs

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion/Further Evaluation
					to manage corrosion to verify the effectiveness of the fuel oil chemistry control program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation. Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Fuel Oil Chemistry – FRCT aging management program, B.1.22A, at managing the loss of material in stainless steel piping, piping components, and piping elements exposed to a fuel oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Fuel Oil Chemistry – FRCT and One-Time Inspection - FRCT aging management program implementation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.3.1-33	Stainless steel piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated (See subsection 3.3.2.2.12.2)	NUREG 1800, subsection 3.3.2.2.12.2 states: Loss of material due to pitting, crevice, and MIC could occur in stainless steel piping, piping components, and piping elements exposed to lubricating oil. The existing program relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. However, control of lube oil contaminants may not always have been adequate to preclude corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that corrosion is not occurring. The GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the lubricating oil program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation. Further Evaluation: Consistent with NUREG-1801 with exceptions. The One-Time Inspection - FRCT aging management program, B.1.24A, will be used to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT, B.1.39, at managing the loss of material in stainless steel piping, piping components, and piping elements exposed to a lubricating oil environment. The One-Time Inspection – FRCT aging management program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion/Further Evaluation
					component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis Program - FRCT and One-Time Inspection - FRCT aging management program implementation.
3.3.1-40	Steel tanks in diesel fuel oil system exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	Aboveground Steel Tanks	No	Consistent with NUREG-1801 with exceptions. The Aboveground Steel Tanks - FRCT aging management program, B.1.21A, will be used to manage the loss of material in carbon steel tanks exposed to an outdoor air (external) environment. Exceptions apply to the NUREG-1801 recommendations for Aboveground Steel Tanks - FRCT aging management program implementation.
3.3.1-43	Steel bolting and closure bolting exposed to air – indoor uncontrolled (external) or air – outdoor (External)	Loss of material due to general, pitting, and crevice corrosion	Bolting Integrity	No	Consistent with NUREG-1801 with exceptions. The Bolting Integrity - FRCT aging management program, B.1.12A, will be used to manage the loss of material in carbon and alloy steel closure bolting exposed to an indoor air (external) and outdoor air (external) environment. Exceptions apply to the NUREG-1801 recommendations for Bolting Integrity - FRCT aging management program implementation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion/Further Evaluation
3.3.1-45	Steel closure bolting exposed to air – indoor uncontrolled (external)	Loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity	No	Consistent with NUREG-1801 with exceptions. The Bolting Integrity - FRCT aging management program, B.1.12A, will be used to manage the loss of preload in carbon and alloy steel closure bolting exposed to an indoor air (external) environment. Exceptions apply to the NUREG-1801 recommendations for Bolting Integrity - FRCT aging management program implementation.
3.3.1-47	Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, and crevice corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the loss of material in carbon steel piping, piping components, piping elements, and tanks exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.3.1-48	Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the loss of material in carbon heat exchanger components exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.3.1-50	Stainless steel piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to pitting and crevice corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the loss of material in stainless steel piping, piping components, and piping elements exposed to a closed-cycle cooling water

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.3.1-51	Copper alloy piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the loss of material in bronze, copper, and copper alloy piping, piping components, piping elements, and heat exchanger components exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.3.1-52	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to closed cycle cooling water	Reduction of heat transfer due to fouling	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the reduction of heat transfer in copper, copper alloy, and carbon steel heat exchanger tubes exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.3.1-55	Steel ducting closure bolting exposed to air – indoor uncontrolled (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	The Structures Monitoring Program, B.1.31, will be used to manage the loss of material in carbon steel ducting closure bolting exposed to an indoor air (external) environment or outdoor air (external) environment. The Structures Monitoring Program, B.1.31, is the same program as is used for aging management of external surfaces at the Oyster Creek Nuclear Generating Station,

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					and as such will adequately manage aging of external surfaces for the Forked River Combustion Turbine power plant.
3.3.1-56	Steel HVAC ducting and components external surfaces exposed to air – indoor uncontrolled (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	The Structures Monitoring Program, B.1.31, will be used to manage the loss of material in carbon steel HVAC components exposed to an indoor air (external) environment. The Structures Monitoring Program, B.1.31, is the same program as is used for aging management of external surfaces at the Oyster Creek Nuclear Generating Station, and as such will adequately manage aging of external surfaces for the Forked River Combustion Turbine power plant.
3.3.1-58	Steel external surfaces exposed to air – indoor uncontrolled (external), air - outdoor (external), and condensation (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	The Structures Monitoring Program, B.1.31, will be used to manage the loss of material on the external surfaces of cast iron and carbon steel piping, piping components, piping elements, tanks, heat exchangers, and HVAC components exposed to an indoor air (external) environment or outdoor air (external) environment. The Structures Monitoring Program, B.1.31, is the same program as is used for aging management of external surfaces at the Oyster Creek Nuclear Generating Station, and as such will adequately manage aging of external surfaces for the Forked River Combustion Turbine power plant.
3.3.1-60	Steel piping, piping components, and piping elements exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	External Surfaces Monitoring	No	The Structures Monitoring Program, B.1.31, will be used to manage the loss of material in carbon steel piping, piping components, and piping elements exposed to an outdoor air (external) environment.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
					The Structures Monitoring Program, B.1.31, is the same program as is used for aging management of external surfaces at the Oyster Creek Nuclear Generating Station, and as such will adequately manage aging of external surfaces for the Forked River Combustion Turbine power plant.
3.3.1-72	Steel HVAC ducting and components internal surfaces exposed to condensation (Internal)	Loss of material due to general, pitting, crevice, and (for drip pans and drain lines) microbiologically influenced corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	No	Consistent with NUREG-1801 with exceptions. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT, B.1.38, will be used to manage the loss of material in carbon steel piping, piping components, piping elements, heat exchangers, and HVAC ducting and components exposed to a condensation (internal) environment. Exceptions apply to the NUREG-1801 recommendations for Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT aging management program implementation.
3.3.1-84	Copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to raw water, treated water, or closed cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exceptions. The Selective Leaching of Materials - FRCT aging management program, B.1.25A, will be used to manage the loss of material due to selective leaching in bronze and copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Selective Leaching of Materials - FRCT aging management program implementation.

Table 3.6.1B Summary of Aging Management Evaluations for the Station Blackout System – Mechanical					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion/Further Evaluation**
3.3.1-93	Glass piping elements exposed to air, air – indoor uncontrolled (external), fuel oil, lubricating oil, raw water, treated water, and treated borated water	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.3.1-94	Stainless steel and nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external)	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.4.1-24	Steel heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exceptions. The Closed-Cycle Cooling Water System - FRCT aging management program, B.1.14A, will be used to manage the loss of material in carbon steel heat exchanger components exposed to a closed-cycle cooling water environment. Exceptions apply to the NUREG-1801 recommendations for Closed-Cycle Cooling Water System - FRCT aging management program implementation.
3.5.1-50	Groups B2, and B4: galvanized steel, aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion	Structures Monitoring Program	No	Consistent with NUREG-1801. The Structures Monitoring Program, B.1.31, will be used to manage the loss of material in stainless steel and aluminum piping, piping components, piping elements, and HVAC components exposed to an outdoor air (external) environment.

TABLE 3.6.2.1.2B

STATION BLACKOUT SYSTEM – MECHANICAL

SUMMARY OF

AGING MANAGEMENT EVALUATION

Table 3.6.2.1.2B
Station Blackout System - Mechanical
Summary of Aging Management Evaluation

Table 3.6.2.1.2B Station Blackout System - Mechanical

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Bird Screen	Filter	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.F4-1 (A-10)	3.3.1-56	E, 12
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Closure bolting	Mechanical Closure	Alloy Steel	Indoor Air (External)	Loss of Material	Bolting Integrity - FRCT (B.1.12A)	VII.I-4 (AP-27)	3.3.1-43	B
				Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)	VII.I-5 (AP-26)	3.3.1-45	B
			Outdoor Air (External)	Loss of Material	Bolting Integrity - FRCT (B.1.12A)	VII.I-1 (AP-28)	3.3.1-43	B
				Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)			H, 2
		Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Bolting Integrity - FRCT (B.1.12A)	VII.I-4 (AP-27)	3.3.1-43	B
				Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)	VII.I-5 (AP-26)	3.3.1-45	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure bolting	Mechanical Closure	Carbon and low alloy steel	Outdoor Air (External)	Loss of Material	Bolting Integrity - FRCT (B.1.12A)	VII.I-1 (AP-28)	3.3.1-43	B
				Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)			H, 2
		Stainless Steel	Indoor Air (External)	Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)			G, 7
			Outdoor Air (External)	Loss of Material	Bolting Integrity - FRCT (B.1.12A)			G, 7
				Loss Of Preload	Bolting Integrity - FRCT (B.1.12A)			G, 7
Closure bolting (Duct)	*Mechanical Closure*	*Carbon and low alloy steel*	*Indoor Air (External)*	*Loss of Material*	Structures Monitoring Program (B.1.31)	VII.F4-3 (A-105)	3.3.1-55	E, 12
			Outdoor Air (External)	*Loss of Material*	Structures Monitoring Program (B.1.31)	VII.F4-3 (A-105)	3.3.1-55	E, 11, 12
		Stainless Steel	*Indoor Air (External)*	*None*	None	VII.J-15 (AP-17)	3.3.1-94	C
			Outdoor Air (External)	*Loss of Material*	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	A
Combustion Turbine Casing	*Pressure Boundary*	*Carbon and low alloy steel*	*Combustion Turbine Exhaust Gases (Internal)*	*Cracking Initiation and Growth*	Periodic Inspection Program - FRCT (B.2.5A)			H, 9

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Combustion Turbine Casing	Pressure Boundary	Carbon and low alloy steel	Combustion Turbine Exhaust Gases (Internal)	Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-2 (A-27)	3.3.1-18	E, 6
			Indoor Air (External)	Loss of Material	Structures Monitoring *Program* (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
Damper housing	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.F4-1 (A-10)	3.3.1-56	E, 12
			Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Ductwork	Pressure Boundary	Carbon and low alloy steel	Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Stainless Steel	Combustion Turbine Exhaust Gases (Internal)	Cracking Initiation and Growth	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-1 (AP-33)	3.3.1-6	E, 6
				Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-2 (A-27)	3.3.1-18	E, 6

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Ductwork	Pressure Boundary	Stainless Steel	Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	C
			Indoor Air (Internal)	None	None	VII.J-15 (AP-17)	3.3.1-94	C, 5
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C
Electric Heater (Fuel Forwarding Skid)	Heat Transfer	Carbon and low alloy steel	Fuel Oil (Internal)	Reduction of Heat Transfer	Fuel Oil Chemistry - FRCT (B.1.22A)			H, 4
					One-Time Inspection - FRCT (B.1.24A)			H, 4
	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
Exhaust Stack	Pressure Boundary	Stainless Steel	Combustion Turbine Exhaust Gases (Internal)	Cracking Initiation and Growth	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-1 (AP-33)	3.3.1-6	E, 6
				Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-2 (A-27)	3.3.1-18	E, 6

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Exhaust Stack	Pressure Boundary	Stainless Steel	Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C
Expansion Joint	Pressure Boundary	Carbon and low alloy steel (Fuel Oil System)	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.H1-8 (A-24)	3.3.1-60	E, 12
		Elastomer (Fuel Oil System)	Fuel Oil (Internal)	Change in Material Properties	Periodic Inspection Program - FRCT (B.2.5A)			G
			Outdoor Air (External)	Change in Material Properties	Periodic Inspection Program - FRCT (B.2.5A)			G
		Stainless Steel (CT Inlet & Exhaust Air System)	Combustion Turbine Exhaust Gases (Internal)	Cracking Initiation and Growth	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-1 (AP-33)	3.3.1-6	E, 6
				Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)	VII.H2-2 (A-27)	3.3.1-18	E, 6
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	A
Fan Housing	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.F1-2 (A-10)	3.3.1-56	E, 12

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Fan Housing	Pressure Boundary	Carbon and low alloy steel	Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Filter Housing	Pressure Boundary	Carbon and low alloy steel	Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Filter Housing (Fuel Forwarding Skid Outlet)	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.H1-8 (A-24)	3.3.1-60	E, 12
Filter Housing (Lube Oil)	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Filter Housing (Lube Oil)	Pressure Boundary	Carbon and low alloy steel	Lubricating Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
Flexible Connection	Pressure Boundary	Carbon and low alloy steel	Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Elastomer	Indoor Air (Internal)	Change in Material Properties	Periodic Inspection Program - FRCT (B.2.5A)	VII.F4-6 (A-17)	3.3.1-11	E
			Outdoor Air (External)	Change in Material Properties	Periodic Inspection Program - FRCT (B.2.5A)			G
		Stainless Steel	Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
			Indoor Air (Internal)	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 5
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-17 (AP-59)	3.3.1-33	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-17 (AP-59)	3.3.1-33	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Flow Element (Fuel Forwarding Skid)	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
Flow Meter	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.H1-8 (A-24)	3.3.1-60	E, 12
Heat Exchangers (Atomizing Air)	Heat Transfer	Copper Alloy (tubes)	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
			Indoor Air (External)	Reduction of Heat Transfer	Periodic Inspection Program - FRCT (B.2.5A)			G
	Pressure Boundary	Carbon and low alloy steel (shell)	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Atomizing Air)	Pressure Boundary	Carbon and low alloy steel (shell)	Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
		Carbon and low alloy steel (tube side components)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VIII.E-5 (S-23)	3.4.1-24	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
		Copper Alloy (tubes & tubesheet)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B
			Indoor Air (External)	Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)	VII.F1-16 (A-46)	3.3.1-25	E, 1
Heat Exchangers (Cooling Tower)	Heat Transfer	Aluminum (fins)	Outdoor Air (External)	Reduction of Heat Transfer	Periodic Inspection Program - FRCT (B.2.5A)			F, 8
		Copper (tubes)	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
			Outdoor Air (External)	Reduction of Heat Transfer	Periodic Inspection Program - FRCT (B.2.5A)			G, 8
	Pressure Boundary	Carbon and low alloy steel (tube side components)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VIII.E-5 (S-23)	3.4.1-24	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Cooling Tower)	Pressure Boundary	Carbon and low alloy steel (tube side components)	Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Copper (tubes)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B
			Outdoor Air (External)	Loss of Material	Periodic Inspection Program - FRCT (B.2.5A)			G
Heat Exchangers (Diesel Jacket Cooling)	Heat Transfer	Copper Alloy (tubes)	Closed Cooling Water (External)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
			Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
	Pressure Boundary	Carbon and low alloy steel (shell)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-1 (A-63)	3.3.1-48	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Copper Alloy (tubes & tubesheets)	Closed Cooling Water (External)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B
					Selective Leaching of Materials - FRCT (B.1.25A)	V.D2-4 (EP-37)	3.2.1-41	B
			Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Diesel Jacket Cooling)	Pressure Boundary	Copper Alloy (tubes & tubesheets)	Closed Cooling Water (Internal)	Loss of Material	Selective Leaching of Materials - FRCT (B.1.25A)	V.D2-4 (EP-37)	3.2.1-41	B
Heat Exchangers (Flame Detector)	Heat Transfer	Carbon and low alloy steel	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F4-9 (AP-77)	3.3.1-52	B
	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VIII.E-5 (S-23)	3.4.1-24	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
Heat Exchangers (Generator)	Heat Transfer	Aluminum (fins)	Indoor Air (External)	Reduction of Heat Transfer	Periodic Inspection Program - FRCT (B.2.5A)			F
		Copper Alloy (tubes)	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
			Indoor Air (External)	Reduction of Heat Transfer	Periodic Inspection Program - FRCT (B.2.5A)			G
	Pressure Boundary	Carbon and low alloy steel (water box)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VIII.E-5 (S-23)	3.4.1-24	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Generator)	Pressure Boundary	Copper Alloy (tubes)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B
			Indoor Air (External)	*Loss of Material*	Periodic Inspection Program - FRCT (B.2.5A)	VII.F1-16 (A-46)	3.3.1-25	E, 1
Heat Exchangers (Lube Oil)	Heat Transfer	Copper Alloy (fins)	Lubricating Oil (External)	Reduction of Heat Transfer	Lubricating Oil Analysis Program - FRCT (B.1.39)	V.D2-9 (EP-47)	3.2.1-9	B
					One-Time Inspection - FRCT (B.1.24A)	V.D2-9 (EP-47)	3.2.1-9	B
		Copper Alloy (tubes)	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-12 (AP-80)	3.3.1-52	B
			Lubricating Oil (External)	Reduction of Heat Transfer	Lubricating Oil Analysis Program - FRCT (B.1.39)	V.D2-9 (EP-47)	3.2.1-9	B
					One-Time Inspection - FRCT (B.1.24A)	V.D2-9 (EP-47)	3.2.1-9	B
	Pressure Boundary	Carbon and low alloy steel *(shell side components)*	*Lubricating Oil* (External)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-5 (AP-39)	3.3.1-21	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-5 (AP-39)	3.3.1-21	B
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-5 (AP-39)	3.3.1-21	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Lube Oil)	Pressure Boundary	Carbon and low alloy steel *(shell side components)*	Lubricating Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H2-5 (AP-39)	3.3.1-21	B
		Carbon and low alloy steel *(tubeside components)*	Closed Cooling Water *(Internal)*	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-1 (A-63)	3.3.1-48	B
			Indoor Air (External)	*Loss of Material*	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
		Copper Alloy (tubes)	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F1-8 (AP-34)	3.3.1-51	B
					Selective Leaching of Materials - FRCT (B.1.25A)	VII.F1-9 (AP-65)	3.3.1-84	B
			Lubricating Oil (External)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	V.D2-22 (EP-45)	3.2.1-6	D
					One-Time Inspection - FRCT (B.1.24A)	V.D2-22 (EP-45)	3.2.1-6	D
Heat Exchangers (Support Leg)	Heat Transfer	Carbon and low alloy steel	Closed Cooling Water (Internal)	*Reduction of Heat Transfer*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.F4-9 (AP-77)	3.3.1-52	B
	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VIII.E-5 (S-23)	3.4.1-24	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchangers (Support Leg)	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
Louvers	Pressure Boundary	Aluminum	Indoor Air (External)	None	None	V.F-2 (EP-3)	3.2.1-50	C
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C
Muffler	Pressure Boundary	Carbon and low alloy steel	Diesel Engine Exhaust Gases (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.H2-2 (A-27)	3.3.1-18	E
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Piping and fittings	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Diesel Engine Exhaust Gases (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.H2-2 (A-27)	3.3.1-18	E
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping and fittings	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
			Soil (External)	Loss of Material	Buried Piping Inspection - FRCT (B.1.26A)	VII.C1-18 (A-01)	3.3.1-19	B
		Stainless Steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-10 (A-52)	3.3.1-50	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping and fittings	Pressure Boundary	Stainless Steel	Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
			Indoor Air (Internal)	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 5
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-17 (AP-59)	3.3.1-33	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-17 (AP-59)	3.3.1-33	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C
Pump Casing (CCW)	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Pump Casing (Fuel Forwarding)	Pressure Boundary	Cast Iron	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Pump Casing (Lube Oil)	Pressure Boundary	*Carbon and low alloy steel*	*Indoor Air (External)*	*Loss of Material*	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Lubricating Oil (Internal)	*Loss of Material*	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
		Cast Iron	Lubricating Oil (External)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
Restricting Orifice	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Restricting Orifice	Pressure Boundary	Carbon and low alloy steel	Lubricating Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Stainless Steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-10 (A-52)	3.3.1-50	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
			Fuel Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B
			Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
			Indoor Air (Internal)	*None*	None	VII.J-15 (AP-17)	3.3.1-94	A, 5
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C
	Throttle	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Restricting Orifice	Throttle	Carbon and low alloy steel	Lubricating Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
		Stainless Steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-10 (A-52)	3.3.1-50	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B
			Indoor Air (Internal)	*None*	None	VII.J-15 (AP-17)	3.3.1-94	A, 5
Sight Glasses	Pressure Boundary	Glass	Closed Cooling Water (Internal)	None	None			G, 3
			Outdoor Air (External)	None	None	VII.J-7 (AP-48)	3.3.1-93	A
Strainer (Fuel Forwarding Skid Inlet)	Filter	Stainless Steel	Fuel Oil (External)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B
Strainer Body	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Strainer Body	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
Tanks (CCW)	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Outdoor Air (External)	Loss of Material	Aboveground Steel Tanks - FRCT (B.1.21A)	VII.H1-11 (A-95)	3.3.1-40	B
Tanks (Fuel Oil)	Pressure Boundary	Carbon and low alloy steel	Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Outdoor Air (External)	Loss of Material	Aboveground Steel Tanks - FRCT (B.1.21A)	VII.H1-11 (A-95)	3.3.1-40	B
			Soil	*Loss of Material*	Aboveground Steel Tanks - FRCT (B.1.21A)	VII.C1-18 (A-01)	3.3.1-19	E, 10

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tanks (Lube Oil)	Pressure Boundary	Carbon and low alloy steel	Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
Thermowell	Pressure Boundary	Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
		Stainless Steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-10 (A-52)	3.3.1-50	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B
			Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve Body	Pressure Boundary	Bronze	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.H2-8 (AP-12)	3.3.1-51	B
					Selective Leaching of Materials - FRCT (B.1.25A)	VII.H2-12 (AP-43)	3.3.1-84	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)			G
		Carbon and low alloy steel	Closed Cooling Water (Internal)	Loss of Material	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-14 (A-25)	3.3.1-47	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-10 (A-30)	3.3.1-20	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-10 (A-30)	3.3.1-20	B
			Indoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-8 (A-77)	3.3.1-58	E, 12
			Indoor Air (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT (B.1.38)	VII.F4-2 (A-08)	3.3.1-72	B, 1
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-20 (AP-30)	3.3.1-14	B

Table 3.6.2.1.2B Station Blackout System - Mechanical (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve Body	Pressure Boundary	Carbon and low alloy steel	Lubricating Oil (Internal)	Loss of Material	One-Time Inspection - FRCT (B.1.24A)	VII.H2-20 (AP-30)	3.3.1-14	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	VII.I-9 (A-78)	3.3.1-58	E, 12
		Stainless Steel	*Closed Cooling Water (Internal)*	*Loss of Material*	Closed-Cycle Cooling Water System - FRCT (B.1.14A)	VII.C2-10 (A-52)	3.3.1-50	B
			Fuel Oil (Internal)	Loss of Material	Fuel Oil Chemistry - FRCT (B.1.22A)	VII.H1-6 (AP-54)	3.3.1-32	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H1-6 (AP-54)	3.3.1-32	B
			Indoor Air (External)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
			Indoor Air (Internal)	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 5
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis Program - FRCT (B.1.39)	VII.H2-17 (AP-59)	3.3.1-33	B
					One-Time Inspection - FRCT (B.1.24A)	VII.H2-17 (AP-59)	3.3.1-33	B
			Outdoor Air (External)	Loss of Material	Structures Monitoring Program (B.1.31)	III.B4-7 (TP-6)	3.5.1-50	C

Notes	Definition of Note
A	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
B	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
C	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
D	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
E	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.
F	Material not in NUREG-1801 for this component.
G	Environment not in NUREG-1801 for this component and material.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.
I	Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.
J	Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1. The environment for this component is conservatively assumed to include condensation, for the evaluating of aging effects.
2. The aging effects for carbon and alloy steel closure bolting in an outdoor air (external) environment also include loss of preload.
3. There are no aging effects for glass in a closed cooling water environment, based on industry standards.
4. Aging effects include reduction of heat transfer between the fuel oil environment and steel-sheathed tubular heating elements.
5. The aging effects for an air-indoor (external) environment are the same for an air-indoor (internal) environment.
6. Diesel exhaust and combustion turbine exhaust are considered equivalent environments for determining aging effects.
7. The aging effects for stainless steel closure bolting in an outdoor air (external) environment include loss of material and loss of preload.
8. Visual inspection of tubes and fins using the identified AMP will assure that the heat transfer intended function is maintained.
9. The combustion turbine casing and exhaust plenum (duct) are inspected for cracking during maintenance inspections. Cracks have been found in the past. Some cracks have resulted in leaks, but have not prevented combustion turbine operation. Cracks are repaired prior to reassembly.
10. The identified program provides aging management for the tank bottom exposed to a soil environment. The progarm specified in NUREG 1801 does not address the bottom of tanks that are not buried.
11. The NUREG-1801 item match is for steel duct bolting in an indoor air environment. The same aging effect and aging management program is applicable to steel duct bolting in an outdoor air invoronment.
12. The Structures Monitoring Program, B.1.31, is the same program as is used for aging management of external surfaces at the Oyster Creek Nuclear Generating Station, and as such will adequately manage aging of external surfaces for the Forked River Combustion Turbine power plant.

Enclosure
Appendix D

Replacement and new text for Oyster Creek LRA and 10/12/05 RAI response, Appendix A, Final Safety Analysis Report Supplement:

- A.1.12A, Bolting Integrity – FRCT
- A.1.14A, Closed-Cycle Cooling Water System – FRCT
- A.1.21A, Aboveground Steel Tanks – FRCT
- A.1.22A, Fuel Oil Chemistry – FRCT
- A.1.24A, One Time Inspection – FRCT
- A.1.25A, Selective Leaching of Materials – FRCT
- A.1.26A, Buried Piping Inspection – FRCT
- A.1.31, Structures Monitoring Program
- A.1.38, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT
- A.1.39, Lubricating Oil Analysis Program – FRCT
- A.2.5A, Periodic Inspection Program – FRCT

Replacement and new text for Oyster Creek LRA and 10/12/05 RAI response, Appendix A, Table A.5, License Renewal Commitment List, line items:

- 31, Structures Monitoring Program
- 51, Bolting Integrity – FRCT
- 52, Closed-Cycle Cooling Water System – FRCT
- 53, Aboveground Steel Tanks – FRCT
- 54, Fuel Oil Chemistry – FRCT
- 55, One Time Inspection – FRCT
- 56, Selective Leaching of Materials – FRCT
- 57, Buried Piping Inspection – FRCT
- 58, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT
- 59, Lubricating Oil Analysis Program – FRCT
- 60, Periodic Inspection Program – FRCT

Replacement and new text for Oyster Creek LRA and 10/12/05 RAI response, Appendix B, Aging Management Programs:

- B.1.12A, Bolting Integrity – FRCT
- B.1.14A, Closed-Cycle Cooling Water System – FRCT
- B.1.21A, Aboveground Steel Tanks – FRCT
- B.1.22A, Fuel Oil Chemistry – FRCT
- B.1.24A, One Time Inspection – FRCT
- B.1.25A, Selective Leaching of Materials – FRCT
- B.1.26A, Buried Piping Inspection – FRCT
- B.1.31, Structures Monitoring Program
- B.1.38, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT
- B.1.39, Lubricating Oil Analysis Program – FRCT
- B.2.5A, Periodic Inspection Program – FRCT

FINAL

SAFETY

ANALYSIS

REPORT

SUPPLEMENT

A.1.12A BOLTING INTEGRITY - FRCT

The Bolting Integrity - FRCT aging management program is a new program that provides for condition monitoring of bolts and bolted joints within the scope of license renewal at the Forked River Combustion Turbine power plant. The Forked River Combustion Turbine power plant was originally designed and supplied by General Electric Company. This program is based on the General Electric recommendations for proper bolting material selection, lubrication, preload application, installation and maintenance associated with the combustion turbine units and auxiliary systems. The program also includes periodic walkdown inspections for bolting degradation or bolted joint leakage at a frequency of at least once every four years. The program manages the loss of material and loss of preload aging effects. This new program will be implemented prior to entering the period of extended operation.

A.1.14A CLOSED-CYCLE COOLING WATER SYSTEM - FRCT

The Closed-Cycle Cooling Water System – FRCT aging management program is a new program that manages aging of piping, piping components, piping elements and heat exchangers that are included in the scope of license renewal for loss of material and cracking, and are exposed to a closed cooling water environment at the Forked River Combustion Turbine power plant. The Closed-Cycle Cooling Water System – FRCT aging management program relies on preventive measures to minimize corrosion by maintaining water chemistry control parameters and by performing system monitoring and maintenance inspection activities to confirm that the aging effects are adequately managed. Chemistry control, performance monitoring and inspection activities are based on industry-recognized guidelines of EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," for closed-cycle cooling water systems.

Chemical control parameters will be monitored by annual water chemistry sampling. System operational monitoring activities will be performed at a frequency of at least once every six months. This new program will be implemented prior to entering the period of extended operation.

A.1.21A ABOVEGROUND STEEL TANKS - FRCT

The Aboveground Steel Tanks - FRCT aging management program is a new program that will manage corrosion of aboveground outdoor steel tanks. Paint coating is a corrosion preventive measure, and periodic visual inspections will monitor degradation of the paint coating and any resulting metal degradation of tank external surfaces. The aboveground tanks external surfaces will be visually inspected for coating degradation by walkdown at least once every two years. The Main Fuel Oil storage tank is supported on a concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. All other in-scope outdoor tanks are supported by structural steel. Therefore, inspection of sealant or caulking at the tank-foundation interface does not apply to the Aboveground Steel Tanks – FRCT aging management program.

The Main Fuel Oil tank bottom is in contact with concrete and soil, and is inaccessible for visual inspection. Therefore, the program includes periodic Non-destructive wall-thickness examinations of the Main Fuel Oil tank bottom to verify that significant corrosion is not occurring.

This program, including the initial tank external paint inspections, will be implemented prior to the period of extended operation. The recommended UT inspection of the Main Fuel Oil tank bottom was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections, and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional UT inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020.

A.1.22A FUEL OIL CHEMISTRY – FRCT

The Fuel Oil Chemistry - FRCT aging management program is a new program that provides assurance that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of Licensing Renewal. The Fuel Oil Storage Tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the American Society for Testing Materials (ASTM). Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The Fuel Oil Storage Tank will be periodically drained of accumulated water and sediment and will be periodically drained, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations.

This new program will be implemented prior to entering the period of extended operation. The internal inspection of the Main Fuel Oil tank was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections and repairs, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional internal inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020.

A.1.24A ONE-TIME INSPECTION - FRCT

The One-Time Inspection – FRCT aging management program is a new program that will provide a means of confirming the aging effects of loss of material and loss of heat transfer are either not occurring or are progressing so slowly as to not have an effect on the intended function of the Combustion Turbine fuel oil and lubricating oil system components within the period of extended operation. Additionally this program will address potentially long incubation periods for loss of material and loss of heat transfer aging effects. The One-Time Inspection – FRCT program will provide measures to verify that an aging management program is not needed, confirms the effectiveness of existing activities, or determines that degradation is occurring which will require evaluation and corrective action. The program will be implemented prior to the period of extended operation.

Inspection methods will include visual examination or volumetric examinations. Inspections will be performed by qualified personnel using procedures developed consistent with the quality classification of the Forked River Combustion Turbines. Acceptance criteria will be in accordance with design standards for the combustion turbines and manufacturer's recommendations. The One-Time Inspection – FRCT program provides for the evaluation of the need for follow-up examinations to monitor the progression of aging if age-related degradation is found that could jeopardize an intended function before the end of the period of extended operation. Should aging effects be detected, the program will initiate actions to characterize the nature and extent of the aging effect and determines what subsequent monitoring is needed to ensure intended functions are maintained during the period of extended operation.

A.1.25A SELECTIVE LEACHING OF MATERIALS - FRCT

The Selective Leaching of Materials - FRCT aging management program is a new program that will consist of inspections of components constructed of susceptible materials to determine if loss of material due to selective leaching is occurring. For the FRCT power plant, these are limited to copper alloy materials exposed to a closed cooling water environment. One-time inspections will consist of visual inspections supplemented by hardness tests. If selective leaching is found, the condition will be evaluated to determine the ability of the component to perform its intended function until the end of the period of extended operation and for the need to expand inspections. This new program will be implemented in the time period after January 2018 and prior to January 2028.

A.1.26A BURIED PIPING INSPECTION – FRCT

The Buried Piping Inspection - FRCT aging management program is a new program that manages the external surface aging effects of loss of material for carbon steel piping and piping system components in a soil (external) environment. The program activities consist of preventive and condition-monitoring measures to manage the loss of material due to external corrosion for piping and piping system components in the scope of license renewal that are in a soil (external) environment. The program scope includes buried portions of glycol cooling water piping located at the Forked River Combustion Turbine station.

External inspections of buried components will occur opportunistically when they are excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. This program will be implemented prior to entering the period of extended operation.

A.1.31 STRUCTURES MONITORING PROGRAM

The Structures Monitoring Program is an existing program that was developed to implement the requirements of 10 CFR 50.65 and is based on NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2 and Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2. The program includes elements of the Masonry Wall Program and the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants aging management program.

The program relies on periodic visual inspections to monitor the condition of structures and structural components, structural bolting, component supports, masonry block walls, water-control structures, the Fire Pond Dam, exterior surfaces of mechanical components that are not covered by other programs, and HVAC ducts, damper housings, and HVAC closure bolting. The program relies on procurement controls and installation practices, defined in plant procedures, to ensure that only approved lubricants and proper torque are applied to bolting in scope of the program.

The scope of the program will be enhanced to include structures and structural components that are not currently monitored, including Station Blackout System structures and phase bus enclosure assemblies; but determined to be in the scope of license renewal, submerged structures, component supports not covered by other programs, the Fire Pond Dam, exterior surfaces of Oyster Creek and Forked River Combustion Turbine mechanical components that are not covered by other programs, including exterior surfaces of HVAC ducts, damper housings, and closure bolting. The program will also be enhanced to require removal of piping and component insulation on a sampling basis to allow visual inspection of insulated surfaces. The program will also be enhanced to require sampling and testing of groundwater every 4 years to confirm that the soil environment is non-aggressive to below-grade concrete structures. The enhancements will be made prior to entering the period of extended operation.

Inspection criteria will be enhanced to provide reasonable assurance that change in material properties, cracking, loss of material, loss of form, reduction or loss of isolation function, reduction in anchor capacity due local degradation, and loss of preload are adequately managed so that the intended functions of structures and components within the scope of the program are maintained consistent with the current licensing basis during the period of extended operation.

Inspection frequency is every four (4) years; except for submerged portions of the water-control structures, which will be inspected when dewatered or on a frequency not to exceed ten (10) years. The program contains provisions for more frequent inspections to ensure that observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process.

A.1.38 INSPECTION OF INTERNAL SURFACES IN MISCELLANEOUS PIPING AND DUCTING COMPONENTS - FRCT

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT aging management program is a new program that consists of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers and heat exchanger shells in the scope of license renewal at the Forked River Combustion Turbine power plant that are not covered by other aging management programs. These components are subject to an internal environment of indoor air that is assumed to include sufficient moisture content to result in loss of material aging effects. In addition, this program includes piping and mufflers with Diesel Engine Exhaust Gas as an internal environment. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. These inspections will be performed during the major combustion turbine inspection outages and will be performed on a frequency of at least once every 10 years.

The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

A.1.39 LUBRICATING OIL ANALYSIS PROGRAM - FRCT

The Lubricating Oil Analysis Program – FRCT is a new program that includes measures to verify the oil environment in mechanical equipment is maintained to the required quality. The Lubricating Oil Analysis Program – FRCT maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction in heat transfer. Lubricating oil testing activities include sampling and analysis of lubricating oil for detrimental contaminants. The presence of water or particulates may also be indicative of inleakage and corrosion product buildup. This program is augmented by the One Time Inspection – FRCT (B.1.24A) program, to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT. This program will be implemented prior to the period of extended operation.

A.2.5A PERIODIC INSPECTION PROGRAM - FRCT

The Periodic Inspection Program - FRCT is a new program that will consist of periodic inspections of selected components to verify the integrity of the system and confirm the absence of identified aging effects. Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years. The purpose of the inspection is to determine if a specified aging effect is occurring. If the aging effect is occurring, an evaluation will be performed to determine the effect it will have on the ability of affected components to perform their intended functions for the period of extended operation, and appropriate corrective action is taken.

Inspection methods may include visual examination, surface or volumetric examinations. Acceptance criteria are in accordance with manufacturers guidelines, applicable codes, and standards. When inspection results fail to meet established acceptance criteria, an evaluation will be conducted to identify actions or measures necessary to provide reasonable assurance that the component intended function is maintained during the period of extended operation.

The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

LICENSE

RENEWAL

COMMITMENT

LIST

A.5 LICENSE RENEWAL COMMITMENT LIST

The items in the table below include a revision to item 31 and new items 51, 52, 53, 54, 55, 56, 57, 58, 59, and 60.

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
31) Structures Monitoring Program	31) Structures Monitoring Program Existing program is credited. The program includes elements of the Masonry Wall Program and the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants aging management program. The Structures Monitoring Program will be enhanced to include: 1. Buildings, structural components and commodities that are not in scope of maintenance rule but have been determined to be in the scope of license renewal. These include miscellaneous platforms, flood and secondary containment doors, penetration seals, sump liners, structural seals, and anchors and embedment. 2. Component supports, other than those in scope of ASME XI, Subsection IWF. 3. Inspection of **Oyster Creek** external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the external surfaces will be the same as those specified for structural steel components and structural bolting. 4. The visual inspection of insulated surfaces will require the removal of insulation. Removal of insulation will be on a sampling basis that bounds insulation material type, susceptibility of insulated piping or component material to potential degradations that could result from being in contact with insulation, and system operating temperature.	A.1.31	Prior to the period of extended operation.	Section B.1.31

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
	5. Inspection of electrical panels and racks, junction boxes, instrument racks and panels, cable trays, offsite power structural components and their foundations, and anchorage. 6. Periodic sampling, testing, and analysis of ground water to confirm that the environment remains non-aggressive for buried reinforced concrete. 7. Periodic inspection of components submerged in salt water (Intake Structure and Canal, Dilution structure) and in the water of the fire pond dam, including trash racks at the Intake Structure and Canal. 8. Inspection of penetration seals, structural seals, and other elastomers for change in material properties. 9. Inspection of vibration isolators, associated with component supports other than those covered by ASME XI, Subsection IWF, for reduction or loss of isolation function. 10. The current inspection criteria will be revised to add loss of material, due to corrosion for steel components, and change in material properties, due to leaching of calcium hydroxide and aggressive chemical attack for reinforced concrete. Wooden piles and sheeting will be inspected for loss of material and change in material properties. 11. Periodic inspection of the Fire Pond Dam for loss of material and loss of form. 12. Inspection of Station Blackout System structures, structural components, and phase bus enclosure assemblies. 13. **Inspection of Forked River Combustion Turbine power plant external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the external surfaces will be the same as those specified for structural steel components and structural bolting.**			

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
51) Bolting Integrity - FRCT	The Bolting Integrity - FRCT aging management program is a new program that provides for condition monitoring of bolts and bolted joints within the scope of license renewal at the Forked River Combustion Turbine power plant. This program is based on the General Electric recommendations for proper bolting material selection, lubrication, preload application, installation and maintenance associated with the combustion turbine units and auxiliary systems. The program also includes periodic walkdown inspections for bolting degradation or bolted joint leakage at a frequency of at least once every four years. The program manages the loss of material and loss of preload aging effects. This new program will be implemented prior to entering the period of extended operation.	A.1.12A	Prior to the period of extended operation.	Section B.1.12A
52) Closed-Cycle Cooling Water System - FRCT	The Closed-Cycle Cooling Water System – FRCT aging management program is a new program that manages aging of piping, piping components, piping elements and heat exchangers that are included in the scope of license renewal for loss of material and cracking, and are exposed to a closed cooling water environment at the Forked River Combustion Turbine power plant. The Closed-Cycle Cooling Water System – FRCT aging management program relies on preventive measures to minimize corrosion by maintaining water chemistry control parameters and by performing system monitoring and maintenance inspection activities to confirm that the aging effects are adequately managed. Chemistry control, performance monitoring and inspection activities are based on industry-recognized guidelines of EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," for closed-cycle cooling water systems. Chemical control parameters will be monitored by annual water chemistry sampling. System operational monitoring activities will be performed at a frequency of at least once every six months. This new program will be implemented prior to entering the period of extended operation.	A.1.14A	Prior to the period of extended operation.	Section B.1.14A

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
53) Aboveground Steel Tanks - FRCT	The Aboveground Steel Tanks - FRCT aging management program is a new program that will manage corrosion of aboveground outdoor steel tanks. Paint coating is a corrosion preventive measure, and periodic visual inspections will monitor degradation of the paint coating and any resulting metal degradation of tank external surfaces. The aboveground tanks external surfaces will be visually inspected for coating degradation by walkdown at least once every two years. The Main Fuel Oil tank bottom is in contact with concrete and soil, and is inaccessible for visual inspection. Therefore, the program includes periodic Non-destructive wall-thickness examinations of the Main Fuel Oil tank bottom to verify that significant corrosion is not occurring. This program, including the initial tank external paint inspections, will be implemented prior to the period of extended operation. The recommended UT inspection of the Main Fuel Oil tank bottom was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections, and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional UT inspections will be performed prior to October 2020.	A.1.21A	Prior to the period of extended operation	Section B.1.21A
54) Fuel Oil Chemistry – FRCT	The Fuel Oil Chemistry - FRCT aging management program is a new program that provides assurance that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of Licensing Renewal. The Fuel Oil Storage Tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the American Society for Testing Materials (ASTM). Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM	A.1.22A	Prior to the period of extended operation.	Section B.1.22A

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
	Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The Fuel Oil Storage Tank will be periodically drained of accumulated water and sediment and will be periodically drained, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations. This new program will be implemented prior to entering the period of extended operation. The internal inspection of the Main Fuel Oil tank was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections and repairs, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional internal inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020.			
55) One-Time Inspection - FRCT	The One-Time Inspection – FRCT program will provide measures to verify that an aging management program is not needed, confirms the effectiveness of existing activities, or determines that degradation is occurring which will require evaluation and corrective action. The program will be implemented prior to the period of extended operation. Inspection methods will include visual examination or volumetric examinations. Should aging effects be detected, the program will initiate actions to characterize the nature and extent of the aging effect and determines what subsequent monitoring is needed to ensure intended functions are maintained during the period of extended operation.	A.1.24A	Prior to the period of extended operation.	Section B.1.24A

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
56) Selective Leaching of Materials -FRCT	The Selective Leaching of Materials - FRCT aging management program is a new program that will consist of inspections of components constructed of susceptible materials to determine if loss of material due to selective leaching is occurring. For the FRCT power plant, these are limited to copper alloy materials exposed to a closed cooling water environment. One-time inspections will be consist of visual inspections supplemented by hardness tests. If selective leaching is found, the condition will be evaluated to determine the ability of the component to perform its intended function until the end of the period of extended operation and for the need to expand inspections. This new program will be implemented in the time period after January 2018 and prior to January 2028.	A.1.25A	This new program will be implemented in the time period after January 2018 and prior to January 2028.	Section B.1.25A
57) Buried Piping Inspection – FRCT	The Buried Piping Inspection - FRCT aging management program is a new program that manages the external surface aging effects of loss of material for carbon steel piping and piping system components in a soil (external) environment. The program activities consist of preventive and condition-monitoring measures to manage the loss of material due to external corrosion for piping and piping system components in the scope of license renewal that are in a soil (external) environment. The program scope includes buried portions of glycol cooling water piping located at the Forked River Combustion Turbine station. External inspections of buried components will occur opportunistically when they are excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. This program will be implemented prior to entering the period of extended operation.	A.1.26A	Prior to the period of extended operation.	Section B.1.26A

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
58) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components- FRCT	The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT aging management program is a new program that consists of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers and heat exchanger shells in the scope of license renewal at the Forked River Combustion Turbine power plant that are not covered by other aging management programs. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. These inspections will be performed during the major combustion turbine inspection outages and will be performed on a frequency of at least once every 10 years. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.	A.1.38	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	Section B.1.38
59) Lubricating Oil Analysis Program - FRCT	The Lubricating Oil Analysis Program – FRCT is a new program that includes measures to verify the oil environment in mechanical equipment is maintained to the required quality. The Lubricating Oil Analysis Program – FRCT maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction in heat transfer. Lubricating oil testing activities include sampling and analysis of lubricating oil for detrimental contaminants. The presence of water or particulates may also be indicative of inleakage and corrosion product buildup. This program is augmented by the One Time Inspection – FRCT (B.1.24A) program, to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT. This new program will be implemented prior to the period of extended operation.	A.1.39	Prior to the period of extended operation.	Section B.1.39

Item Number	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
60) Periodic Inspection Program - FRCT	The Periodic Inspection Program - FRCT is a new program that will consist of periodic inspections of selected components to verify the integrity of the system and confirm the absence of identified aging effects. Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years. The purpose of the inspection is to determine if a specified aging effect is occurring. If the aging effect is occurring, an evaluation will be performed to determine the effect it will have on the ability of affected components to perform their intended functions for the period of extended operation, and appropriate corrective action is taken. Inspection methods may include visual examination, surface or volumetric examinations. When inspection results fail to meet established acceptance criteria, an evaluation will be conducted to identify actions or measures necessary to provide reasonable assurance that the component intended function is maintained during the period of extended operation. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.	A.2.5A	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	Section B.2.5A

AGING

MANAGEMENT

PROGRAMS

B.1.12A BOLTING INTEGRITY – FRCT

Program Description

The Bolting Integrity - FRCT aging management program is a new program that provides for condition monitoring of bolts and bolted joints within the scope of license renewal at the Forked River Combustion Turbine station. The Forked River Combustion Turbine power plant was originally designed and supplied by General Electric Company. This program is based on the General Electric recommendations for proper bolting material selection, lubrication, preload application, installation and maintenance associated with the combustion turbine units and auxiliary systems. The program also includes periodic walkdown inspections for bolting degradation or bolted joint leakage. The program manages the loss of bolting function, including loss of material and loss of preload aging effects. Bolted joint inspections rely on detection of visible leakage during routine observations and equipment maintenance activities.

NUREG-1801 Consistency

The Bolting Integrity - FRCT aging management program is consistent with the ten elements of aging management program XI.M18, "Bolting Integrity," specified in NUREG-1801 with the following exceptions:

Exceptions to NUREG-1801

- The Bolting Integrity – FRCT program does not specifically incorporate NRC and industry recommendations delineated in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants." The program also does not specifically address Electric Power Research Institute (EPRI) NP-5769 for safety-related bolting, or EPRI TR-104213. These documents were developed specifically for the nuclear power industry. The Forked River Combustion Turbine station is a non-nuclear fossil-fueled station.

  The Bolting Integrity – FRCT program was evaluated against the ten elements of aging management program XI.M18, "Bolting Integrity," specified in NUREG-1801. Each element is evaluated, and the associated portions of the element that are applicable to the Forked River Combustion Turbine power plant have been incorporated into this program. This program applies good industry bolting practices based on General Electric (the original FRCT designer and supplier) recommendations, supplemented with periodic walkdown inspections to confirm bolting integrity. The requirements for safety-related bolting, and bolting for nuclear steam supply system component supports, do not apply to the Forked River Combustion Turbine power plant.

- The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Bolting Integrity – FRCT aging management program is a new program to be implemented for bolting located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

This program covers bolting within the scope of license renewal at the Forked River Combustion Turbine power plant. There is no safety-related bolting or bolting for nuclear steam supply system (NSSS) component supports at the Forked River Combustion Turbine power plant. The program scope includes pressure-retaining component bolting and structural bolting used on the Forked River combustion turbine units and auxiliary systems and structures in the scope of license renewal. The Forked River Combustion Turbine power plant was originally designed and supplied by General Electric Company, and this program is based on the General Electric recommendations for proper bolting application and maintenance associated with the combustion turbine units and auxiliary systems.

2. Preventive Actions

Selection of bolting material and the use of lubricants and sealants is in accordance with the recommendations provided by General Electric. The GE Inspection and Maintenance manual for the units prescribe the specific sealants and lubricants to be used, and how and where they are applied. Bolting replacement activities include proper torquing of the bolts, proper alignment of flanges, and checking for proper mating surface contact after assembly based on the specific joint classification. Maintenance practices require the application of an appropriate preload, as specified in the General Electric Inspection and Maintenance Instructions for the combustion turbine units. Preload of gasketed joints is controlled by torque wrench or by measurement of bolt or stud elongation. Preload of joints with metal-to-metal contact is controlled by torque wrench, by measurement of bolt or stud elongation, or by head rotation.

3. Parameters Monitored/Inspected

This program monitors the effects of aging on the intended function of bolting associated with the Forked River Combustion Turbine power plant. There are no safety-related pressure retaining components or NSSS component supports at the Forked River Combustion Turbine power plant. Pressure retaining bolting at the Forked River Combustion Turbine power plant will be periodically inspected for signs of leakage. Other bolting will be inspected for signs of significant degradation including loss of material, loss of coating integrity, and obvious signs of corrosion, rust, or loose or missing bolts.

4. Detection of Aging Effects

Degradation of the pressure retaining closure bolting due to crack initiation, loss of prestress, or loss of material due to corrosion of the closure bolting would result in leakage. Periodic plant walkdowns will assure detection of leakage before the leakage becomes excessive such that the intended function of the Forked River Combustion Turbine power plant would be impacted.

In addition to leakage detection, plant walkdowns will include inspection of bolting for signs of significant degradation including loss of material, loss of coating integrity, and obvious signs of corrosion, rust, or loose or missing bolts.

5. Monitoring and Trending

Walkdown inspections for leakage and inspections for bolting degradation will be performed at least once every four years. Identified leakage will be monitored daily until repaired. Much of the equipment at the Forked River Combustion Turbine power plant is located outdoors, so even small leaks must be immediately isolated or repaired because of potential environmental concerns. If continued leakage is acceptable under the applicable permits and regulations, and if the leak rate does not increase, the inspection frequency may be decreased to biweekly or weekly.

6. Acceptance Criteria

Any indications of leaking pressure retaining bolting, or bolting degradation that could potentially lead to loss of system or component intended functions, will be evaluated and dispositioned in accordance with the corrective action process described below.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

In March 2004 (Unit 1 FRCT), GE Energy Services performed major inspection and maintenance activities and documented all work performed in an inspection reports dated June 7, 2004. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a major maintenance inspection. This was the first major inspection that was performed on the unit since initial installation in 1988. During final alignment of the load gear following the major inspection, three load gear anchor bolt studs failed. The cause of the failure was determined to be improper initial installation. All anchor bolt studs were repaired by welding new studs in place. The anchor bolts had not failed during the sixteen years of operation prior to the major outage.

There is no history of bolted joint failures resulting in loss of intended function of the combustion turbine units. Damaged and missing bolts have been identified in the hot exhaust gas plenum, but the exhaust system structural integrity was not compromised and the unit operability and reliability was not affected. Critical bolting associated with the combustion turbine assembly is inspected during maintenance inspections and replaced if required.

Numerous bolts and bolted joints were visually observed during walkdowns conducted during the combustion turbine Unit 2 major inspection outage that began in October 2005. Bolted joints, including pipe flanges, ventilation joints, pump casings and valve bonnets, were observed in indoor and outdoor environments, and were found to be in good condition with no signs of significant degradation or missing or loose bolts. Minor surface rust was observed on some outdoor bolting. The coating of painted bolting was observed to be in good condition. Bolting was observed on Unit 1, Unit 2, and common auxiliary systems.

The operating experience with the Forked River combustion turbines includes a significant number of past inspection activities that included observations of bolting and bolted joints. The documented inspection results provide objective evidence that existing environmental conditions are not resulting in significant bolting degradation that could result in a loss of the bolting intended functions. Past inspections have been performed at a various frequencies, as long at 16 years for some components, with the units performing reliably between inspections. Implementation of this new program will assure that proper bolting maintenance practices are continued, and that walkdown inspections for leakage and inspections for bolting degradation will be performed at least once every four years, providing reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

Conclusion

The Bolting Integrity – FRCT aging management program provides reasonable assurance that aging effects are adequately managed so that the intended functions of bolting within the scope of license renewal at the FRCT station are maintained consistent with the current licensing basis during the period of extended operation.

B.1.14A CLOSED-CYCLE COOLING WATER SYSTEM - FRCT

Program Description

The Closed-Cycle Cooling Water System – FRCT aging management program is a new program that manages aging of pumps, tanks, piping, piping components, piping elements and heat exchangers that are included in the scope of license renewal and are exposed to a closed cooling water environment at the Forked River Combustion Turbine power plant. This program incorporates experience with existing activities associated with the closed cooling water system, performed at the Forked River Combustion Turbine power plant. The closed cooling water environment at the Forked River Combustion Turbine power plant is a blended water-glycol based environment. This program includes preventive measures to minimize corrosion and stress corrosion cracking (SCC), and performance monitoring and maintenance inspection activities to monitor the effects of corrosion and SCC on the intended function of the components.

Preventive activities rely on maintenance of appropriate water chemistry control parameters within the specified limits of Electric Power Research Institute (EPRI) TR-107396 (Revision 1) for blended glycol formulations, to minimize corrosion and SCC. These control parameters include percent glycol or freeze point, and pH. EPRI TR-107396 (Revision 1) does not require monitoring of system corrosion inhibitor concentrations for blended glycol formulations, unless corrosion inhibitors have been added. If corrosion inhibitors are added, then EPRI TR-107396 (Revision 1) Section 5.9 requires that the corrosion inhibitor concentrations be monitored to within the range recommended by the corrosion inhibitor manufacturer. The FRCT Closed-Cycle Cooling Water System utilizes a proprietary inhibited glycol product and does not add supplemental corrosion inhibitors.

Performance monitoring provides indications of degradation in closed-cycle cooling water systems, with plant operating conditions providing indications of degradation in frequently operated systems. In addition, station maintenance inspections provide condition monitoring of heat exchangers exposed to closed-cycle cooling water environments. These measures will ensure that the intended functions of the systems and components serviced by the closed cooling water system are not compromised by aging.

NUREG-1801 Consistency

The Closed-Cycle Cooling Water System – FRCT aging management program is consistent with the ten elements of aging management program XI.M21, "Closed-Cycle Cooling Water System," specified in NUREG-1801 with the following exception.

Exceptions to NUREG-1801

- NUREG 1801 refers to EPRI TR-107396 Closed Cooling Water Chemistry Guidelines 1997 Revision. The Closed-Cycle Cooling Water System – FRCT aging management program will be based on the guidance provided in EPRI TR-107396, Revision 1, which is the 2004 revision to TR-107396. EPRI periodically updates industry water chemistry guidelines, as new information becomes available. The 2004 revision has been reviewed and the most significant difference is that the new revision provides more prescriptive guidance and has a more conservative monitoring approach. The 2004 revision meets the same requirements as the 1997 revision, for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems for effectively mitigating many aging effects.

- The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Closed-Cycle Cooling Water System – FRCT aging management program is a new program to be implemented for the components in the scope of license renewal and subject to a closed cycle cooling water environment located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

The scope of this program includes the closed cooling water systems in the scope of license renewal at the Forked River Combustion Turbine power plant. The closed cooling water systems at the Forked River Combustion Turbine power plant are not subject to significant sources of contamination and are subject to water chemistry control. The closed cooling water system on the diesel engine starter rejects heat to the associated combustion turbine unit closed cooling water system through a water-to-water shell and tube heat exchanger. The combustion turbine closed cooling water system rejects heat to the atmosphere through a mechanical draft cooling tower water to air copper tube and fin heat exchanger.

Components in the scope of this program include heat exchangers, piping and piping elements, pump casings, restricting orifices, strainer bodies, tanks, thermowells, and valve bodies.

2. Preventive Actions

The design of the Forked River Combustion Turbine power plant closed cooling water systems includes the use of appropriate materials for the anticipated environmental conditions. Internal linings and coating are not credited for license renewal aging management. Chemical control parameters, including percent glycol or freeze point, and pH, will be maintained in accordance with limits of EPRI TR-107396 (Revision 1) for blended glycol formulations, to minimize corrosion and SCC. The program includes monitoring and control of closed cooling water chemistry to minimize exposure to aggressive environments, and monitoring of these chemistry control parameters to mitigate general, crevice, and pitting corrosion as well as SCC.

3. Parameters Monitored/Inspected

This aging management program monitors the effects of corrosion and SCC by performance monitoring and maintenance inspection activities in accordance with guidance in EPRI TR-107396 (Revision 1) to evaluate system and component condition. For the diesel engine starter closed cooling water system components, the system temperature during engine operation will be monitored for signs of loss of cooling capability. No flowrate or pressure indication is available on the diesel engine starter closed cooling water (engine water jacket) system. For the combustion turbine unit closed cooling water system, performance parameters that will be monitored include combustion turbine lube oil temperature, closed cooling water temperature at the mechanical draft cooling tower heat exchanger inlet and outlet, closed cooling water head tank water level, and pump discharge pressure. Pump suction pressure and flowrate indication is not available on this portion of the closed cooling water system.

Portions of the closed cooling water system are periodically disassembled to perform maintenance and inspection activities on the combustion turbine unit. The lube oil heat exchanger is removed and disassembled during the major inspection outage, and the closed cooling water side of the heat exchanger is cleaned and inspected. The closed cooling water cooled flame detectors are periodically removed and tested for proper function. Recent inspections of the lube oil heat exchanger revealed only minor pitting of carbon steel components, and no significant signs of corrosion or wall thinning in the copper alloy tubes. Pump casings, piping and valve internal surfaces exposed to closed cooling water were also visually inspected, with no significant corrosion or wall thinning observed. These periodic inspections provide confirmation that the Forked River Combustion Turbine components subject to closed cooling water are not experiencing significant age related degradation. These inspections also provide confirmation that the closed cooling water chemistry has been adequately maintained to effectively manage the effects of aging.

Chemical parameters that will be monitored include percent glycol or freeze point, and pH.

4. Detection of Aging Effects

Control of water chemistry does not preclude corrosion or SCC at locations of stagnant flow conditions or crevices. Degradation of a component due to corrosion or SCC could result in degradation of system or component performance. Internal conditions of closed cooling water system components are visually inspected for signs of degradation when disassembled for combustion turbine maintenance and inspection activities. The Forked River Combustion Turbine power plant closed cooling water systems and associated components are frequently operated as they are put into service each time the associated combustion turbine is started to provide peaking power to the grid. Performance monitoring of the systems when in service ensures acceptable functioning of the closed cooling water system and associated combustion turbine components serviced by the system. Operational performance will be trended for evaluation of heat transfer capability and chemistry data trends. Flowrate indication is not available.

Water chemistry monitoring in accordance with EPRI TR-107396 (Revision 1) recommended frequency assures that the closed cooling water chemistry control parameters are maintained within required limits. Based on plant specific operating experience, the frequency of maintenance inspections and performance monitoring is adequate to assure detection of aging effects prior to loss of intended functions.

5. Monitoring and Trending

Chemical control parameters, including percent glycol or freeze point, and pH, will be maintained in accordance with limits of EPRI TR-107396 (Revision 1) for blended glycol formulations, to minimize corrosion and SCC. These parameters will be monitored by annual water chemistry sampling.

In accordance with EPRI TR-107396 (Revision 1), internal visual inspections and performance/functional tests will be performed periodically to demonstrate system operability and confirm the effectiveness of the program. Operational performance monitoring will evaluate heat removal capability of the system and provide for early detection of degradation of system components. For the diesel engine starter closed cooling water (engine water jacket) system, operational monitoring will include temperature monitoring during engine operation. For the combustion turbine unit closed cooling water portion of the system, operational monitoring will include lube oil temperature, closed cooling water temperature at the mechanical draft cooling tower heat exchanger inlet and outlet, closed cooling water head tank water level, and pump discharge pressure during unit operation. Based on system conditions observed during maintenance inspections, and plant specific operating experience, these operational parameters will be monitored and documented for trending at a frequency of at least once every six months.

6. Acceptance Criteria

Water chemistry control parameters will be maintained within the limits specified in the EPRI water chemistry guidelines for CCCW. Results of system and component performance monitoring and maintenance inspections will be evaluated in accordance with system and component design basis requirements. Acceptance criteria and tolerances are in accordance with manufacturer design requirements.

7. Corrective Actions

Water chemistry is controlled in accordance with EPRI TR-107396 (Revision 1) for blended glycol formulations which specifies following the vendor's sampling schedule and specific recommendations for adjusting the inhibitor package.

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

The Forked River Combustion Turbine power plant has not experienced a loss of intended function failure of components due to corrosion product buildup, through-wall loss of material, or SCC for components within the scope of license renewal that are subject to a closed-cycle cooling water environment.

The Forked River Combustion Turbine units undergo periodic major inspection outages in accordance with manufacturers recommendations. In March 2004 (Unit 1 combustion turbine), GE Energy Services performed major inspection and maintenance activities and documented all work performed in an inspection reports dated June 7, 2004. In October 2005, GE began a major inspection and maintenance outage on the Unit 2 combustion turbine. The scope of equipment inspections included the turbine and its internals and support equipment. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The combustion turbine lube oil heat exchangers were removed, disassembled and inspected during the major inspection outages performed on each combustion turbine unit. GE did not identify any significant degradation of these heat exchangers in the Unit 1 outage final report. The Unit 2 lube oil heat exchangers were visually inspected during the current (October 2005) outage, and were found to be in good condition with only minor pitting of carbon steel components, and no significant signs of corrosion or wall thinning in the copper alloy tubes. Pump casings, piping and valve internal surfaces exposed to closed cooling water were also visually inspected during this outage, with no significant corrosion or wall thinning observed.

Forked River Combustion Turbine power plant components in the scope of license renewal and exposed to closed cooling water, including head tanks, the water to air heat exchanger located at the mechanical draft cooling tower and the various heat exchangers cooled by the closed cooling water system, have not experienced loss of intended function failures due to age related degradation.

This operating experience provides objective evidence that the Forked River Combustion Turbine components subject to closed cooling water are not experiencing significant age related degradation, and that the closed cooling water chemistry has been adequately maintained to effectively manage the effects of aging. This new Closed-Cycle Cooling Water System – FRCT aging management program will include additional chemistry controls and component condition monitoring activities, providing further assurance that a non-corrosive environment is maintained, such that age related degradation will continue to be minimized.

Conclusion

The Closed-Cycle Cooling Water System – FRCT aging management program provides reasonable assurance that loss of material and cracking aging effects are adequately managed so that the intended functions of components exposed to closed-cycle cooling water environments within the scope of license renewal are maintained consistent with the current licensing basis during the period of extended operation.

B.1.21A ABOVEGROUND STEEL TANKS - FRCT

Program Description

The Aboveground Steel Tanks - FRCT aging management program will provide for management of loss of material aging effects for outdoor carbon steel storage tanks. The tanks included in this program are the Main Fuel Oil storage tank, the closed cooling water system head tanks located at the closed cooling water mechanical draft cooling towers, and the diesel starter jacket water (closed cooling water) head tanks located on the roof of the combustion turbine auxiliary enclosure. The program credits the application of paint coating as a corrosion preventive measure and includes periodic visual inspections to monitor degradation of the paint coating and any resulting metal degradation for the steel tanks.

Periodic internal UT inspections will be performed on the bottom of the outdoor steel Main Fuel Oil tank supported by earthen/concrete foundation. Other outdoor carbon steel tanks in the scope of this program are not directly supported by earthen or concrete foundations and therefore undergo external visual inspections without the necessity of bottom surface UT inspections.

The Main Fuel Oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. Other tanks in the scope of this program are raised tanks not directly supported by earthen or concrete foundations and do not have caulking or sealing. Therefore, inspection of sealant or caulking at the tank-foundation interface does not apply.

The Aboveground Steel Tanks - FRCT aging management program is a new program. External tank inspections will be at a frequency of every two years. Bottom surface UT inspections will be at a frequency of once every 20 years, based on plant specific operating experience with the Forked River Combustion Turbine power plant Main Fuel Oil storage tank. This program, including the initial tank external paint inspections, will be implemented prior to the period of extended operation. The recommended UT inspection of the Main Fuel Oil tank bottom was performed in October 2000, so it is not necessary to perform this initial inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections, and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years before the next internal inspection would be necessary. Therefore, UT inspections of the tank floor are not necessary prior to entering the period of extended operation, and will be performed again prior to October 2020.

NUREG-1801 Consistency

The Aboveground Steel Tanks - FRCT aging management program is consistent with the ten elements of aging management program XI.M29, "Aboveground Steel Tanks," specified in NUREG-1801, with the following exception:

Exceptions to NUREG-1801

The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Aboveground Steel Tanks - FRCT aging management program is a new program to be implemented for the aboveground steel tanks located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

This program consists of (a) preventive measures to mitigate corrosion by protecting the external surfaces of outdoor aboveground steel tanks with paint or coatings, and (b) periodic walkdowns to manage the effects of corrosion on the intended function of these tanks. The entire outer surface of the tanks is inspected, unless a surface is not accessible due to being in contact with soil or concrete. The tanks included in this program are the Main Fuel Oil storage tank, the closed cooling water system head tanks located at the closed cooling water mechanical draft cooling towers, and the diesel starter jacket water (closed cooling water) head tanks located on the roof of the combustion turbine auxiliary enclosure. The Main Fuel Oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. Periodic internal UT inspections will be performed on the bottom of this tank, to confirm adequate wall thickness.

2. Preventive Actions

In accordance with industry practice, the tanks at the Forked River Combustion Turbine power plant are coated with protective paint to mitigate corrosion by protecting the external surface of the tank from environmental exposure. The Main Fuel Oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. The Main Fuel Oil tank bottom is designed to extend beyond the tank wall and extend beyond the edge of the concrete foundation. This design precludes water from penetrating the interface.

3. Parameters Monitored/Inspected

This program utilizes periodic walkdowns to monitor degradation of tank coatings for the three tanks in the scope of the program. The condition of the coatings is directly related to the potential for loss of materials. The Main Fuel Oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. Raised tanks not directly supported by earthen or concrete foundations also do not have caulking or sealing. Therefore, inspection of sealant or caulking at the tank-foundation interface does not apply to the Aboveground Steel Tanks – FRCT aging management program. Periodic internal UT inspections will be performed on the bottom of this tank, to confirm adequate wall thickness.

4. Detection of Aging Effects

Degradation of exterior carbon steel surfaces cannot occur without degradation of paint or coatings on the outer surface. Periodic walkdowns are utilized to confirm that the tank paint coating is intact. Inspection of coating integrity is an effective method to manage the effects of corrosion on the external surface of the tanks.

The Main Fuel Oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. The Main Fuel Oil tank bottom is designed to extend beyond the tank wall and extend beyond the edge of the concrete foundation. This design precludes water from penetrating the interface. Therefore, inspection of sealant or caulking at the tank-foundation interface does not apply to the Aboveground Steel Tanks – FRCT aging management program.

Corrosion may occur at inaccessible locations, such as the tank bottom surface in contact with concrete or soil. Therefore, thickness measurements of the Main Fuel Oil tank bottom are taken to ensure that significant degradation is not occurring and the component intended function will be maintained during the extended period of operation.

5. Monitoring and Trending

The effects of corrosion of the aboveground external tank surfaces are detectable by visual techniques. Periodic walkdown inspections provide for timely detection of aging effects. The aboveground tanks external surfaces will be visually inspected for coating degradation by walkdown at least once every two years.

The effects of corrosion of the Main Fuel Oil storage tank bottom external surface (exposed to soil) are detectable by thickness measurement of the tank bottom. Thickness measurements will be performed at least once every 20 years, based on the current operating experience with this tank at the Forked River Combustion Turbine power plant. The results of these inspections are monitored and trended if significant material loss is detected.

6. Acceptance Criteria

Any degradation of tank paint is reported and will require further evaluation for potential impact on the associated tank intended function. Degradation consists of cracking, flaking, or peeling of the paint. For the Main Fuel Oil storage tank, thickness measurements of the tank bottom are evaluated against the tank minimum required design thickness, with consideration of actual corrosion rates that are occurring.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

Based on plant operating experience, painting has provided adequate protection to the external surfaces of outdoor steel tanks, such that loss of material due to external corrosion has not been a concern. Some coating degradation has been observed, and the resulting exposed steel surfaces have experienced minor surface rusting that does not impact the tank intended function. Implementation of this new program, prior to the period of extended operation, will result in specific evaluations of any identified coating degradation, including an assessment on the potential impact on the tank intended function. These periodic inspections of tank coatings provide reasonable assurance that the intended functions will be maintained.

A certified tank inspection company inspected the Main Fuel Oil tank on October 30, 2000. The inspection included ultrasonic testing (UT) of the floor, shell and roof, Magnetic Flux Leakage (MFL) testing of the floor with UT prove-up, level surveying of the foundation settlement and a thorough visual inspection of the entire tank structure.

The results of the MFL/UT inspection to detect floor underside corrosion indicate that some isolated underside corrosion is occurring. A total of eight MFL indications were found and evaluated, with the deepest underside corrosion pit measuring 0.185" remaining floor thickness. An analysis of corrosion rates since initial tank installation determined that a minimum 0.230" remaining floor thickness was required in order to certify the tank as acceptable until the next 20-year internal inspection. Four locations were identified below the required 0.230" thickness, and these locations were subsequently repaired with seal welded patch plates.

Visual inspection of the floor internal surface revealed 15 pits, with the deepest pit measuring 0.060" deep measured with a pit gauge. These pits were subsequently weld repaired.

Ultrasonic inspections at a number of locations on the shell and roof, coupled with a complete visual inspection of these areas, showed no signs of significant corrosion problems or structural deficiencies. There were no signs of service induced weld failures or leakage.

Early signs of paint failure were noted on the tank roof exterior surface.

The level survey indicated that the tank foundation is level within ¼".

The Main Fuel Oil Tank was found to be generally in good condition. With the repair of the identified floor corrosion, it was the professional opinion of the inspection firm that the tank is suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years before the next internal inspection will be necessary.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The external surfaces of the closed cooling water system head tanks located at the closed cooling water mechanical draft cooling towers, and the diesel starter jacket water (closed cooling water) head tanks located on the roof of the combustion turbine auxiliary enclosure, were visually inspected and did not show signs of significant paint degradation or metal corrosion. The Main Fuel Oil storage tanks were walked down, including ascending the tank stairs up the side of the tank to the tank roof. The tank walls did not show signs of significant paint degradation or metal corrosion. The tank roof was observed to have early signs of coating failure, as was noted in the tank inspection report discussed above. The underlying metal showed minor surface rust.

The operating experience with the aboveground steel tanks at the Forked River Combustion Turbine power plant provides objective evidence that existing environmental conditions are not causing significant material degradation that could result in a loss of component intended functions. Recent external inspections confirm that the exterior paint has prevented significant material degradation. Internal inspections of the Main Fuel Oil storage tank confirms that corrosion of the tank bottom is occurring at a rate that can be managed by the recommended future periodic inspections. Implementation of this new program will assure that the painted external tank surfaces are inspected at least once every two years, and that internal inspection of the Main Fuel Oil storage tank will be performed at least once every 20 years, providing reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

Conclusion

The new Aboveground Steel Tanks – FRCT aging management program periodic inspections will provide reasonable assurance that the aging effects of loss of material are adequately managed so that the intended functions of outdoor aboveground carbon steel storage tanks within the scope of license renewal are maintained consistent with the current licensing basis during the period of extended operation.

B.1.22A FUEL OIL CHEMISTRY - FRCT

Program Description

The Fuel Oil Chemistry - FRCT aging management program is a new program that provides assurance that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of Licensing Renewal. The Fuel Oil Storage Tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the American Society for Testing Materials (ASTM). Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The Fuel Oil Storage Tank will be periodically drained of accumulated water and sediment and will be periodically drained, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations.

NUREG-1801 Consistency

The Fuel Oil Chemistry – FRCT aging management program is a new program that is consistent with NUREG-1801 aging management program XI.M30, Fuel Oil Chemistry with the following exceptions:

Exceptions to NUREG-1801

- Preventive Actions (Element 2), Parameters Monitored/Inspected (Element 3), and Detection of Aging Effects (Element 4) require that fuel oil tanks be periodically sampled, drained of accumulated water and sediment, cleaned, and internally inspected. Multilevel sampling and tank bottom sampling of the diesel starter engines fuel oil tanks is not performed. These tanks are supplied directly from the Fuel Oil Storage Tank, which will be periodically sampled and analyzed. The diesel starter engines fuel oil tanks are small in size and experience a high turnover rate of the fuel stored within as a result of routine engine operations. Stratification of fuel is not likely to occur due to the high turnover rate. Additionally, the diesel starter engines fuel oil tanks are skid mounted and enclosed within the combustion turbine accessories compartment, which is maintained at a constant temperature during cold periods through operation of enclosure heaters. Maintaining temperature during cold periods minimizes thermal cycling and reduces the potential for condensation formation within the tanks. The periodic draining of water and sediment from the bottom of the diesel starter engines fuel oil tanks is therefore not required and the cleaning and internal inspection of the diesel starter engines fuel oil tanks is not necessary to verify degradation is not occurring due to the accumulation of particulate contamination and water and sediment.

- The Program Description, Scope of Program (Element 1), and Monitoring and Trending (Element 5) refer to plant technical specifications related to fuel oil quality. There are no plant technical specifications at the Forked River Combustion Turbine power plant.

- The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The new Fuel Oil Chemistry - FRCT aging management program is adequate to support the extended period of operation with no enhancements.

Evaluation and Technical Basis

1. Scope of Program

The new Fuel Oil Chemistry - FRCT aging management program includes activities that manage the conditions that cause general, pitting, and microbiological-influenced corrosion (MIC) of the Forked River Combustion Turbine Fuel Oil Storage Tank. The program relies on the sampling and analysis of new fuel oil and the periodic (quarterly) sampling and analysis of stored fuel oil to reduce the potential of exposure of the fuel oil tank internal surface to fuel oil contaminated with water and microbiological organisms. Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796.

2. Preventive Actions

As determined by chemistry analysis, the quality of fuel oil will be maintained by the addition of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. The Fuel Oil Storage Tank will be periodically (quarterly) drained of accumulated water and sediment to reduce the amount of water and sediment that may accumulate in the Fuel Oil Storage Tank sump and to reduce the length of contact time.

3. Parameters Monitored/Inspected

ASTM Standard D 4057 will be used for guidance on multilevel and tank bottom oil sampling. ASTM Standard D 1796 or ASTM Standard D 2709 will be used for the determination of water and sediment. ASTM recommends the use of D 2709 for determination of water and sediment in grades D1 and D2 fuel. ASTM D 1796 is intended for testing higher viscosity fuels that may be used at the Forked River Combustion Turbine. Modified ASTM Standard D 2276 Method A or ASTM Standard D 6217 will be used for the determination of particulate contamination. The modification to Method A of ASTM D 2276 consists of using a filter with a pore size of 3.0 μm, instead of 0.8 μm.

4. Detection of Aging Effects

ASTM Standard D 4057 will be used for guidance on multilevel and tank bottom oil sampling. ASTM Standard D 1796 or ASTM Standard D 2709 will be used for the determination of water and sediment. ASTM recommends the use of D 2709 for determination of water and sediment in grades D1 and D2 fuel. ASTM D 1796 is intended for testing higher viscosity fuels that may be used at the Forked River Combustion Turbine. Modified ASTM Standard D 2276 Method A or ASTM Standard D 6217 will be used for the determination of particulate contamination. The modification to Method A of ASTM D 2276 consists of using a filter with a pore size of 3.0 μm, instead of 0.8 μm.

The Fuel Oil Storage Tank will be periodically drained, cleaned and internally inspected to ensure that significant degradation is not occurring on the tank bottom surface. Ultrasonic thickness measurements of the tank bottom will be taken to verify the lack of significant degradation due to the loss of material aging effect. The internal inspection of the Main Fuel Oil tank was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections and repairs, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional internal inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020. Internal tank inspections will be performed at a 20-year frequency based on operating experience (see OE, Element 10).

5. Monitoring and Trending

The new Fuel Oil Chemistry - FRCT aging management program will provide for the monitoring and trending of water and biological activity or particulate contamination concentrations for timely detection of conditions conducive to corrosion of the internal surface of the Fuel Oil Storage Tank. Multilevel samples of the Fuel Oil Storage Tank will be analyzed for particulate contamination and water and sediment quarterly. Tank bottom samples will be analyzed for particulate contamination and water and sediment quarterly. In the event the acceptance criteria for stored fuel oil are exceeded, corrective actions will be initiated. This action enters the out-of-spec condition(s) into the corrective action program.

6. Acceptance Criteria

ASTM Standard D 4057 will be used for guidance on multilevel and tank bottom oil sampling. ASTM Standard D 1796 or ASTM Standard D 2709 will be used for the determination of water and sediment. ASTM recommends the use of D 2709 for determination of water and sediment in grades D1 and D2 fuel. ASTM D 1796 is intended for testing higher viscosity fuels that may be used at the Forked River Combustion Turbine. Modified ASTM Standard D 2276 Method A or ASTM Standard D 6217 will be used for the determination of particulate contamination. The modification to Method A of ASTM D 2276 consists of using a filter with a pore size of 3.0 μm, instead of 0.8 μm.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

Corrective Actions for non-compliant (e.g., out-of-specification) fuel oil will be evaluated on an individual case basis. Depending on the severity of the non-compliance, corrections may include draining water and sediment from the bottom of the tank, the addition of stabilizers, biocides, or corrosion inhibitors, or the complete draining and cleaning of the fuel oil tank. Non-compliances not corrected will be evaluated to ensure that the intended function of the fuel oil system will be maintained.

8. Confirmation Process

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Administrative Controls element is not accomplished in accordance with the AmerGen quality assurance (QA) program or the requirements of 10 CFR Part 50, Appendix B. However, the Fuel Oil Chemistry – FRCT aging management program implementing documents will be administratively controlled and will include a formal review and approval process.

10. Operating Experience

Fuel oil chemistry activities have been proven to be effective in managing the aging effects associated with fuel oil systems so that the intended functions of components within the scope of license renewal will be maintained during the period of extended operation. On October 30, 2000 to satisfy the requirements of the American Petroleum Institute's (API's) Standard No. 653 entitled Tank Inspection, Repair, Alteration, and Reconstruction, TAQ, Inc. performed an "out-of-service" inspection of the Forked River Combustion Turbine Fuel Oil Storage Tank . The inspection included ultrasonic testing (UT) and visual (VT) inspection of the floor. The inspection was performed by an API-653 Certified Tank Inspector after 10 years of service (date of original tanks construction was 1989).

The following summary is provided concerning tank floor inspections:

Visual (VT) inspection of the floor revealed 15 "product side" pits with the deepest pit measuring 0.060" deep (measured by pit gauge). The pitting was weld repaired.

The floor is equipped with a 24" sump serviced by a 4" water draw-off line. There was no topside corrosion noted on the sumps floor and walls and UT inspection to detect underside corrosion revealed no appreciable corrosion.

Based on the above findings, it was the professional opinion of the qualified inspector that the Forked River Fuel Oil Storage Tank will be suitable for the storage of no. 2 fuel oil for a period of time not to exceed 20 years before the next internal inspection.

In October 2001 (Unit 2 FRCT) and March 2004 (Unit 1 FRCT), GE Energy Services performed major inspection and maintenance activities and documented all work performed in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a major maintenance inspection. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection, the fuel forwarding pumps were removed and sent to the General Electric service shop for cleaning, inspection and repairs. The GE report does not indicate any issues associated with degradation of these pump casings.

The Unit 2 inspection was a fuel nozzle and combustion section inspection. The inspection included a borescope and combustion inspection, removal of exhaust frame cooling piping and disconnection of the fuel lines for inspection, and fuel nozzle inspection, repair, and testing. The GE report does not identify any issues with the disassembled fuel oil piping.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The internal surfaces of disassembled stainless steel fuel oil piping were observed, and there were no signs of corrosion or wall thinning.

The fuel forwarding pump discharge filters are regularly replaced. During filter replacement, filter housing internal surfaces have been visually inspected and signs of significant corrosion have not been identified.

The operating experience with the Forked River combustion turbines includes a number of past inspection activities of components in a fuel oil environment. The documented inspection results provide objective evidence that existing fuel oil environmental conditions are not causing material degradation that could result in a loss of component intended functions. Recent inspections indicate that component surfaces subject to fuel oil environments are in good material condition and not experiencing significant age related degradation. This operating experience with the combustion turbine system components subject to a fuel oil environment demonstrates that the combustion turbine fuel oil system has not experienced significant intrusion of water and contaminants that would result in aging degradation. This new Fuel Oil Chemistry – FRCT program will provide additional assurance that water and contaminant concentrations are minimized, such that age related degradation will continue to be minimized.

Conclusion

The Fuel Oil Chemistry - FRCT aging management program provides reasonable assurance that the aging effects associated with fuel oil systems will be effectively managed so that the intended functions of components within the scope of license renewal are maintained during the period of extended operation.

B.1.24A ONE-TIME INSPECTION - FRCT

Program Description

The One-Time Inspection - FRCT aging management program is a new program that will provide reasonable assurance that the loss of material and loss of heat transfer aging effects are not occurring, or that the aging effects are occurring slowly enough to not affect the fuel oil and lubricating oil system components intended functions during the period of extended operation, and therefore will not require additional aging management. The program is credited for components in fuel oil and lubricating oil environments where either (a) an aging effect is not expected to occur but there is insufficient data to completely rule it out, (b) an aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected, or (c) the characteristics of the aging effect include a long incubation period.

The One-Time Inspection – FRCT will be used only to provide assurance that loss of material and loss of heat transfer for components subject to FRCT fuel oil and lubricating oil environments are not occurring, or that the aging effects are insignificant. It will not be used to confirm that aging is not occurring or insignificant in other FRCT environments.

The One-Time Inspection – FRCT will be used to verify that the fuel oil and lubricating oil systems activities are effective in preventing or minimizing aging to the extent that it will not cause the loss of intended function during the period of extended operation. The program will require inspection at locations of low or stagnant flow, which are susceptible to water pooling and gradual accumulation or concentration of agents that promote loss of material and loss of heat transfer. The program will provide inspections that either verifies that unacceptable loss of material or loss of heat transfer is not occurring or initiates additional actions that will assure the intended function of affected components will be maintained during the period of extended operation.

The new program elements include (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. When evidence of an aging effect is revealed by a one-time inspection, an evaluation of the inspection results will be perform to identify appropriate corrective actions.

The inspection sample includes "worse case" one-time inspection of more susceptible materials in the fuel oil and the lubricating oil environments (e.g., low or stagnant flow areas) to manage the effects of aging. Examination methods will include visual examination and/or volumetric examinations. Acceptance criteria are based on the design codes and standards for the Forked River Combustion Turbines and manufacturer's recommendations.

The One-Time Inspection - FRCT aging management program will be implemented prior to the period of extended operation.

NUREG-1801 Consistency

The One-Time Inspection - FRCT aging management program is consistent with the ten elements of aging management program XI.M32, "One-Time Inspection," specified in NUREG-1801 with the following exceptions:

Exceptions to NUREG-1801

Parameters Monitored/Inspected (Element 3) and Detection of Aging Effects (Element 4) require that Inspections be performed by qualified personnel following procedures consistent with the requirements of ASME Code and 10 CFR 50, Appendix B. The Forked River Combustion Turbine fuel oil and lubricating oil systems are not designed to ASME requirements and are not safety-related. Thus, ASME requirements are not applicable and AmerGen has elected not to include the One-Time Inspection – FRCT under 10 CFR 50 Appendix B requirements. Personnel qualified to industry standards using approved procedures consistent with the combustion turbine manufacturer's recommendations will perform the inspections. The One-Time Inspection – FRCT will be conducted under a separate quality assurance activity specifically developed for Forked River Combustion Turbines as discussed in the Corrective Actions, Confirmation Process, and Administrative Controls elements.

The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The One-Time Inspection - FRCT aging management program is a new program that will confirm aging effects are adequately managed for components in the scope of license renewal and subject lubricating oil and fuel oil environment located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

The program will include measures to verify that unacceptable degradation is not occurring, thereby validating the effectiveness of existing Forked River Combustion Turbines fuel oil and lubricating oil practices. The structures and components for which one-time inspection is specified to verify the effectiveness of existing fuel oil and lubricating oil activities and practices include piping, piping components, piping elements, pump casings, heat exchangers, expansion and flexible joints included in the scope of license renewal and exposed to fuel oil and lubricating oil environments. These inspections provide confirmation that continuation of existing practices, plus implementation of additional controls in accordance with the Fuel Oil Chemistry – FRCT and Lubrication Oil Analysis Program – FRCT, will manage aging-related degradation for the period of extended operation.

2. Preventive Actions

One-time inspection is an inspection activity independent of methods to mitigate or prevent degradation.

3. Parameters Monitored/Inspected

The program monitors parameters directly related to the loss of material and loss of heat transfer of the fuel oil and the lubricating oil system components. Qualified personnel will perform inspections using procedures developed consistent with industry standards and the Forked River Combustion Turbine manufacturer's recommendations. Inspection methods consist of nondestructive examination (NDE), including visual, volumetric, and surface techniques.

4. Detection of Aging Effects

The new program will include (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation. When evidence of an aging effect is revealed by a one-time inspection, an evaluation of the inspection results will be performed to identify appropriate corrective actions.

The inspection sample will include "worse case" one-time inspection of more susceptible materials in the fuel oil and the lubricating oil environments (e.g., low or stagnant flow areas) to manage the effects of aging. Examination methods will include visual examination and/or volumetric examinations (UT).

5. Monitoring and Trending

The program will provide for increasing of the inspection sample size and locations in the event that aging effects are detected. Determination of the sample size will be based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience. Unacceptable inspection findings are evaluated in accordance with the FRCT corrective action process to determine the need for subsequent (including periodic) inspections and for monitoring and trending the results.

6. Acceptance Criteria

Inspection results will be evaluated by qualified personnel to determine if loss of material or loss of heat transfer is occurring. If a loss of material is identified, the results are compared to the applicable design minimum wall thickness. Identified fouling that could result in a loss of heat transfer will be evaluated in accordance with design standards for the combustion turbine for impact on heat transfer performance. Additional evaluations will be performed to a) determine the need for follow-up inspections to monitor the progression of aging degradation, b) identify appropriate corrective actions to mitigate any excessive loss of material or loss of heat transfer, and c) determine if repair/replacement is required. Corrective actions, if necessary, would expand to include other components.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

In October 2001 (Unit 2 FRCT) and March 2004 (Unit 1 FRCT), GE Energy Services performed major inspection and maintenance activities and documented all work performed in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a major maintenance inspection. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection, the fuel forwarding pumps and emergency DC lube oil pumps were removed and sent to the General Electric service shop for cleaning, inspection and repairs. The GE report does not indicate any issues associated with degradation of these pump casings. The combustion turbine lube oil system was drained, cleaned and inspected. Various pumps were inspected, and the lube oil coolers were cleaned. No degradation of these components was identified. The main lube oil pump was disassembled and inspected, and no defects were observed.

The Unit 2 inspection was a fuel nozzle and combustion section inspection. The lube oil filters were replaced. The inspection included a borescope and combustion inspection, removal of exhaust frame cooling piping and disconnection of the fuel lines for inspection, and fuel nozzle inspection, repair, and testing. The GE report does not identify any issues with the disassembled fuel oil piping.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The internal surfaces of disassembled stainless steel piping and flexible hoses were observed, and there were no signs of corrosion or wall thinning. The combustion turbine lube oil heat exchangers were dissembled, cleaned and inspected. The carbon steel and copper alloy heat exchanger components normally exposed to lubricating oil were found to be in excellent condition. The standby heat exchanger that is not normally in service was found to have some minor accumulation of sediment that was cleaned off. Carbon steel pump casings that are normally submerged in the lubricating oil reservoir were visually observed to be in excellent condition, with no signs of corrosion. The carbon steel internal surfaces of the lubricating oil reservoir were also observed to be in excellent condition, with no signs of corrosion.

The fuel forwarding pump discharge filters are regularly replaced. During filter replacement, filter housing internal surfaces have been visually inspected and signs of significant corrosion have not been identified.

The operating experience with the Forked River combustion turbines includes a significant number of past inspection activities of components in the scope of this one-time inspection program. The documented inspection results provide objective evidence that existing lubricating oil and fuel oil environmental conditions are not causing material degradation that could result in a loss of component intended functions. Past inspections have been performed at a frequency as long at 16 years, with the units performing reliably between inspections. Recent inspections indicate that component surfaces subject to lubricating oil and fuel oil environments are in good material condition and not experiencing significant age related degradation. Implementation of this new one-time inspection program will provide for additional inspections to monitor aging in these environments, providing reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

Conclusion

The new One-Time Inspection – FRCT aging management program will provide reasonable assurance that either an aging effect is not occurring, or the aging effect is occurring so slowly that the intended function of fuel oil and lubricating oil systems consistent with the current licensing basis is not affected. These inspections provide confirmation that continuation of existing practices, plus implementation of additional controls in accordance with the Fuel Oil Chemistry – FRCT and Lubrication Oil Analysis Program – FRCT, will manage aging-related degradation for the period of extended operation.

B.1.25A SELECTIVE LEACHING OF MATERIALS - FRCT

Program Description

The Selective Leaching of Materials – FRCT aging management program ensures the integrity of the components that may be susceptible to selective leaching at the Forked River Combustion Turbine power plant. The aging management program (AMP) includes a one-time visual inspection and hardness measurement of selected components to determine whether loss of materials due to selective leaching is occurring, and whether the process will affect the ability of the components to perform their intended function for the period of extended operation.

The one-time inspection program includes visual inspections, hardness tests and other appropriate examination methods as may be required to confirm or rule out selective leaching, and to evaluate the remaining component wall thickness when leaching is identified. Components of the susceptible materials at the FRCT site are comprised of copper alloy materials exposed to a treated water (Closed Cooling Water (CCW)) environments. The purpose of the program is to determine if loss of material due to selective leaching of the zinc component of the alloy (dezincification) is occurring. If selective leaching is found, the program provides for evaluation as to the effect it will have on the ability of the affected components ability to perform their intended function for the period of extended operation.

The Selective Leaching of Materials - FRCT aging management program is a new program. This new program will be implemented in the final 10 years of the period of extended operation.

NUREG-1801 Consistency

The Selective Leaching of Materials - FRCT aging management program is consistent with the ten elements of aging management program XI.M33, "Selective Leaching of Materials," specified in NUREG-1801, with the following exception:

Exceptions to NUREG-1801

The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Selective Leaching of Materials - FRCT aging management program is a new program to be implemented for the components in the scope of license renewal and potentially subject to selective leaching at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program:

The scope of this program includes the FRCT components that may be susceptible to selective leaching and assesses their ability to perform the intended function during the period of extended operation. These components include valve bodies and heat exchanger components. The materials of construction for these components include bronze and copper alloys. These components are exposed to a treated water (CCW) environment. The AMP includes a one-time visual inspection and hardness measurement of a selected set of sample components to determine whether loss of material due to selective leaching is not occurring for the period of extended operation. Laboratory examinations may be performed if visual inspections and hardness tests are unfeasible or inconclusive.

The selective leaching process involves the preferential removal of one of the alloying elements from the material, which leads to the enrichment of the remaining alloying elements. Dezincification (loss of zinc from brass) and graphitization (removal of iron from cast iron) are examples of such a process. Susceptible materials, high temperatures, stagnant-flow conditions, and corrosive environment such as acidic solutions, for example, for brasses with high zinc content, and dissolved oxygen, are conducive to selective leaching.

The Forked River Combustion Turbine power plant does not have cast iron components within the scope of License Renewal exposed to raw or treated water. The CCW environment at Forked River is not acidic.

2. Preventive Actions:

The Selective Leaching of Materials - FRCT program consists of inspection/verification activities including hardness tests that detect component degradation prior to loss of their intended functions. As such, there are no preventive or mitigative attributes associated with these activities. In the FRCT CCW systems, water chemistry parameters are monitored. This activity and the corrosion-inhibiters in the glycol coolant are considered effective in reducing selective leaching.

3. Parameters Monitored/Inspected:

The visual inspection and hardness measurement is to be a one-time sample inspection. Because selective leaching is a slow acting corrosion process, this measurement is normally performed just before the end of the initial license, which would be between 35 and 40 years of service. Since the Forked River power plant was installed in 1988, the components will not be in service for 40 years until the year preceding the end of the period of extended operation at Oyster Creek. As such, inspections for selective leaching will be performed in the final 10 years of the period of extended operation. Follow-up of unacceptable inspection findings includes expansion of the inspection sample size.

4. Detection of Aging Effects:

The one-time visual inspection and hardness measurement includes close examination of a select set of components to determine whether selective leaching has occurred and whether the resulting loss of strength and/or material will affect the intended functions of these components during the period of extended operation. Selective leaching generally does not cause changes in dimensions and is difficult to detect. However, in certain brasses it causes plug-type dezincification, which can be detected by visual inspection. The FRCT selective leaching program visually inspects the susceptible components closely and conducts hardness testing on the surfaces of the selected set of components to determine if selective leaching has occurred. Laboratory examinations may be performed if visual inspections and hardness tests are unfeasible or inconclusive. If selective leaching is occurring, an engineering evaluation is initiated to determine acceptability of the affected components for further service.

5. Monitoring and Trending:

There is no monitoring and trending for the one-time visual inspection and hardness measurement. Inspection results that identify selective leaching will be submitted for engineering evaluation so that the components ability to perform its intended function for the extended period of operation will be ensured.

6. Acceptance Criteria:

The presence of selective leaching will trigger engineering evaluations that will determine the individual component's continued use (depth of leaching vs. min-wall requirements), and as necessary a root cause analysis. An evaluation that indicates the end-of-life (violation of minimum wall thickness) of the component prior to the end of the period of extended operation will be considered unacceptable and result in the requirement for additional component inspections and/or replacements.

7. Corrective Actions:

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process:

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls:

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

Selective leaching 'one-time' inspection process is consistent with industry and staff guidance in the inspection techniques utilized and the selection of components inspected. Selective leaching has not been identified at the Forked River Combustion Turbine power plant.

In March 2004 (Unit 1 FRCT), GE Energy Services performed major inspection and maintenance activities and documented all work performed in an inspection report dated June 7, 2004. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a major maintenance inspection. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection the combustion turbine lubricating oil system was drained, cleaned and inspected. The equipment inspections included the lube oil coolers subject to the closed cooling water environment. The coolers were removed from the sump, cleaned and inspected. No degradation of these components was identified.

Unit 2 began a major outage inspection in October 2005. The combustion turbine lubricating oil heat exchangers were dissembled, cleaned and inspected. Based on visual observations, the copper alloy heat exchanger components normally exposed to closed cooling water appeared to be in excellent condition. The tube ends at the tube sheet did not show signs of significant wall thinning.

The operating experience with the combustion turbine system heat exchangers subject to a closed cooling water environment and potentially subject to selective leaching, demonstrates that selective leaching has not been an identified concern. This operating experience demonstrates that either the FRCT closed cooling water environment is less conducive to selective leaching, or that selective leaching is occurring slowly enough as to not yet become evident. Because selective leaching is a slow acting corrosion process, this program will include inspections for selective leaching within the final 10 years of the period of extended operation.

Conclusion

The Selective Leaching of Materials – FRCT aging management program provides reasonable assurance that the loss of material aging effects due to selective leaching will be effectively managed so that the intended functions of components within the scope of license renewal are maintained during the period of extended operation.

B.1.26A BURIED PIPING INSPECTION - FRCT

Program Description

The Buried Piping Inspection - FRCT aging management program is a new aging management program and includes preventive measures to mitigate corrosion and periodic inspection of external surfaces for loss of material to manage the effects of corrosion on the pressure-retaining capacity of carbon steel piping in a soil (external) environment. Preventive measures are in accordance with standard industry practices for maintaining external coatings and wrappings. External inspections of buried piping will occur opportunistically when excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period.

NUREG-1801 Consistency

The Buried Piping Inspection - FRCT aging management program is consistent with the ten elements of aging management program XI.M.34, "Buried Piping and Tanks Inspection," specified in NUREG-1801.

Exceptions to NUREG-1801

The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Buried Piping Inspection – FRCT aging management program is a new program to be implemented for the buried piping located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

This program relies on existing pipe coating and wrapping as a preventive measure, and periodic inspection for loss of material caused by corrosion of the external surface of buried carbon steel piping. There are no buried tanks in the scope of this program or in the scope of license renewal at the Forked River Combustion Turbine power plant. Buried piping is exposed to a soil environment that may be sufficiently aggressive to result in loss of material caused by general, pitting, and crevice corrosion, and microbiologically-influenced corrosion (MIC). Periodic inspections are performed when the components are excavated for maintenance or for any other reason. The scope of the program covers buried carbon steel portions of the glycol cooling water piping at the Forked River Combustion Turbine power plant that is within the scope of license renewal.

2. Preventive Actions

In accordance with industry practice, the underground piping at the Forked River Combustion Turbine power plant was coated during installation with a protective coating system to protect the piping from contacting the potentially aggressive soil environment.

3. Parameters Monitored/Inspected

This program monitors parameters such as coating and wrapping integrity that are directly related to corrosion damage of the external surface of buried steel piping. Coatings and wrappings are inspected by visual techniques. Coatings and wrappings will be inspected for any evidence of damaged wrapping or coating defects, such as coating perforation, holidays, or other damage, that is an indicator of possible corrosion damage to the external surface of the piping.

4. Detection of Aging Effects

Inspections will be performed to confirm that coating and wrapping are intact. These inspections are an effective method to ensure that corrosion of external surfaces has not occurred and the intended function is maintained. Buried piping will be opportunistically inspected whenever excavated for maintenance. The inspections will be performed on all of the areas made accessible to support the maintenance activity.

It is anticipated that one or more opportunistic inspections may occur within a ten-year period. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. Inspections will be performed in areas with the highest likelihood of corrosion problems, and in areas with a history of corrosion problems, if any. The Forked River Combustion Turbine power plant has not had a history of corrosion problems on the exterior surfaces of buried piping, to date.

5. Monitoring and Trending

Results of any previous inspections will be used to identify susceptible locations for future inspections.

6. Acceptance Criteria

Any coating and wrapping degradations, and any associated piping degradation, will be reported and evaluated in accordance with the Forked River Combustion Turbine power plant corrective actions procedures.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

The Buried Piping Inspection – FRCT aging management program is a new program that will be effective in managing aging degradation for the period of extended operation by providing timely detection of aging effects and implementation of appropriate corrective actions prior to loss of system or component intended functions. To date, there have been no buried pipe leaks due to external degradation at the Forked River Combustion Turbine power plant.

The buried piping at the Forked River Combustion Turbine power plant that is included in the scope of license renewal is the glycol filled cooling water piping that is routed below grade between the combustion turbines and the mechanical draft cooling towers. A head tank normally pressurizes the system, and the head tank includes level monitoring instrumentation. There is no history of buried pipe leaks in this system.

Based on plant operating experience, coatings and wrappings have provided adequate protection to the external surfaces of buried piping such that loss of material due to external corrosion has not been a concern. Thus inspection of buried piping when excavated for maintenance provides reasonable assurance that the intended functions will be maintained. Inspections will be performed within ten tears of entering the period of extended operation, and again within ten years after entering the period of extended operation, unless opportunistic inspections occur within each of these ten-year periods.

Conclusion

The Buried Piping Inspection - FRCT aging management program will provide reasonable assurance that the aging effects on the external surfaces of buried piping are adequately managed so that the intended functions of components within the scope of license renewal are maintained consistent with the current licensing basis during the period of extended operation.

B.1.31 STRUCTURES MONITORING PROGRAM

Program Description

The Structures Monitoring Program provides for aging management of structures and structural components, including structural bolting, within the scope of license renewal. The program was developed based on guidance in Regulatory Guide 1.160 Revision 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and NUMARC 93-01 Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," to satisfy the requirement of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,"

The scope of the program also includes condition monitoring of masonry walls and water-control structures as described in the Masonry Wall Program and in the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants, aging management program. As a result, the program elements incorporate the requirements of NRC IEB 80-11, "Masonry Wall Design", the guidance in NRC IN 87-67, "Lessons learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11", and the requirements of NRC Regulatory Guide 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants."

The program relies on periodic visual inspections by qualified personnel to monitor structures and components for applicable aging effects. Specifically, concrete structures are inspected for loss of material, cracking, and a change in material properties. Steel components are inspected for loss of material due to corrosion. Masonry walls are inspected for cracking, and elastomers will be monitored for a change in material properties. Earthen structures associated with water-control structures and the Fire Pond Dam will be inspected for loss of material and loss of form. Component supports will be inspected for loss of material, reduction or loss of isolation function, and reduction in anchor capacity due to local concrete degradation. Exposed surfaces of bolting are monitored for loss of material, due to corrosion, loose nuts, missing bolts, or other indications of loss of preload. The program relies on procurement controls and installation practices, defined in plant procedures, to ensure that only approved lubricants and proper torque are applied consistent with the NUREG-1801 bolting integrity program.

The scope of the program will be enhanced to include structures that are not monitored under the current term but require monitoring during the period of extended operation. Details of the enhancements are discussed below.

Inspection frequency is every four (4) years; except for submerged portions of water- control structures, which will be inspected when the structures are dewatered, or on a frequency not to exceed 10 years. The program contains provisions for more frequent inspections to ensure that observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process

NUREG-1801 Consistency

The Structures Monitoring Program is consistent with the ten elements of aging management program XI.S6,"Structures Monitoring Program," specified in NUREG-1801.

Exceptions to NUREG-1801

None.

Enhancements

The scope of the program will be increased to add buildings, structural components and commodities that are not in scope of maintenance rule but have been determined to be in the scope of license renewal. These include miscellaneous platforms, flood and secondary containment doors, penetration seals, liner for sumps, structural seals, and anchors and embedment.

The scope of the program will be enhanced to include Station Blackout System Structures, structural components, and phase bus enclosure assemblies. Inspection frequency, inspection methods, and acceptance criteria will be the same as those specified for other structures in scope of the program.

The scope of the program will be increased to include component supports, other than those in scope of ASME XI, Subsection IWF.

The scope of the program will be enhanced to include inspection of external surfaces of Oyster Creek and Forked River Combustion Turbine mechanical components that are not covered by other programs, including exterior surfaces of HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the exterior surfaces will be the same as those specified for structural steel components and structural bolting.

The program will be enhanced to require removal of piping and component insulation to permit visual inspection of insulated surfaces. Removal of insulation will be on a sampling basis that bounds insulation material type, susceptibility of insulated piping or component material to potential degradations that could result from being in contact with insulation, and system operating temperature.

The program will provide for inspections of, electrical panels and racks, junction boxes, instrument racks and panels, cable trays, offsite power structural components and their foundations, and anchorage.

The program will provide for periodic sampling and testing of ground water and review its chemistry data to confirm that the environment remains non-aggressive for buried reinforced concrete.

The program will provide for periodic inspection of components submerged in salt water (Intake Structure and Canal, Dilution structure) and in the water of the fire pond dam, including trash racks at the Intake Structure and Canal.

The program will require inspection of penetration seals, structural seals, and other elastomers for change in material properties by inspecting the elastomers for cracking and hardening.

The program will require inspection of vibration isolators, associated with component supports other than those covered by ASME XI, Subsection IWF, for reduction or loss of isolation function by inspecting the isolators for cracking and hardening.

The current inspection criteria will be enhanced to add loss of material, due to corrosion for steel components, and change in material properties, due to leaching of calcium hydroxide and aggressive chemical attack for reinforced concrete. Accessible wooden piles and sheeting will be inspected for loss of material and a change in material properties. Concrete foundations for Station Blackout System structures will be inspected for cracking and distortion due to increased stress level from settlement that may result from degradation of the inaccessible wooden piles.

The program will be enhanced to include periodic inspection of the Fire Pond Dam for loss of material and loss of form.

Enhancements will be implemented prior to the period of extended operation.

Operating Experience

The review of program documentation, and other plant operating experience before the program was implemented, identified cracking of reinforced of exterior walls of the reactor building, drywell shield wall above elevation 95', and the spent fuel pool support beam. Cracking of the reactor building exterior walls was generally minor and attributed to early shrinkage of concrete and temperature changes. Engineering evaluation concluded that the structural integrity of the walls is unaffected by the cracks. Repairs to areas of concern were made to prevent water intrusion and corrosion of concrete rebar. The cracks and repaired areas are monitored under the program to detect any changes that would require further evaluation and corrective action.

Cracking of the drywell shield wall was attributed to high temperature in the upper elevation of the containment drywell. Engineering analysis concluded that stresses are well below allowable limits taking into consideration the existing cracked condition. The shield wall cracking was addressed in NRC SEP review of the plant under Topic III-7B. The cracks have been mapped and inspected periodically under the program. Recent inspections identified no significant change in the cracked area.

Cracking of the spent fuel storage pool concrete support beams was identified in mid-1980. Subsequently crack monitors were installed to monitor crack growth and an engineering evaluation was performed. Based on the evaluation results and additional non-destructive testing to determine the depth of the cracks, it was concluded that the beams would perform their intended function, and that continued monitoring with crack monitors is not required. The cracks are examined periodically under the program and have shown little change.

Inspection of the intake canal, performed in 2001, identified cracks and fissures, voids, holes, and localized washout of coatings that protect embankment slopes from erosion. The degradations were evaluated and determined not to impact the intended function of the intake canal (UHS). However the inspector recommended repair of the degradations to prevent further deterioration. A project to repair the canal banks has been initiated.

Inspections conducted in 2002, concluded that degradations discussed above have not become worse and remains essentially the same as identified in previous inspections. In addition minor cracking, rust stains, water stains, localized exposed rebars and rebar corrosion, and damage to siding were observed. The degradations were evaluated and determined not to have an impact on the structural integrity of affected structures. Operating experience review concluded that the program is effective for managing aging effects of structures, structural components, and water-control structures.

Conclusion

The Structures Monitoring Program was developed to implement the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The program relies on periodic visual inspections to monitor the condition of structures and structural components. Inspection frequency is every four (4) years (except for water-control structures) with provisions for more frequent inspections to ensure that observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process. Submerged portions of water-control structures will be inspected when dewatered or on a frequency not to exceed ten (10) years.

The scope of the program will be enhanced to include all structures, and component supports not covered by other programs, the Fire Pond Dam, and exterior surfaces of mechanical components in the scope of license renewal that are not covered by other programs. Inspection criteria will also be enhanced to provide reasonable assurance that the aging effects are adequately managed so that the intended functions of structures and components within the scope of license renewal are maintained consistent with the current licensing basis during the period of extended operation.

B.1.38 INSPECTION OF INTERNAL SURFACES IN MISCELLANEOUS PIPING AND DUCTING COMPONENTS - FRCT

Program Description

The program as implemented for the Forked River Combustion Turbine power plant will consist of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers and heat exchanger shells that are not covered by other aging management programs. These components are subject to an internal environment of indoor air that is assumed to include sufficient moisture content to result in loss of material aging effects. In addition, this program includes piping and muffler with Diesel Engine Exhaust Gas as an internal environment. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions.

NUREG-1801 Consistency

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT aging management program is consistent with the ten elements of aging management program XI.M38 – "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," specified in NUREG-1801, with the following exceptions:

Exceptions to NUREG-1801

The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT aging management program is a new program to be implemented for the internal surfaces of steel piping, piping components, ducting, and other components in the scope of license renewal at the Forked River Combustion Turbine power plant, that are not covered by other aging management programs.

Evaluation and Technical Basis

1. Scope of Program

The scope of this program includes visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers, and heat exchanger shells in the scope of license renewal at the Forked River Combustion Turbine power plant, that are not covered by other aging management programs. Visual inspections will be performed to identify loss of material. Inspections are performed when the internal surfaces are accessible during scheduled maintenance outages. The scope of the program for the Forked River Combustion Turbine power plant does not address indications of borated water leakage, as there is no borated water used at the plant.

2. Preventive Actions

This program as implemented for the Forked River Combustion Turbine power plant is an inspection activity independent of methods to mitigate or prevent degradation.

3. Parameters Monitored/Inspected

Visual inspections will be performed during scheduled maintenance activities. The identified components within the scope of this program are associated with the combustion turbines and their auxiliary systems. A major maintenance outage is periodically scheduled based on operating factors such as fuel used, run time and number of unit starts. The major maintenance outages will be performed at a frequency of at least once every 10 years. The major maintenance outage includes the following inspection activities for the identified components:

- Inlet system filter and filter compartment inspection
- Exhaust system plenum, expansion joint and stack inspection
- Cooling and Sealing air system exhaust frame blower fans inspection
- Heating and ventilation system blowers inspection and repair
- Diesel starter inspection and repair
- Atomizing air cooler cleaning, inspection and repair

These inspection activities will include inspection for visible evidence of corrosion to indicate possible loss of material.

The initial inspections associated with this program will be performed at the next major inspection outage for each unit. As discussed under Operating Experience (Element 10), the last combustion turbine (CT) Unit 1 major inspection outage was performed in 2004. The outage began in March 2004 and was completed in May 2004. The last CT Unit 2 major inspection outage began in October 2005 and is scheduled for completion in November 2005. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals, such that equipment is maintained within design specifications to provide reliable service until the next major maintenance inspection. Based on the extent and location of aging effects that were observed, and the as-left internal component conditions following the maintenance outages, additional internal inspections are not warranted prior to entering the period of extended operation. Based on the established inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

4. Detection of Aging Effects

The periodic component inspections performed during the scheduled maintenance outages provide for detection of loss of material on the internal surfaces of the identified components in the scope of this program. The internal surfaces of the inlet filter housing are painted, and this program includes inspection of the filter housing coating for degradation. The internal surfaces of other components within the scope of this program are not painted.

This program will identify loss of material on the internal surfaces of the identified steel components by visual inspection of the surfaces that are exposed and accessible during the major maintenance outages. Internal surface inspections of the identified components are addressed as follows:

The atomizing air cooler (heat exchanger) is completely disassembled for inspection and repair. The internal surfaces of the carbon steel shell side components will be visually inspected for evidence of loss of material during this inspection activity.

The heating and ventilation systems are disassembled for blower inspection and repair activities, or as part of disassembly of the combustion turbine enclosures during the maintenance outage. The internal surfaces of carbon steel ductwork, fan housings and damper housings are exposed during these inspection activities, and will be visually inspected for evidence of loss of material.

The inlet filter and filter compartment inspection includes visual inspection of the coating, and visual inspection for evidence of loss of material on any internal surfaces where coating degradation has occurred.

The steel piping and steel valves subject to an indoor air environment and within the scope of this program are associated with the sealing and cooling air system of the combustion turbine. The piping and valves are disassembled during turbine disassembly such that a visual inspection of at least one open end of piping or one open end of a valve can be performed. The exposed internal surfaces of the steel piping and steel valves will be visually inspected for evidence of loss of material.

The steel piping and muffler exposed to diesel exhaust gas is part of the diesel starter. The internal surfaces of this steel piping and muffler will be inspected during the diesel starter inspection and repair activity. The exposed internal surfaces of the steel piping and muffler will be visually inspected for evidence of loss of material.

This aging management program incorporates planned maintenance activities, with accompanying repair and replacement of parts as necessary to ensure the maximum availability and reliability of the combustion turbines. Maintenance intervals are established in accordance with manufacturers recommendations, based on operating experience with these and similar combustion turbine installations, and factors that affect part life such as fuel type and starting frequency. The major inspection outage involves inspection of all the major components of the turbine generator and auxiliary systems.

Visual inspections are performed by mechanics and technicians with experience in inspection and maintenance of combustion turbine generator units. Visual inspection techniques are appropriate for identifying coating degradation, or for identifying signs of loss of material of steel component surfaces, as the resulting deteriorated coatings or corroded steel surface conditions can be visually observed.

These visual inspections will be incorporated into the major maintenance outage, when the majority of the turbine and auxiliary systems are fully disassembled. Some of the components within the scope of this program, such as the atomizing air heat exchangers, fan housings, ductwork and filter housings, are essentially 100% inspected during the outage. For the remaining components (piping, valve bodies, mufflers, damper housings), there are a significant number of components that are removed or exposed during disassembly to provide a representative sample for visual inspection.

Inspection intervals and maintenance activities are based on many years of operating experience with the Forked River combustion turbine units, and similar combustion turbine installations, and provide for maximum reliability of the units. Results of past tests, inspections, and maintenance provide operating trends and data that demonstrate high reliability of the FRCTs. Between maintenance inspections, the units are operated as peaking units and as such are started and stopped frequently, at least once a day during high demand periods. The unit availability and reliability are monitored and trended by periodic analysis of the actual start data history for the two units. Previous major maintenance intervals for these combustion turbines have been as long as 16 years, with the units still demonstrating high reliability. Therefore, the established 10-year inspection frequency for the internal surfaces of the components in the scope of this

program will provide reasonable assurance that aging effects will be identified and corrected prior to the loss of component intended functions.

The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on the established inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

5. Monitoring and Trending

Visual inspection activities are performed by experienced mechanics and technicians, as a part of planned maintenance activities in accordance with established procedures based on vendor recommendations. Existing procedures will be enhanced or new procedures will be created to assure visual inspections are performed in accordance with this program, including specific requirements for personnel qualifications and guidance for the identification of corrosion mechanisms and fouling. The results of visual inspections will be documented for monitoring and trending. Any identified degradation or negative trend will be evaluated by engineering personnel, and corrective actions taken as appropriate. Inspection intervals are based on previous operating experience. The indoor air environment associated with these components is not expected to contain significant moisture, and the piping exposed to diesel exhaust gas is only exposed on an intermittent basis when the starting diesel engine is operating. When the diesel engine is shut down, exhaust gasses would dissipate and the environment would be similar to indoor air. Therefore, the extent and schedule of inspections will assure detection of component degradation prior to loss of intended functions.

6. Acceptance Criteria

Existing maintenance procedures will be enhanced or new procedures will be created to assure visual inspections are performed in accordance with this program, including specific guidance including acceptance criteria for identification of corrosion mechanisms and fouling. The results of visual inspections will be documented, and any identified degradation or negative trend will be evaluated by engineering personnel, and corrective actions taken as appropriate to assess the material condition and determine whether the component intended function is affected.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

In October 2001 (Unit 2 FRCT) and March 2004 (Unit 1 FRCT), GE Energy Services performed inspection and maintenance activities and documented all work performed in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a Major maintenance inspection. The Major inspection is the most comprehensive inspection that is performed on the combustion turbine units. The interval between Major inspections is based on operating experience with these and similar combustion turbine installations, and factors that affect part life such as fuel type and starting frequency. The purpose of this type of maintenance inspection is to identify equipment degradation, and if degradation is identified the affected component is replaced or refurbished in accordance with manufacturers specifications such that the unit will perform reliably through the next operating interval. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection, bare paint spots with surface rust were identified in the filter housing, and were cleaned and touched up with new paint to prevent further rusting. The exhaust frame fan housings were cleaned and inspected, and no degradation was identified. Corrosion was identified in the compressor bleed valves that impacted smooth valve operation, but the valve body pressure boundary was not affected, and the valves were refurbished and reused. Ventilation fans were refurbished, and no issues with fan housing integrity were identified.

The Unit 2 inspection was a fuel nozzle and combustion section inspection. The Unit 2 inspection found the inlet filter housing to be in good condition, with no visual defects. The inspection included a borescope and combustion inspection, removal of exhaust frame cooling piping and disconnection of the fuel lines for inspection, and fuel nozzle inspection, repair, and testing.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The internal surfaces of disassembled ductwork, fan housings and several damper housings were observed and did not show signs of significant corrosion. The turbine inlet air filters were replaced during the outage, and the coated internal surfaces of the filter housing were inspected and found to be in good condition. Internal surfaces of frame cooling piping were also observed to be in good condition, with minor surface rust and no significant pitting or loss of wall thickness. The internal surfaces of the diesel starter engine exhaust piping and muffler were also observed to be in good condition, with surface rust and no signs of significant pitting or wall-thinning.

The operating experience with the Forked River combustion turbines includes a significant number of past inspection activities of steel components in the indoor air and diesel exhaust environment. The documented inspection results provide objective evidence that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. Past inspections have been performed at a frequency as long at 16 years, with the units performing reliably between inspections. Implementation of this new program will assure that these inspections are continued on a more conservative frequency of 10 years, providing reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

Conclusion

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – FRCT aging management program will provide reasonable assurance that the aging effects on the internal surfaces of steel components in the scope of license renewal at the Forked River Combustion Turbine power plant, that are not covered by other aging management programs, are adequately managed so that the intended functions are maintained consistent with the current licensing basis during the period of extended operation.

B.1.39 LUBRICATING OIL ANALYSIS PROGRAM - FRCT

Program Description

The Lubricating Oil Analysis Program – FRCT will include measures to verify the oil environment in mechanical equipment is maintained to the required quality. The Lubricating Oil Analysis Program - FRCT maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction in heat transfer. Lubricating oil testing activities include sampling and analysis of lubricating oil for detrimental contaminants. The presence of water or particulates may also be indicative of in leakage and corrosion product buildup.

NUREG-1801 Consistency

The Lubricating Oil Analysis Program- FRCT aging management program is consistent with the ten elements of aging management program XI.M39, "Lubricating Oil Analysis Program" specified in NUREG-1801 with the following exceptions:

Exceptions to NUREG-1801

- Parameters Monitored/Inspected (Element 3) requires the flash point be measured for the lubricating oils. Flash Point is not measured for lubricating oils in service, since this is a quality control measurement when purchasing new oil. It is not a primary measurement to determine the presence of water or contaminants, which are the concerns for controlling the environment of concern.

- The Corrective Actions (Element 7), Confirmation Process (Element 8), and Administrative Controls (Element 9) are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B, but do meet the guidance in Branch Technical Position IQMB-1, Quality Assurance for Aging Management Programs.

Enhancements

The Lubricating Oil Analysis Program - FRCT aging management program is a new program that will confirm aging effects are adequately managed for components in the scope of license renewal and subject lubricating oil environment located at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

The Lubricating Oil Analysis Program – FRCT assures samples will be obtained of lubricating oils from plant components subject to aging management review on a periodic basis. The lubricating oil system provides lubrication for the components subject to aging management. The lubricating oil system also provides a source of hydraulic oil for the hydraulic supply and trip oil systems in the Forked River Combustion Turbines (FRCT's). No other systems subject to aging management were determined to have lubricating oils subject to this program. The complete aging management program for lubricating oil relies on the verification of its effectiveness using the One Time Inspection – FRCT (B.1.24A) program.

2. Preventive Actions

The Lubricating Oil Analysis Program – FRCT through periodic sampling maintains oil systems contaminants (primarily water and particulates) within acceptable limits.

3. Parameters Monitored/Inspected

No components with periodic oil changes were identified to have intended functions. Components with intended functions that do not have regular oil changes are supplied oil from the lubricating oil system. A particle count and check for water will be performed on the lubricating oil in the lubricating oil system to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion. In addition, viscosity, and neutralization number will be determined to verify the oil is suitable for continued use. Wear particles will be identified through analytical ferrography, and elemental analysis.

4. Detection of Aging Effects

Periodic sampling will be performed. Sample results will be reviewed against acceptance criteria, and results which do not meet acceptance criteria, result in actions to bring the properties of the lubricating oil into conformance with the acceptance criteria. Actions taken maintain the environment not conducive to aging mechanisms that could lead to the aging effects of loss of material, cracking, and reduction of heat transfer. Additional inspections will be performed by the One Time Inspection – FRCT (B.1.24A), to verify the effectiveness of this program.

5. Monitoring and Trending

Results from oil analysis will be reviewed and trended to determine if alert level or limits have been exceeded. Lubricating oil analysis is performed periodically by an accredited laboratory. Any acceptance criteria, which is exceeded, or trends indicating degradation, will be reviewed to determine the proper course of action to bring the oil properties back into acceptable limits.

6. Acceptance Criteria

Combustion Turbine lubricating oil is analyzed for particle concentration in accordance with Industry Standard ISO 4406. Water and particle concentration will not be allowed to exceed limits based on manufacturer's recommendations or industry standards recommended for each components type. Viscosity bands will be based on a tolerance around the base viscosity of the lubricating oil as recommended by the components manufacturer or industry standards. Metal limits as determined by spectral analysis and ferrography will be based on original baseline data and manufacturer's recommendations, industry standards, or other justified basis.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

The Lubricating Oil Analysis Program – FRCT is a new program that will be effective in managing aging degradation for the period of extended operation by providing periodic sampling and analysis of lubricating oil to provide timely detection of degradation in lubricating oil properties and take appropriate corrective actions prior to loss of system or component intended functions.

In October 2001 (Unit 2 FRCT) and March 2004 (Unit 1 FRCT), GE Energy Services performed major inspection and maintenance activities and documented all work performed in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a major maintenance inspection. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection, the emergency DC lubricating oil pump was removed and sent to the General Electric service shop for cleaning, inspection and repairs. The GE report does not indicate any issues associated with degradation of this pump casing. The combustion turbine lubricating oil system was drained, cleaned and inspected. Various pumps were inspected, and the lubricating oil coolers were cleaned. No degradation of these components was identified. The main lubricating oil pump was disassembled and inspected, and no defects were observed.

The Unit 2 inspection was a fuel nozzle and combustion section inspection. The lubricating oil filters were replaced. The GE report does not identify any issues with the lubricating oil system or components.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The internal surfaces of disassembled stainless steel piping and flexible hoses were observed, and there were no signs of corrosion or wall thinning. The combustion turbine lubricating oil heat exchangers were dissembled, cleaned and inspected. The carbon steel and copper alloy heat exchanger components normally exposed to lubricating oil were found to be in excellent condition. The standby heat exchanger that is not normally in service was found to have some minor accumulation of sediment that was cleaned off. Carbon steel pump casings that are normally submerged in the lubricating oil reservoir were visually observed to be in excellent condition, with no signs of corrosion. The carbon steel internal surfaces of the lubricating oil reservoir were also observed to be in excellent condition, with no signs of corrosion.

The operating experience with the combustion turbine system components subject to a lubricating oil environment demonstrates that the combustion turbine lubricating oil systems have not experienced significant intrusion of water and contaminants that would result in aging degradation. This new Lubricating Oil Analysis Program – FRCT will provide additional assurance that water and contaminant concentrations are minimized, such that age related degradation will continue to be minimized.

The Lubricating Oil Analysis Program – FRCT will monitor for adverse trends in performance. Problems identified will not cause impact to the intended functions of the Forked River Combustion Turbine power plant, and adequate corrective actions will be taken to prevent recurrence. There is sufficient confidence that the implementation of the Lubricating Oil Analysis Program – FRCT will effectively maintain oil systems contaminants (primarily water and particulates) within acceptable limits.

Conclusion

The Lubricating Oil Analysis Program – FRCT will provide reasonable assurance that the combustion turbine oil systems will be effectively managed to provide an acceptable oil environment, so that the intended functions of components within the scope of license renewal will be maintained during the period of extended operation.

B.2.05A PERIODIC INSPECTION PROGRAM - FRCT

Program Description

The Periodic Inspection Program – FRCT aging management program will address Forked River Combustion Turbine power plant components in the scope of license renewal that require periodic monitoring of aging effects, and are not covered by other aging management programs. Activities will consist of a periodic inspection of selected components to verify integrity and confirm the absence of identified aging effects. The inspections will be condition monitoring examinations, intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of intended functions.

This program is used for the following:

- To confirm change in material properties due to aging is not occurring in elastomer expansion joints and flexible connections exposed to fuel oil, indoor air or outdoor air environments.
- To confirm reduction of heat transfer due to aging is not occurring in heat exchangers exposed to indoor air or outdoor air environments.
- To confirm loss of material in various steel and stainless steel components subject to an intermittent combustion turbine exhaust gas environment is monitored such that there is no loss of component intended functions.
- To confirm loss of material in copper heat exchanger components subject to an indoor air or outdoor air environment is monitored such that there is no loss of component intended functions.
- To confirm cracking in stainless steel components subject to intermittent combustion turbine exhaust gas environment is monitored such that there is no loss of component intended functions.

The program elements will include (a) determination of appropriate inspection sample size, (b) identification of inspection locations, (c) selection of examination technique, with acceptance criteria, and (d) evaluation of results to determine the need for additional inspections or other corrective actions.

The sample size will be based on aspects such as the specific aging effect, location, existing technical information, materials of construction, service environment, or previous failure history. The inspection samples will include locations where the most severe aging effect(s) would be expected to occur. The inspection locations will be based on aspects such as similarity of materials of construction, fabrication, operating environment, or aging effects. Inspection methods may include visual examination, surface or volumetric examinations, or other established Non-Destructive Examination (NDE) techniques.

This program will assess change in material properties, loss of material, cracking and reduction of heat transfer of FRCT mechanical components. For components in the scope of this program, an inspection will be conducted to confirm change in material properties, loss of material, cracking, and reduction of heat transfer is not occurring, or the aging effect is occurring at a rate so as not to affect the component intended function. The program will provide inspection criteria, require evaluation of the results of the inspections, and provide recommendations for additional inspections, as necessary.

Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on the established inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

Enhancements

The Periodic Inspection Program – FRCT aging management program is a new program to be implemented at the Forked River Combustion Turbine power plant.

Evaluation and Technical Basis

1. Scope of Program

The scope of this activity includes systems in the scope of license renewal that require periodic monitoring of aging effects, and are not covered by other existing periodic monitoring programs. Inspections will be performed at susceptible locations in the system.

2. Preventive Actions

The Periodic Inspection Program – FRCT activities will be condition monitoring activities to detect degradation prior to change in material properties, loss of material, cracking and reduction of heat transfer aging effects as applicable for the material and environment. No preventive or mitigating attributes are associated with this program.

3. Parameters Monitored/Inspected

The program will provide inspection for change in material properties, loss of material, cracking and reduction of heat transfer. Inspection procedures will be prepared in accordance with applicable codes, standards and inspection practices. Examination methods include visual examination of disassembled components, surface or volumetric examinations, or other established Non-Destructive Examination (NDE) techniques.

4. Detection of Aging Effects

Inspections for change in material properties, loss of material, cracking and reduction of heat transfer will be performed on a representative sample of susceptible locations. Inspection for loss of material will consist of surface inspections, thickness measurements using nondestructive examination (UT), or visual examination of disassembled components.

A representative sample of locations will be inspected to confirm that unacceptable degradation is not occurring and the intended function of components will be maintained during the period of extended operation.

Unacceptable inspection results will require that the sample size and locations be expanded until the extent of the problems is determined. The sample size and location expansion will be determined based on evaluations of the unacceptable inspection results.

Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years.

The initial inspections associated with this program will be performed at the next major inspection outage for each unit. As discussed under Operating Experience (Element 10), the last combustion turbine (CT) Unit 1 major inspection outage was performed in 2004. The outage began in March 2004 and was completed in May 2004. The last CT Unit 2 major inspection outage began in October 2005 and is scheduled for completion in November 2005. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals, such that equipment is maintained within design specifications to provide reliable service until the next major maintenance inspection. Based on the extent and location of aging effects that were observed, and the as-left internal component conditions following the maintenance outages, additional internal inspections are not warranted prior to entering the period of extended operation. Based on the established inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.

5. Monitoring and Trending

Results of the periodic inspection activities will be monitored. Indications of insufficient material wall thickness, change in material properties, cracking and reduction of heat transfer in excess of established acceptance criteria will require further evaluation. The evaluation will either demonstrate acceptability or specify the appropriate repair or replacement. Follow up examinations will be performed, if necessary, to determine the extent of the degraded condition, thus expanding the sample size and locations of inspections.

6. Acceptance Criteria

Results of the examinations will be evaluated to determine if change in material properties, loss of material, cracking or reduction of heat transfer aging is occurring, and if so, the rate at which the aging effect is occurring. Evaluation of the examination results will also a) determine the need for follow-up examinations to monitor the progression of aging degradation, and b) identify appropriate corrective actions, including repairs or replacements, to mitigate any excessive rates of aging degradation. Corrective actions, if necessary, would expand to include other components.

Change in material properties, loss of material, cracking and reduction of heat transfer will be evaluated consistent with original design or evaluation codes and criteria, or manufacturers standards.

7. Corrective Actions

The Forked River Combustion Turbines and supporting systems are non-safety related and are not subject to 10 CFR 50 Appendix B requirements in the current licensing basis (CLB). AmerGen has elected not to include this program under Oyster Creek 10 CFR 50 Appendix B Program. Instead, processes and procedures will be established to assure that conditions adverse to quality are promptly identified and corrected. Identified conditions that do not satisfy acceptance criteria will be documented, evaluated, and corrected as required to maintain the intended function of combustion turbines during the period of extended operation. In the case of significant conditions adverse to quality, the procedures will require that the cause of the condition be determined, actions to preclude repetition be taken, and the condition be reported to the appropriate level of management.

8. Confirmation Process

The confirmation process for the Forked River Combustion Turbine will focus on follow-up actions that must be taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The established process and procedures will include the requirements that measures be taken to preclude repetition of significant conditions adverse to quality. These measures will include actions to verify effective implementation of the proposed corrective actions, determination of root cause, tracking open corrective actions to completion, and reviews of corrective action effectiveness.

9. Administrative Controls

The Forked River Combustion Turbine procedures will include administrative controls that provide for formal review and approval of aging management activities.

10. Operating Experience

The Periodic Inspection Program – FRCT aging management program is a new program that will be effective in managing aging degradation for the period of extended operation by providing timely detection of aging effects and implementation of appropriate corrective actions prior to loss of component intended functions. This program will be incorporated into current maintenance inspection practices, which have been demonstrated through operating experience to be effective in managing age related degradation such that the intended functions of the combustion turbines have been maintained.

In October 2001 (Unit 2 FRCT) and March 2004 (Unit 1 FRCT), GE Energy Services performed inspection and maintenance activities and documented all work performed in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the combustion turbines, internals and support equipment. All work was carried out closely following the instructions and guidance found in the original equipment manufacturer's design, maintenance and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The Unit 1 inspection was a Major maintenance inspection. The Major inspection is the most comprehensive inspection that is performed on the combustion turbine units. The interval between Major inspections is based on operating experience with these and similar combustion turbine installations, and factors that affect part life such as fuel type and starting frequency. The purpose of this type of maintenance inspection is to identify equipment degradation, and if degradation is identified the affected component is replaced or refurbished in accordance with manufacturers specifications such that the unit will perform reliably through the next operating interval. This was the first major inspection that was performed on the unit since initial installation in 1988. During the Unit 1 inspection, extensive cracking was found in the exhaust system ductwork and expansion joint. The degradation allowed hot exhaust gasses to escape but did not prevent the combustion turbine from operating. The damaged components were weld repaired. Cracking was also identified in some turbine casing sections, which were also repaired prior to loss of component function. The stainless steel inlet ductwork was inspected with no deficiencies noted. The generator heat exchangers were opened, cleaned and inspected, and no deficiencies were note with the copper tubes. Maintenance personnel stated that the tubes were found in good condition.

The Unit 2 inspection was a fuel nozzle and combustion section inspection. The Unit 2 inspection found the inlet filter housing to be in good condition, with no visual defects. Exhaust ductwork was also inspected. No serious defects were found. One channel section was found with missing nuts, and new nuts were installed. Repair of identified cracks was deferred to the next major overhaul outage.

Unit 2 began a major outage inspection in October 2005. During the outage, with many components disassembled, components were visually inspected for signs of age related degradation. The internal surfaces of disassembled exhaust system ductwork and turbine casing sections were observed. The exhaust system components were cracked and were being replaced. The casing also had cracks that were being repaired. The exhaust system and casing cracks had not prevented combustion turbine operation prior to the scheduled outage. Minor exhaust system and casing leaks do not prevent the combustion turbine from performing its intended function of providing alternate AC power to Oyster Creek during a station blackout event. The glycol cooling water heat exchanger tubes and fins at the mechanical draft cooling tower were visually inspected and did not show signs of significant corrosion. External surfaces of elastomer flexible connections were inspected and did not appear cracked or deteriorated.

The operating experience with the Forked River combustion turbines includes a significant number of past inspection activities of components in the scope of this periodic inspection program. The documented inspection results provide confirmation that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. Past inspections have been performed at a frequency as long at 16 years, with the units performing reliably between inspections. Implementation of this new program will assure that these inspections are continued on a more conservative frequency of 10 years, providing reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

Conclusion

The new Periodic Inspection Program FRCT will provide reasonable assurance that the system components are routinely inspected for age related degradation, and will adequately manage the identified aging effects. The program will provide reasonable assurance that system intended functions are maintained consistent with the current licensing basis during the period of extended operation.