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SOUTHERN COMPANY
Energy to Serve Your World℠

April 22, 2004

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U. S. Nuclear Regulatory Commission
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Joseph M. Farley Nuclear Plant Units 1 and 2
Application for License Renewal – Requests for Additional Information

Ladies and Gentlemen:

This letter is in response to your letters dated March 22, 2004 and March 23, 2004 requesting additional information for the review of the Joseph M. Farley Nuclear Plant, Units 1 and 2, License Renewal Application. Responses to the Requests for Additional Information (RAIs) are provided in Enclosures 1 and 2. By agreement between Ms. Tilda Liu, NRC Project Manager, NRR, and Mr. Jan Fridrichsen, SNC License Renewal Licensing Project Manager, the March 22 responses are provided on the same schedule as the March 23 responses.

Mr. L. M. Stinson states he is a vice president of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

If you have any questions, please contact Charles Pierce at 205-992-7872.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson

L. M. Stinson

Sworn to and subscribed before me this 22 *day of* April, *2004.*

Marie H. Bui
Notary Public

My commission expires: 6-7-05

A099

LMS/JAM/slb

Enclosures: 1. Responses to March 22, 2004 Requests for Additional Information, Joseph M. Farley Nuclear Plant, Units 1 and 2
2. Responses to March 23, 2004 Requests for Additional Information, Joseph M. Farley Nuclear Plant, Units 1 and 2

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley Jr., Executive Vice President
Mr. D. E. Grissette, General Manager – Plant Farley
Document Services RTYPE: CFA04.054; LC# 14017

U. S. Nuclear Regulatory Commission
Ms. T. Y. Liu, License Renewal Project Manager
Mr. L. A. Reyes, Regional Administrator
Mr. S. E. Peters, NRR Project Manager – Farley
Mr. C. A. Patterson, Senior Resident Inspector – Farley

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

ENCLOSURE 1

Joseph M. Farley Nuclear Plant Units 1 and 2

Application for License Renewal

Responses to March 22, 2004 Requests for Additional Information

RAI 3.1.2.4-1

LRA Table 3.1.2-4 lists the aging effects of cracking and loss of material for the Alloy 690 TT channel divider plate, primary nozzle dam rings, and steam outlet flow limiter, and credits the Water Chemistry Control Program for aging management of these components during the extended period of operation. However, Table 3.1.2-4 notes that neither the component, nor the material and environment combination is evaluated for these SG components in the GALL report. The staff notes that an inspection program capable of detecting the presence of degradation should also be credited in conjunction with an aging management program. The staff also notes that the adequacy of the Water Chemistry Control Program in managing cracking and loss of material in these components cannot be ascertained without an identification of the responsible aging mechanisms.

The staff requests that the applicant discuss:

a. The program that will be used to detect cracking and loss of material in these SG components.

b. How the program identified in part a. will be used to detect degradation, thereby verifying that the Water Chemistry Control Program alone can effectively manage aging of these components during the period of extended operation (e.g., the Water Chemistry Control Program is augmented with an inspection to detect the aging effects, or the water chemistry control program has a one-time inspection which includes this material/environment combination).

c. Identify the aging mechanisms responsible for the aging effects listed for these components.

Response

The Water Chemistry Control Program alone is credited to manage cracking and loss of material for the replacement steam generator channel divider plate, primary nozzle dam rings, and steam outlet flow limiters. The aging mechanism associated with cracking is stress corrosion cracking (SCC). The aging mechanisms associated with loss of material are crevice corrosion and pitting. The Water Chemistry Control Program is not augmented with an inspection of these components. The technical justification for this follows:

SNC has conservatively considered cracking and loss of material as aging effects that require management for these components. These aging effects are unlikely to occur with the existing chemistry controls provided by the FNP Water Chemistry Control Program. These steam generator sub-components are fabricated from thermally treated Alloy 690 base metal and Alloy 52 / 152 weld materials. A review of the available industry operating experience indicates that no cracking or loss of material in thermally treated Alloy 690 base metal and Alloy 52 / 152 weld materials has occurred to date in the PWR primary and secondary environments.

Available experimental data and industry experience associated with Alloy 690 base metals and Alloy 52 / 152 weld materials indicate that the primary and secondary chemistry controls implemented by the FNP Water Chemistry Control Program are

sufficient to prevent stress corrosion cracking, pitting, and crevice corrosion of these steam generator subcomponents. The superiority of these materials is well recognized in the industry. Regarding stress corrosion cracking, a number of industry studies indicate that the increased Chromium content and improved microstructure of thermally treated Alloy 690 base metal and Alloy 52 / 152 weld materials result in a significant increase in resistance to primary water stress corrosion cracking over mill annealed Alloy 600 base metal and Alloy 82 / 182 weld materials. Regarding pitting and crevice corrosion, nickel alloys exhibit a dense passivation layer at the component surface which protects the material from loss of material due to localized corrosion, especially in the pure primary water and main steam environments.

Furthermore, the components addressed by this RAI are not component locations that have been associated with significant degradation, even when less corrosion resistant mill annealed Alloy 600 base metal and Alloy 82 / 182 weld materials are utilized. Any degradation of FNP Replacement Steam Generator Alloy 690 / 52 / 152 materials is expected to occur in areas where higher stresses and more aggressive environmental conditions exist, such as the tube to tubesheet expansion region, tube to tube support plate intersections, and primary nozzle to safe-end welds. Existing inspections and evaluations of these and other corrosion prone locations will provide leading indication of any susceptibility of thermally treated Alloy 690 base metals and Alloy 52 / 152 weld materials to corrosion in the borated water and main steam environments. FNP monitors industry operating experience and initiates inspection activities as needed.

SNC also notes that the components addressed by this RAI are internal to the steam generators and do not perform a reactor coolant pressure boundary function. FNP LRA Table 3.1.2-4 lists the applicable component functions for each component type. Cracking or loss of material in these components is only safety significant if the degradation results in a loss of structural integrity which is improbable due to the highly flaw-tolerant nature of Alloy 690 materials.

For the channel divider plate, the applicable component intended functions are flow distribution and structural support. The loading on the channel divider plate is the differential pressure across the divider plate and equivalent to the pressure drop across the SG tube bundle. Therefore, stress on the divider plate during normal operations is very low. SCC, pitting, or crevice corrosion of the channel divider plate would only result in minimal leakage from the higher pressure hot leg inlet to the lower pressure cold leg outlet and would not be safety significant.

For the primary nozzle dam rings, structural support is the applicable component intended function. When nozzle dams are not installed, the loading on the primary nozzle dam rings is low and results from the minor differential pressure/frictional losses resulting from primary loop flow across the ring. When nozzle dams are installed (during an outage), the loading on the rings is also low - equivalent to the static head of the reactor vessel/refueling cavity water level. Significant degradation in a nozzle dam ring would be identified during nozzle dam installation. Leakage across the nozzle dam and ring is monitored. In addition, failure of a nozzle dam assembly would not drop the RCS water level below the mid-loop level. Core coverage and cooling would be maintained.

Flow restriction is the applicable component function for the steam outlet flow limiters. In the high purity main steam environment, only trace amounts of detrimental ionic impurities are present and very low oxygen content exists. In this environment, SCC,

pitting, and crevice corrosion are highly unlikely. Even so, any cracking, pitting, and crevice corrosion is not likely to affect the flow restriction function, since only structural integrity of the limiter need be maintained.

In summary, the Water Chemistry Control Program alone is credited to manage cracking and loss of material within the channel divider plate, primary nozzle dam rings, and steam outlet flow limiters. The Water Chemistry Control Program alone provides reasonable assurance the component intended functions will be maintained during the period of extended operation considering the favorable industry experience and research results regarding Alloy 690 and 52 / 152 materials, the lack of degradation in less resistant Alloy 600 and 82 / 182 materials for these component locations, the ongoing inspections of more susceptible locations, and the improbability of a loss of structural integrity due to the highly flaw-tolerant nature of Alloy 690 materials.

RAI 3.1.2.4-2

There is no aging effect for secondary closure bolting listed on page 3.1-73 of LRA Table 3.1.2-4. In addition, Note 8 to the table states that the secondary handholes are removed to facilitate sludge removal and visual inspection; therefore, loss of bolting preload is not an aging effect requiring management. However, the staff notes that the secondary manholes bolting may still be subjected to loss of prestress.

The staff requests that the applicant provide details (and a technical basis) on how loss of prestress of secondary closure bolting is managed.

Response

Secondary side closure bolting is used to secure covers for two 16" I.D. manways, six 6" I.D. handholes, and four 4" I.D. inspection ports. The bolting used to secure the manway covers is 1.25" in diameter, and the bolting used to secure the handhole and inspection port covers is 1" in diameter. This secondary side closure bolting is fabricated from ASME SA-193 Grade B7 alloy steel.

No aging effects are listed for FNP Replacement steam generator secondary side closure bolting because the FNP aging management review for these components determined that no aging effects requiring management exist for these bolts. The technical basis for this conclusion as it relates to loss of prestress follows.
Work performed as a part of the EPRI Material Reliability Program indicates that secondary, steady-state, creep only occurs for alloy steels when operating temperatures exceed 40% to 50% of the melting temperature (in absolute units). A conservative lower bound melting temperature for alloys steels is 2500°F (2959°R). SNC conservatively used 725°F as the temperature below which no steady-state creep of the alloy steel bolting will occur. The FNP operating temperatures are below this threshold temperature.

The steam generator secondary side closures are routinely disassembled to provide access for cleaning and inspection. No long term accumulation of creep effects is expected to occur since these closure joints are disassembled and re-installed periodically. Any leakage will be a function either of improper joint installation or gasket effects.

Leakage at joints is typically associated with improper joint installation or joint design, not relaxation of the bolting materials. FNP procedures for joint installation incorporate industry guidance from EPRI NP-5769, *Good Bolting Practices*, and EPRI TR-104213, *Bolted Joint Maintenance and Application Guide*. These procedures provide for the use of proper lubricants and sound bolt torquing practices. However, these procedures are considered to be a part of normal maintenance practices and are not credited as a specific aging management program for license renewal.

Lastly, FNP operating experience with the steam generators has not indicated any problems with loss of prestress in the steam generator secondary side closures.

Based on this information, SNC maintains that loss of prestress is not an aging effect requiring management in these bolted connections.

RAI 3.1.2.4-3

LRA Table 3.1.2-4 lists the aging effects of cracking and/or loss of material for the feedwater distribution assembly, primary manway covers and disc inserts, tube support plates, flow distribution baffles, and antivibration bars, and credits the Water Chemistry Program for management of these components during the period of extended operation. In addition, the Steam Generator Program is also credited for the management of cracking and loss of material for the feedwater distribution assembly, tube support plates, flow distribution baffles, and antivibration bars.

The staff requests that the applicant provide details (and a technical basis) on how the program credited for the management of cracking and/or loss of material in these steam generator components will detect cracking and/or loss of material.

Response

Loss of material and cracking within the replacement steam generator (RSG) secondary side components addressed by this RAI (i.e., feedwater distribution assembly, tube support plates, flow distribution baffles, and anti-vibration bars) are managed primarily through the preventive features of the FNP Secondary Water Chemistry Control Program.

For these secondary side components, the FNP RSGs incorporate improvements in materials of construction to address industry-experienced degradation issues. The RSGs utilize thermally treated Alloy 690 base metal and Alloy 52/152 weld materials (Alloy 600 materials are prohibited in the RSGs). Corrosion resistant materials (ASME SA-240 Type 405 ferritic stainless steel) were used in the tube support plates and the flow distribution baffle (the support plates in the original SGs were carbon steel). Anti-vibration bars are also constructed from ASME SA-240 Type 405 ferritic stainless steel. The feedwater distribution assembly is an elevated feed ring design and consists of a thermally treated Alloy 690 thermal sleeve which transitions to an elevated feedwater distribution ring pipe constructed from alloy steel with spray nozzles in lieu of j-tubes. The spray nozzles are fabricated from thermally treated Alloy 690. Industry experience and research demonstrate the reliability of these materials in the secondary-side environment of the SGs.

The FNP RSGs also incorporate design improvements to reduce scale buildup and deposition of solids (sludge) within the tube bundle, further reducing the potential for component degradation. The flow distribution baffle increases the flow velocity across the tubesheet surface to limit the low velocity region to the center of the tube bundle near the blowdown intake. The passively operating sludge collector reduces the amount of sludge deposited within the tube bundle. The tube support plates use broached quatrefoil shaped holes (instead of drilled holes) to improve axial flow and reduce contaminant concentration at the tube to tube support interface.

Details regarding how the FNP Steam Generator (SG) Program manages aging of the feedwater distribution assembly, tube support plates, flow distribution baffles, and anti-vibration bars are provided in the response to RAI 3.1.2.4-5. The SG Program performs an assessment based upon the FNP SG design, potential degradation mechanisms, and related FNP and industry operating experience to establish inspection requirements for secondary side internals components. FNP-specific operating experience includes

results from prior inspections and observations made during cleaning activities (e.g., sludge lancing, sludge collector cleaning, etc.). Where appropriate based on the conclusions of this assessment, visual inspections may be performed to detect component degradation.

In summary, the FNP Water Chemistry Control Program and Steam Generator Program are adequate to manage and detect cracking and/or loss of material on the secondary side of the steam generators for the feedwater distribution assembly, tube support plates, flow distribution baffles, and anti-vibration bars.

SNC credits the preventive actions of the FNP Water Chemistry Program for aging management of the primary manway covers and disc inserts in the borated water environment. The Chemistry Control Program provides for both a strongly reducing environment via the addition of oxygen scavengers and strict control of detrimental ionic species. By design, only the disc inserts are exposed to the primary water environment. These disc inserts are fabricated from ASME SA-240, Grade 304 austenitic stainless steel plate and are held in place by stainless steel screws. These inserts were heat treated after machining and are not field welded, thus eliminating sensitization issues. There has been no evidence of age-related degradation of the primary manway disc inserts or covers in the operating experience to-date. In addition, the primary manway covers and disc inserts are periodically removed in support of SG primary-side activities (e.g., eddy current testing of the SG tubes). Their condition is visually assessed as part of these normal activities.

In summary, the FNP Water Chemistry Control Program alone is adequate to manage cracking and/or loss of material in the primary manway covers and disc inserts. Visual assessment of their condition during normal SG activities provides added assurance that an aging effect will be detected prior to loss of intended function. No additional "detection" or confirmation activities are needed.

RAI 3.1.2.4-4

There are no aging effects requiring management listed for the inside environment (i.e., *exterior surfaces inside the containment structure) for the feedwater inlet nozzle*, secondary shell penetrations, upper head with integral steam nozzles, upper shells, lower shells, and transition cones in LRA Table 3.1.2-4. GALL AMP XI.M10, "Boric Acid Corrosion," states that the program covers any carbon steel and low-alloy steel structure or component on which borated water may leak.

In light of recent events at Davis-Besse that involved the leakage of borated coolant water and subsequent corrosion of a ferrous component, the staff requests that the applicant discuss why loss of material due to borated water leakage was not listed as an aging effect requiring management, and describe the program that will detect and manage borated water leakage and corrosion of the exterior surfaces (exposed to the inside environment) for these steam generator components.

Response

The FNP replacement steam generator upper head with integral steam nozzle, upper shell, transition cone, lower shell, and feedwater inlet nozzle are not subject to borated water leakage because they are not located beneath any potential source of borated water leakage and are physically separated from the primary manways. There are no borated water pipelines routed above the steam generator cubicles. The FNP replacement steam generator primary manways are located on the underside of the lower channel head. Any borated water leakage from the primary manways would either remain on the lower head or would drip downward, away from the subject steam generator sub-components. Therefore, boric acid corrosion is not considered plausible for these steam generator sub-components.

This SNC position is consistent with NUREG-1801, Volume 2, Section IV.D1. Within this section of NUREG-1801, only the steam generator lower head and primary manway component types are associated with boric acid corrosion. Steam generator upper heads, shells, transition cones, and feedwater nozzles are included in NUREG-1801, but these component types are not associated with boric acid corrosion.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

a. Scope of the program: Clarify that the scope of the Steam Generator Program credited for the management of the aging effects of the steam generator secondary-side internals includes the components listed above.

Response

Consistent with NEI 97-06 and GALL Section XI.M19, the FNP Steam Generator Program (SGP) scope includes activities to detect degradation of steam generator secondary side internal components whose failure could impact tubing integrity. NEI 97-06 includes monitoring of secondary-side steam generator components if their failure could prevent the steam generator from fulfilling its intended safety-related function. As shown in FNP LRA Table 3.1.2-4, the FNP SGP is credited to manage degradation of:

- feedwater distribution assembly,
- primary moisture separator and sludge collector assembly
- secondary moisture separator assembly
- stayrod assemblies
- tube bundle wrapper and support assembly
- tube support plates, flow distribution baffles, and anti-vibration bars
- tubesheet.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

b. Preventative actions: Discuss how the steam generator secondary-side internals are managed using preventative measures, such as materials selection and component design, so that degradation and failure are prevented or mitigated.

Response

While the FNP replacement steam generators include several design and materials improvements, these features are not preventive measures of the Steam Generator (SG) Program. Consistent with NEI 97-06 and GALL Section XI.M19, the SG Program relies upon water chemistry controls to prevent or mitigate initiation of degradation mechanisms or reduce rates of degradation. These primary and secondary-side chemistry controls are implemented as part of the FNP Water Chemistry Control Program.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

c. Parameters monitored or inspected: Discuss the aspects of the Steam Generator Program that pertain to parameters monitored or inspections performed for signs of degradation of the steam generator secondary-side internals.

Response

Consistent with NEI 97-06, the FNP Steam Generator Program includes inspection activities intended to detect degradation of secondary side internals needed to maintain tubing integrity and accomplishment of the steam generator (SG) intended safety-related functions. An assessment based upon SG design, potential degradation mechanisms, and related FNP and industry operating experience is performed to establish inspection requirements for secondary side internals components. The resulting inspection requirements are incorporated into the SG inspection plans.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

d. Detection of aging effects: Discuss how the aging effects will be detected in the steam generator secondary-side internals. Include a discussion of the methods used, such as visual inspection, ultrasonic and eddy current exams, etc., and their technical basis.

Response

The steam generator (SG) tubing eddy current testing data provides some indication of secondary-side conditions (e.g., evidence of loose parts). However, detection of aging effects in the steam generator (SG) secondary-side internals is primarily accomplished through the use of visual inspections. Industry and FNP-specific operating experience resulting from prior inspections and cleaning activities (e.g., sludge lancing, sludge collector cleaning, etc.) is considered in establishing secondary-side inspection requirements.

Inspections of SG secondary-side components are performed as needed to assess conditions or evaluate potential degradation mechanisms. Visual inspections are adequate to detect loss of material and cracking of steam generator internal support structures prior to any detrimental impact on tube integrity. Various tools and techniques are available for visual inspection of secondary side components however the choice of visual tools and techniques is dependent on the points of interest for the inspection.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

e. Monitoring and trending: Discuss how monitoring and trending will be used to detect, in a timely manner, aging effects in the applicant's steam generator secondary-side internals.

Response

Consistent with NEI 97-06, secondary side steam generator components whose failure could prevent the steam generator from fulfilling its intended safety-related function shall be monitored. NEI 97-06 states "The monitoring shall include design reviews, an assessment of potential degradation mechanisms, industry experience for applicability, and inspections, as necessary, to ensure degradation of these components does not threaten tube structural integrity and leakage integrity or the ability of the plant to achieve and maintain safe shutdown." Inspection requirements are based upon the results of an assessment which considers steam generator design, potential degradation mechanisms, and related FNP and industry operating experience. Inspection results are documented and, when applicable, trends are used to alter the inspection requirements for subsequent inspections.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

f. Acceptance criteria: Discuss the acceptance criteria against which the need for corrective actions will be evaluated, and what actions that will be taken upon the detection of degradation in the steam generator secondary-side internals.

Response

Acceptance criteria for inspections of secondary side components are based on the inspection method and engineering evaluation. Visual inspections typically use qualitative criteria for identifying degradation sufficient to warrant further evaluation. Further evaluation may involve additional inspection and engineering evaluation to quantify the amount of degradation (e.g., ultrasonic testing to determine actual wall thickness and engineering evaluation to compare the results to the design requirements). Corrective actions can include follow-up inspections to assess the rate of degradation or repair/replacement of the degraded component, or other actions as deemed appropriate. Any rate of degradation that could potentially result in a loss of steam generator tube integrity or loss of intended function prior to the next scheduled inspection is unacceptable.

When test or inspection results do not satisfy established acceptance criteria, corrective actions are initiated using a condition report. The FNP corrective actions program described in Section B.1.4.1 of the LRA is consistent with the corrective actions described in NUREG 1801, Section XI.M20, Branch Technical Position RLSB-1 in Section A.1.2.3.7 of NUREG 1800 and 10 CFR Part 50, Appendix B.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

g. Operating experience: Provide details of the most recent inspections of the steam generator secondary-side internals to support the assertion that the applicant's program for management of degradation is effective. Include in the discussion the operating experience of other plants with similar steam generator secondary-side internals.

Response

The FNP replacement steam generators (RSGs) are a Westinghouse Model 54F with significant design and material improvements as compared to the original Westinghouse Model 51 steam generators. The RSGs were installed in Unit 1 in May of 2000, and in Unit 2 in May of 2001. To date, no degradation of the Model 54F replacement steam generator secondary side components has been identified at FNP. In addition, SNC is not aware of any degradation of similar model replacement steam generators within the industry. A review of generic communications issued since NUREG-1801 did not identify any applicable degradation issues.

The FNP Steam Generator Program is a mature program with significant operating experience managing steam generator degradation issues with the original Model 51 steam generators. This program successfully managed degradation of the Model 51 steam generator secondary-side internals without loss of component intended function prior to their replacement.

RAI 3.1.2.4-6

The applicant's FSAR states that the Steam Generator Program, used to perform tube surveillance, is in accordance with the Technical Specifications, and that the Steam Generator Program is based on NEI 97-06. The applicant also states that the Steam Generator Program is consistent with the ten attributes of the aging management program GALL Section XI.M19 (Steam Generator Tube Integrity).

However, the FSAR does not describe the management of the aging effects of the steam generator secondary-side internals. The staff requests that the applicant state in the FSAR that the aging effect of steam generator secondary-side internals will be managed in a manner consistent with the attributes described in RAI 3.1.2.4-5.

Response

Section A.2.7 of the FSAR supplement will be revised as follows (changes indicated by ***bold italics***):

A.2.7 STEAM GENERATOR PROGRAM

The Steam Generator Program used to perform replacement steam generator tube surveillance in accordance with the Technical Specifications will be continued during the period of extended operation. ***The program includes monitoring of steam generator secondary side internal components whose failure could prevent the steam generator from fulfilling its intended safety-related function.*** The program will be based upon NEI 97-06, "Steam Generator Program Guidelines" or its successors.

This program is consistent with the 10 attributes of the aging management program described in NUREG-1801, Section XI.M19.

RAI 3.5-12

Item 3.5.1-23, Table 3.5.1 (page 3.5-27) of the Farley LRA lists Water Chemistry and monitoring of spent fuel pool water level as aging management programs credited to manage aging of Group 5 liners. FNP stated under the discussion column that AMR results are consistent with NUREG -1801 with some minor exceptions and loss of material due to localized corrosion will be managed by FNP Water Chemistry Control Program. Clarify what is intended by the term "some minor exceptions?" Is spent fuel pool water level monitoring credited as part of the FNP's AMPs for aging management of this item? If not, provide the basis for not crediting the spent fuel pool water level monitoring program as indicated in NUREG -1801, item III A5.2-b (page III A5-10).

Response

The Group 5 liners (spent fuel pool, refueling cavity and canal) are age- managed by the Water Chemistry Control Program. The NUREG-1801 aging management review (AMR) results in Table 3.5.1 for item 3.5.1-23 indicate two aging effects/mechanisms for the Group 5 liners: loss of material due to crevice corrosion, and stress corrosion cracking (SCC). In the discussion column for this item, SNC states "SCC is not applicable for reactor cavity or spent fuel pool liners because it is not subject to high temperatures and an aggressive environment." This was termed a "minor exception." SNC provided additional information on this determination in our April 7, 2004 response to RAI 3.3-17b (SNC letter number NL-04-0473). Although SCC was determined to not be applicable, there is no impact on relying on the Water Chemistry Control Program as the aging management program for the Group 5 liners.

Monitoring of the spent fuel pool water level is not credited as part of aging management for the Group 5 liners. The effectiveness of the Water Chemistry Control Program at managing crevice corrosion in stainless steels in a borated water environment has been demonstrated in industry and FNP-specific operating experience.

SNC does not consider spent fuel pool water level monitoring adequate to detect small leaks in the pool liner. The large volume of the pool, pool inventory manipulations to support fuel movement activities, and normal make-up requirements (e.g., for evaporative losses) would mask any pool level impact. FNP confirms SFP liner integrity by periodic monitoring of the pool's leak chase drain system. This system consists of a leak chase that collects leakage into the area between the SFP liner and the concrete retaining wall. The tell-tale drain valves are opened periodically (currently done at least annually) and any water collected is volumetrically measured and sampled for boron concentration.

RAI 3.6.2-2

Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR). Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in the instrument loop. The Farley LRA stated that a representative sample of instrumentation circuit cables with sensitive, high-voltage low-level signals which are installed in adverse localized environments will be tested at least every 10 years. This sampled approach to a small population in this category of sensitive cables is not consistent with previously accepted NRC position documented in Interim Staff Guidance (ISG) 15, "Revision of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.E2, 'Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits."

During the AMP audit conducted at Southern Nuclear Operating Company (SNC) during the week of November 3, 2003, and by its letter NL-03-2418, dated December 5, 2003, the applicant indicated that it would amend the AMP to include all the instrumentation cables in this population. Provide the revised AMP.

Also, provide a description of the testing program that will be relied upon to detect aging degradation in sensitive, low-level signal circuits.

Response

As indicated in our letter NL-03-2418, dated December 5, 2003, the Non-EQ Cables Program is revised to remove any reference to a "a representative sample" from the description of the population of instrument cables with sensitive, high voltage, low-level signals which are installed in adverse localized environments being tested.

SNC will employ a proven cable system test for detecting deterioration of the insulation system such as insulation resistance tests, time domain reflectometry tests, or other testing judged to be effective in determining cable insulation condition. The first test shall be completed prior to the end of the current license term.

Conforming changes to subsection **B.5.6.1, Non-EQ Electrical Cables Used In Instrumentation Circuits (Alternate XI.E2),** in the Non-EQ Cables Program description in Appendix B.5.6 are indicated below (changes are indicated by ***bold italics*** with deletions indicated by strikethrough).

Under subsection **B.5.6.1.5, Parameters Inspected or Monitored**:

> ~~A representative sample of~~ ***All*** instrument circuit cables with sensitive, high voltage, low-level signals which are installed in adverse localized environments will be tested. Parameters monitored will be determined from the type of test performed and will be specific to radiation monitoring and nuclear instrumentation circuits. The technical basis for the sample will be documented.

Under subsection **B.5.6.1.6, Detection of Aging Effects:**

~~A representative sample of~~ ***All*** instrumentation circuit cables with sensitive, high voltage, low-level signals which are installed in adverse localized environments will be tested at least once every 10 years. The type of test performed will be applicable to radiation monitoring and nuclear instrumentation circuits. ***SNC will employ a proven cable system test for detecting deterioration of the insulation system such as insulation resistance tests, time domain reflectometry tests, or other testing judged to be effective in determining cable insulation condition.*** The first test will be completed before the beginning of the period of extended operation.

RAI 3.6.2-3

Surface oxidation of high voltage electrical switchyard bus connections are not considered significant aging mechanism at FNP. In its letter NL-03-2418, dated December 5, 2003, SNC addressed this concern by stating that, based on the operating experience at FNP, the surface oxidation did not affect the function of the conductors and cable accessories. SNC also stated that the connection surfaces were coated with an anti-oxidant compound prior to tightening the connection. Confirm that the anti-oxidant compound is stable, at a minimum, through the period of the extended operation.

Response

The anti-oxidant compound is a consumable which is used for initial assembly of connections and replaced as required when connections are taken apart and reassembled (e.g., during routine maintenance). The anti-oxidant compound has proven to be stable through many years of service at FNP. Operating experience confirms that FNP has had no failures of connections due to degradation of the compound.

RAI 3.6.2-4

The most prevalent mechanism contributing to loss of high voltage transmission conductor strength is corrosion which includes corrosion of steel core and aluminum strand pitting. In its letter NL-03-2418, dated December 5, 2003, SNC addressed the loss of strength caused by aging by referring to an Ontario-Hydro corrosion test which demonstrated satisfactory strength in 80-year old aluminum cable-steel reinforced (ACSR) conductor. Confirm that the conductors in use at FNP are identical to those tested by Ontario-Hydro or provide an evaluation of the differences. Also, indicate the useful life of the transmission conductors and their accessories such as line terminal connectors and line splices used at FNP.

Response

The aluminum cable-steel reinforced (ACSR) conductors tested by Ontario-Hydro are representative of the overhead conductors used at FNP. These conductors are constructed of aluminum strands with a stranded galvanized steel reinforced center. An exact match between the conductor size and stranding for every cable used in the high voltage switchyard at FNP and those tested by Ontario-Hydro was not determined, nor is it considered necessary. The key point is the configuration of aluminum cable reinforced with steel, not the conductor size and stranding ratio. The test performed on ACSR conductors by Ontario-Hydro is representative of and applicable to the ACSR conductors at FNP.

Transmission conductor accessories, such as line terminal connectors and line splices, are made from aluminum or galvanized steel. There are no organic components to restrict the useful life of the accessories. The useful life of aluminum and galvanized steel materials in transmission system service are consistent with or greater than the ACSR conductors.

The spans in the high voltage switchyard are much less that what would be found in a typical transmission line. Therefore, the tension exerted on the conductors and accessories is less than would be experienced in typical applications. The FNP AMR results (i.e., no aging effects requiring management) are consistent with the conclusion of previous applicants including the most recent applicants. There are no applicable aging effects that could affect the function of the transmission conductors for the period of extended operation. No aging management program was required in the SER for any of these plants.

RAI 3.6.2-5

Section 2.2, Table 2.2-1f of the LRA indicates that the non-segregated phase bus duct is included within the scope of license renewal for FNP. In its letter NL-03-2418, dated December 5, 2003, question E17, SNC stated that the term non-segregated buses listed in Table 2.2-1f was the same component as metal enclosed cable bus listed in Table 2.5.1. The applicant stated that its review of metal enclosed cable bus has concluded that no aging effects exist requiring an aging management program.

Industry operating experiences, as documented in Information Notices 89-64, 98-36, 2000-14, and Sandia 96-0344, indicate problems associated with bus ducts. The problems are related to the insulation material deterioration due to aging, moisture/debris intrusion, and bolt loosening due to thermal cycling. The applicant is requested to describe the aging management review that was used to reach its conclusion.

Section 3.6 of LRA did not address the non-segregated phase bus duct. The applicant is requested to describe how it plans to manage the aging effects associated with this equipment.

Response

Non-segregated phase bus duct is characterized as all three phases contained in a single enclosure. This could be exposed conductors (ie. tube, bar, channel, etc.) insulated from the enclosure or it could be insulated cable. The bus duct configuration utilized at FNP is insulated cable in a vented tray traversing from start-up auxiliary transformers to switchgear locations. Cable splices are made in tap boxes. The tap boxes contain aluminum channel conductors mounted on insulators. Cable conductors are equipped with connectors which are bolted to the channel conductors.

Materials

The non-segregated phase bus ducts are constructed of the following materials:
- aluminum
- galvanized steel
- stainless steel
- porcelain
- various organic polymers
- fiberglass

Environments

The non-segregated phase bus ducts are exposed to inside and outside environments.

An inside environment is associated with components that are found within environmentally controlled structures. As a minimum, temperature is controlled to prevent freezing. This environment would include the Auxiliary and Turbine Buildings for Metal Enclosed Cable Bus.

In an outside environment, components may be exposed to direct sunlight, precipitation,

and freezing conditions. This environment is termed "weather exposed" by the GALL report and for Metal Enclosed Cable Bus would include the low voltage switchyard.

Aging Effects Evaluation

Aging effects for the non-segregated phase bus ducts requiring evaluation are those associated with insulation material deterioration due to aging, moisture/debris intrusion, and bolt loosening due to thermal cycling.

Insulation Material Deterioration Due to Aging:

The cable bus ducts are located both inside and outside. The metal bus duct enclosures provide protection for the enclosed insulated cables against weather. The bus cables exit the bus duct enclosures in the low voltage switchyard and approximately six feet of the cables are exposed where they connect to the start-up auxiliary transformers. The exposed cable insulation is EPR with a Hypalon (chlorosulfonated polyethylene) jacket. These materials are discussed in SAND96-0344 – Aging Management Guideline for Commercial Nuclear Power Plants – Electrical Cable and Terminations and the cables have no significant aging effects when exposed to these conditions. Therefore, insulation material deterioration due to aging is not an aging effect requiring management.

Moisture/Debris Intrusion:

The cable bus duct enclosures are constructed of sheet aluminum attached to an aluminum angle frame with both welded and bolted connections. The side panels are louvered. Bus duct enclosures are located both inside and outside. Tap boxes are constructed similar to bus duct enclosures, except with solid covers. All tap boxes for in-scope cable bus ducts are located inside. Moisture and debris can possibly enter the cable bus duct through the louvered side panels. However, this has no adverse affect on the insulated cable conductors. Entry of moisture and debris into the tap boxes is precluded by the solid cover design. Therefore, moisture/debris intrusion is not an aging effect requiring management.

Bolt Loosening due to Thermal Cycling:

Industry experience has shown that bus ducts exposed to appreciable ohmic or ambient heating during operation may experience loosening of bolted connections related to the repeated cycling of connected loads or the ambient temperature environment. This phenomenon can occur in heavily loaded circuits (i.e., those exposed to appreciable ohmic heating or ambient heating) that are routinely cycled.

The cable bus duct was designed for a "hottest spot temperature rise" of 35° C above 40° C. This results in a temperature of 75° C (167° F). The cables contained in the cable bus duct are insulated with EPR insulation. Per Table 9.1 in the EPRI License Renewal Electrical Handbook 1003057 Final Report, dated December 2001, 167° F equates to a 60 year life.

The portions of the metal enclosed cable bus duct in scope for license renewal are normally energized. Thus, routine cycling is not experienced. Connections from bus to equipment are made with Belleville washers which are superior to split washers in

maintaining compression force on the connections. The FNP non-segregated phase bus ducts are designed to carry the output of the start-up auxiliary transformers. The worst case loading on any portion of the cable bus duct for either unit is approximately 65%. Therefore, bolt loosening due to thermal cycling is not an aging effect requiring management.

Review of Operating Experience:

A review of plant operating experience at FNP did not reveal any issues for the cable bus duct.

Industry operating experience was reviewed for problems associated with bus ducts. The following items were selected for further review and dispositioned:

> Information Notice 89-64, "Electrical Bus Bar Failures", was issued to address Noryl insulated medium voltage bus bar failures that occurred at several nuclear facilities. The failures identified in Information Notice 89-64 were attributed to cracking of the Noryl bus bar insulation in combination with the accumulation of moisture or debris in the bus duct housings that provided a tracking path to ground. Noryl is the General Electric Trademark name for a plastic type electrical insulation material.
>
> Information Notice 98-36, "Inadequate or Poorly Controlled, Non-Safety Related Maintenance Activities Unnecessarily Challenged Safety Systems", notified licensees of various inadequate maintenance activities (e.g., failure to install gaskets or caulking of outdoor components) in the industry which resulted in moisture intrusion and challenges to safety related systems.
>
> Information Notice 2000-14, "Non-Vital Bus fault Leads to Fire and Loss of Offsite Power", informed licensees of a transient at Diablo Canyon nuclear plant caused by a failure of a bus bar due to overheating at a splice joint. Potential causes of the failure include inconsistent silver plating of aluminum bus bars, currents approaching bus capacity, undersized splice plates, torque relaxation of connecting bolts, and undetected damage from a 1995 explosion of Auxiliary Transformer 1-1.

Non-segregated phase bus duct is characterized as all three phases contained in a single enclosure. This could be exposed conductors (ie. tube, bar, channel, etc.) insulated from the enclosure or it could be insulated cable. The bus duct configuration utilized at FNP is insulated cable in a vented tray traversing from start-up auxiliary transformers to switchgear. The problems documented in Information Notices 89-64, 98-36, and 2000-14, apply to bus duct with exposed bar conductors. The failure mechanisms identified in Information Notices 89-64 and 98-36 are not applicable to FNP because FNP bus ducts do not have exposed conductors.

Some of the potential causes of the bus bar failure addressed in Information Notice 2000-14 could apply to other types of bus duct designs. These mechanisms include currents approaching bus capacity and torque relaxation of connecting bolts. The FNP non-segregated phase bus ducts are designed to carry the output of the start-up auxiliary transformers. The worst case loading on any portion of the cable bus duct for

either unit is approximately 65%. Connections from bus to equipment are made with Belleville washers which are superior to split washers in maintaining compression force on the connections. Therefore, currents approaching bus capacity and torque relaxation are not applicable aging mechanisms for the non-segregated phase bus ducts at FNP.

Aging Management Review Results Summary

SNC concluded that none of the aging effects evaluated for non-segregated phase bus duct require management. Although the aging management review concluded there were no aging effects requiring management, the non-segregated phase bus duct cables are included in the Non-EQ Cables Program as noted in the discussion column for item 3.6.1-2 in LRA Table 3.6.1.

RAI 3.6.2-6

The FNP FSAR does not describe the electrical system grounding. Are the safety related 4160V and 480V systems solidly grounded or grounded through an impedance? Describe the cable that grounds the system. Is it a bare conductor or insulated? How is the ground connection monitored for the effects of aging, such as corrosion or mechanical wear?

Response

Safety related 4160V and 600V systems are grounded through neutral grounding resistors at the low (Wye) side of the start-up auxiliary transformers and at the generator neutral of the emergency diesels. The ground cables from the start-up auxiliary transformers to their neutral grounding resistors and the neutral grounding resistors to ground are bare copper cables. The ground cables from the diesel generators to the neutral grounding resistors are insulated copper cables. The ground cables from the emergency diesel generators neutral grounding resistors to ground are bare copper cables. In addition, each piece of electrical distribution equipment (switchgear, MCC, etc.) has a chassis ground connection using bare copper cable.

Operability of the ground conductor is not credited as part of the FNP design basis analysis for meeting safety-related requirements. The ground conductor has not been credited as part of the design basis analysis for ensuring that there is sufficient independence of redundant systems to meet single failure requirements. The grounding systems do not perform an intended function and therefore are not in scope for license renewal (refer to LRA Table 2.2-1i). The chassis grounds in electrical distribution equipment are part of the active equipment and do not require an aging management review. Therefore, none of the ground connections are monitored for effects of aging under license renewal.

The staff has agreed to this position in the final SER for McGuire/Catawba (NUREG-1772). NUREG-1772 states "Because the plant conforms with single failure criteria, and because operability of the ground conductor has not been credited as part of the design basis analysis for ensuring that there is sufficient independence of redundant systems to meet single failure requirements of Criterion 17 of 10 CFR Part 50, Appendix A, the staff agrees that the uninsulated ground conductors are not within scope because a failure of these components would not prevent satisfactory completion of any of the safety-related functions identified in 10 CFR 54.4(a)(1)(i), (ii), or (iii)."

ENCLOSURE 2

Joseph M. Farley Nuclear Plant Units 1 and 2

Application for License Renewal

Responses to March 23, 2004 Requests for Additional Information

RAI 2.0-2

The following questions are CONFIRMATORY and CLARIFICATION (C/C) in nature. The corresponding draft RAI number associated with each question is indicated in parenthesis.

I. (D-RAI 2.3.3.6-3)

License renewal boundary drawings D-175002L and D-205002 have notations that are not explained in the standard P&ID symbol legend or license renewal drawing legend. For example, barriers shown on Sheet 3 of license renewal boundary drawings D-175002L and D-205002L (at locations B-6 and B-8, C6 and C8, and D6 and D8) are not defined in the CCW system drawings or the legend drawings. Define these notations and explain the significance of including these barriers in the license renewal boundary drawings.

Response

These "barriers" are actually in-scope concrete walls and are included in the civil/structural portion of the LRA (see LRA Table 2.4.2.1, "Masonry Walls"). Structural components are not normally shown on mechanical boundary drawings and in those rare cases where they are shown, they are not highlighted because they are not in the mechanical scope.

RAI 2.2-5

Clarify how the components listed below are addressed in the Farley LRA. These components are shown as being within the scope of license renewal on the license renewal boundary drawings. However, they are not listed in the LRA tables (e.g., Table 2.3.3.5 for open-cycle cooling water system components subject to an AMR). These components are passive and long-lived, and serve a pressure boundary intended function. Justify the exclusion of these components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

a. Flexible hoses/connections and flexible joints shown at multiple locations in the open-cycle cooling water, closed-cycle cooling water, and emergency diesel generator systems.

Response

Flexible hoses/connections and flexible joints in the open-cycle cooling water (OCCW) and closed-cycle cooling water (CCW) systems are metallic, are in-scope, and are encompassed in the "piping" component type. The "piping" component type is included in Table 2.3.3.5 for OCCW and Table 2.3.3.6 for CCW. The intended function is pressure boundary.

Flexible hoses/connections and flexible joints in the emergency diesel generator system (EDG) are constructed of elastomers and are in-scope for license renewal but were omitted from the LRA.

The component type "Flexible Connectors" should have been included in LRA Table 2.3.3.15 as follows:

Component Type	Intended Function
Flexible Connectors	Pressure Boundary

Corresponding, LRA Table 3.3.2-15 should have included this component type (Flexible Connectors) as follows:

Component Type *GALL Reference*	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flexible Connectors *None*	Pressure Boundary	Elastomers	Closed Cooling Water	Change in Material Properties, Cracking, and Loss of Material	External Surfaces Monitoring Program			J
			Air/gas (wetted) [Air Intake Piping Connectors]	Change in Material Properties, Cracking, and Loss of Material	External Surfaces Monitoring Program			J
			Lube Oil	Change in Material Properties, Cracking, and Loss of Material	External Surfaces Monitoring Program			J
			Inside	Change in Material Properties, Cracking, and Loss of Material	External Surfaces Monitoring Program			J

The scope of the External Surfaces Monitoring Program (Section B.5.3.5) will be expanded to include elastomer flexible connectors in the EDG Systems.

RAI 2.2-5

Clarify how the components listed below are addressed in the Farley LRA. These components are shown as being within the scope of license renewal on the license renewal boundary drawings. However, they are not listed in the LRA tables (e.g., Table 2.3.3.5 for open-cycle cooling water system components subject to an AMR). These components are passive and long-lived, and serve a pressure boundary intended function. Justify the exclusion of these components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

b. Nitrogen cylinders and air tanks shown within the scope of license renewal on several license renewal boundary drawings. However, these components are not listed in LRA tables for components subject to an AMR. If they are excluded because they are subject to replacement as defined in 10 CFR 54.21(a)(1)(ii), describe the schedule for periodic replacement or the monitoring program and criteria for replacement if replaced on condition.

Response

Nitrogen cylinders or bottles are in scope to provide a backup source of pneumatic pressure and are short lived, being subject to replacement based on a qualified life, a specified time period, or on condition [10 CFR 54.21(a)(1)(ii)]. The nitrogen cylinder pressure is monitored daily (every 4 and 8 hours) and if the pressure has decayed below a specified value, the cylinder is replaced. Please note that the nitrogen cylinders mentioned in the question are included in the compressed air system (CAS) rather than the open-cycle cooling water system (OCCW).

Air tanks within the scope of license renewal are used in various applications and listed in the LRA tables under several component types. In the Compressed Air and Emergency Diesel Generator LRA System (Tables 2.3.3.7 and 2.3.3.15), component types "Air Accumulators" and "Air Receiver" address various air tanks that provide a reserve air capacity for system-level use. Some in-line air tanks are included within the component type "Piping" (due to similarity to piping and other in-line fittings and components). These air tanks are subject to an AMR.

Pneumatic valve operators can include air reservoirs or "air tanks" that are (typically) supplied by the valve vendor and mounted on the valve as part of the valve operator assembly. These "air tanks" are an integral part of the valve operator, directly support the active function of the operator, and are included as part of the valve operator component for license renewal. The valve operator only performs an active function and therefore is not subject to an aging management review. Age-related degradation of the valve operator is managed under the requirements of the Maintenance Rule.

RAI 2.3.3.5-1

a. On license renewal boundary drawing A-200475L, sheet 47, the compressed air filter N2P16F560 is shown as within the scope of the license renewal, however, it is not listed in Table 2.3.3.5 as being subject to an AMR. Air filters are passive and long-lived components, and serve a pressure boundary intended function. Justify the exclusion of the filter housing from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

The details shown on license renewal boundary drawing A-200475L, sheet 47 includes the subparts of the valve actuator assembly. The air filter is (typically) supplied by the valve vendor and mounted on the valve as part of the valve operator assembly. The air filter is an integral part of the valve operator and included as part of the valve operator component for license renewal. The valve operator only performs an active function and therefore is not subject to an aging management review. Age-related degradation of the valve operator is managed under the requirements of the Maintenance Rule.

RAI 2.3.3.5-1

b. On license renewal boundary drawings A-170059L, sheet 146, and A-200475L, sheet 47, there are two components with symbols, which appear to be a roto-flow meter and a pressure regulator, that are not identified in the license renewal boundary drawings for P&ID legend and symbols. These components are shown as within the scope of license renewal. Provide additional information to identify these components and clarify whether they are included in LRA Table 2.3.3.5. If not, justify why they are excluded from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(21).

Response

These components are a check valve and a self-contained pressure regulator valve which are part of the active valve operator assembly. The symbol for the self-contained pressure regulator valve is found on legend drawing D175016L sheet 2 under "self-actuating devices." The check valve symbol used on A170059L sheet 146 and A200475L sheet 47 represents an older style box symbol for check valves that is not found on the legend drawing because currently, its use has been discontinued.

The details shown on license renewal boundary drawings A-170059L, sheet 146 and A-200475L, sheet 47 include the subparts of the valve actuator assemblies. The check valve and self-contained pressure regulator valve shown is (typically) supplied by the valve vendor and mounted on the valve as part of the valve operator assembly. The check valve and self-contained pressure regulator valve are integral parts of the valve operator and included as part of the valve operator component for license renewal. The valve operator only performs an active function and therefore is not subject to an aging management review. Age-related degradation of the valve operator is managed under the requirements of the Maintenance Rule.

RAI 2.3.3.6-1

For the Units 1 and 2 reactor coolant drain tank heat exchangers (Q1G21H001 and Q2G21H001):

a. LRA Table 2.3.3.6 lists the heat exchanger tubesheet as within the scope of license renewal and subject to an AMR. However, the heat exchanger channel is shown as outside the scope of licensing renewal on Sheet 2, at location G-4, of license renewal boundary drawings D-175002L and D-205002L. Heat exchanger channels serve a pressure boundary intended function, and are passive and long-lived components. Justify exclusion of the reactor coolant drain tank heat exchanger channel from the scope of licensing renewal and being subject to an AMR in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1), respectively.

b. Table 2.1-3 of NUREG-1800 lists the heat exchanger intended functions as heat transfer and pressure boundary. Clarify why the heat transfer intended function is not listed in LRA Table 2.3.3.6 as an intended function for the reactor coolant drain tank heat exchangers.

Response

The channel side of the reactor coolant drain tank (RCDT) heat exchanger is in the liquid waste and drains system (LWD) and processes reactor coolant liquid waste from the reactor coolant drain tank. Processing reactor coolant liquid waste from the reactor coolant drain tank is not in-scope for 10 CFR 54.4, however those components that perform the containment isolation function are in scope of license renewal (see drawings D175042L sheet 1 on Unit 1 and D205042L sheet 1 on Unit 2). The shell and tube side of the RCDT heat exchanger (including tubesheets) is in the component cooling water system (CCW) and is in-scope to preserve the pressure boundary intended function for CCW components. The components of the RCDT heat exchanger that perform the in-scope pressure boundary intended function are the tubes (internal and external surfaces), the tube sheets, and the shell. These components are in-scope and highlighted on the LRA boundary drawings (D175042L sheet 1 and D175002L sheet 2 for Unit 1, D205042L sheet 1 and D205002L sheet 2 for Unit 2). The channel side of the RCDT heat exchanger does not come in contact with the CCW fluid pressure boundary and is not relied upon to preserve the pressure boundary intended function for CCW components. A failure in the LWD system pressure boundary (channel side of RCDT heat exchanger) will have no adverse effect on the CCW pressure boundary intended function.

It is noted that the shell and tube portions of the RCDT heat exchanger are in scope only because the shell side (CCW) is not automatically isolated during an emergency. The pressure boundary intended function for CCW components must be preserved to assure no loss of CCW inventory during an emergency, when CCW cooling of other safety-related equipment is relied upon. Since processing reactor coolant liquid waste from the reactor coolant drain tank is not in-scope for 10 CFR 54.4, the heat transfer is not an in-scope intended function for this heat exchanger and should not appear in Table 2.3.3.6.

RAI 2.3.3.6-2

The Units 1 and 2 post accident sample coolers (Q1P15H001A/B and Q2P15H001A/B) on license renewal boundary drawings, D-175002L and D-205002L, Sheet 3, locations E-10 and E-11, are depicted as outside the scope of license renewal. However, these coolers are shown as being within the scope of license renewal on the Units 1 and 2 sampling system boundary drawings (Sheet 1 of license renewal boundary drawing D-175009L at location E-7 and Sheet 1 of license renewal boundary drawing D-205009L at locations D-7 and A-6).

a. Explain why the post accident sample coolers are considered outside the scope of license renewal as shown on license renewal boundary drawings, D-175002L and D-205002L, Sheet 3.

Response

The tube side of the post accident sample coolers is in the sampling system (SAMPL) and in-scope for fire protection (10 CFR 50.48) of 10 CFR 54.4(a)(3). In the event of a fire, manual sampling of certain parameters is performed to determine that an adequate cold shutdown margin has been achieved. The tube side of these coolers is in-scope for pressure boundary integrity, to ensure that a flow path to the sample sink is maintained. These coolers are not in-scope for the heat exchange intended function because the samples are taken when the fluid is relatively cool (approximately 200° F).

The shell side of these coolers is in the closed cooling water (CCW) system and not in scope. The shell side does not come in contact with the fluid pressure boundary of the tube side of the cooler. CCW cooling flow is not required in the event of a fire because as stated above, the samples are taken when the fluid is relatively cool and remains in the liquid state.

The "Exchange Heat" intended function shown in LRA Tables 2.3.3.24 and 3.3.2-24 for these coolers is incorrect and is removed.

RAI 2.3.3.6-2

The Units 1 and 2 post accident sample coolers (Q1P15H001A/B and Q2P15H001A/B) on license renewal boundary drawings, D-175002L and D-205002L, Sheet 3, locations E-10 and E-11, are depicted as outside the scope of license renewal. However, these coolers are shown as being within the scope of license renewal on the Units 1 and 2 sampling system boundary drawings (Sheet 1 of license renewal boundary drawing D-175009L at location E-7 and Sheet 1 of license renewal boundary drawing D-205009L at locations D-7 and A-6).

b. Explain whether the CCW pipe segments and valves (e.g., globe valve NV181A) associated with these coolers should be within the scope of the license renewal and subject to an AMR. If not, justify the exclusion of these components from being within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The CCW pipe segments and valves associated with these coolers are not in the scope of license renewal. These components are located on the non-safety related miscellaneous equipment header which automatically isolates on certain signals such as low-low level in the surge tank. See our response to D-RAI 2.3.3.6-2a for explanation of the scoping basis for the post-accident sample coolers.

RAI 2.3.3.7-1

License renewal boundary drawings D-170131L, Sheet 2, at location B13 and D-200019L, Sheet 1, at location B11 show compressed air lines, which are outside the scope of license renewal, continuing to "Air to Essential Instruments" on drawings D-170473, Sheet 1 and D-200020, Sheet 1. However, drawings D-170473, Sheet 1 and D-200020, Sheet 1 are not included in the license renewal boundary drawings provided for review. Identify the "essential instruments" and whether intended functions are performed that rely on the compressed air supplied from these air lines, or provide drawings D-170473 and D-200020, Sheet 1. This will allow the staff to determine whether the instrumentation air components on the lines to the "essential instruments" should be considered as being within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

On LRA boundary drawings D-170131L Sheet 2 (location B13), and D-200019L Sheet 1 (location B11), the continuation flags indicating "Air to Essential Instruments" depict air service to components in the Turbine Building that are not in the scope of license renewal. The "essential instruments" referred to by the continuation flag (e.g., heater drain valves to the condenser, steam jet air ejector bypass valve, moisture separator reheater drain valves to the condenser), are essential for power production but are not required to support a safety function or a regulated event. The Compressed Air System is designed to preferentially isolate portions of the system on decreasing system pressure to maintain air pressure to the auxiliary and containment buildings. Air operated valves V903 (and V904) isolate the subject lines providing the "Air to Essential Instruments" on decreasing pressure in the compressed air system.

License renewal boundary drawings were not created for D-170473, sheet 1 or D-200020, sheet 1 because they do not contain any in-scope components.

RAI 2.3.3.7-2

The staff is seeking clarification and explanation as to why certain components and their associated pipe segments and valves are considered outside the scope of license renewal and not subject to an AMR, while components in parallel trains are considered to be within the scope of license renewal and subject to an AMR.

a. License renewal boundary drawings D-170131, and 200019L (for Units 1 and 2, respectively), Sheet 1 depict that trains "A" and "B" of the air compressors (C001A/B), air receivers (T001A, T001B1, and T001B2) and their associated piping to the check valve downstream of the receivers are excluded from the scope of license renewal. However, license renewal boundary drawings D-170131L, Sheet 5, and D-200019L, Sheet 2 show that the train "C" air compressor, air receiver, and their associated piping are within the scope of the license renewal. For both units, describe how the above-mentioned components for trains "A" and "B" differ from the components for train "C." Explain how these differences were considered in the scoping and screening process for trains "A" and "B."

b. For trains "A" and "B," explain why piping and valves downstream of the check valves (shown on license renewal boundary drawings D-170131L and D-200019L, Sheet 1 at locations B6, E6 and G6) are considered to be within the scope of license renewal, if the air compressors and receivers are considered not within the scope.

Response

The compressed air system (CAS) is not required for design basis safe shutdown or to prevent/mitigate the consequences of an accident. However, certain components of the CAS are in-scope for 10 CFR 54.4(a)(3), the fire protection regulated event (10 CFR 50.48). The "C" air compressors, their associated receivers and dryers, as well as segments of the air distribution system are relied upon for compliance with 10 CFR 50.48.

For both units, the "A" and "B" air compressors, air receivers and their associated piping to the check valves downstream of the receivers are not in the scope of license renewal because they are not relied upon for compliance with 10 CFR 50.48. Large portions of the air distribution system downstream of these check valves are brought into scope because of no readily available means to isolate them from those segments relied upon for compliance with 10 CFR 50.48.

All passive, long lived CAS components that are in scope for compliance with 10 CFR 50.48 as described above ("C" and portions of "A" and "B" distribution system) were included in the screening process.

RAI 2.3.3.7-3

Clarify whether the components of the dryer and/or compressor assemblies are scoped and screened as complex assemblies. Regarding complex assemblies, Table 2.1-2 of NUREG-1800 states that "some structures and components, when combined, are considered a complex assembly. . . . An applicant should establish the boundaries for each assembly by identifying each structure and component that makes up the complex assembly and determining whether or not each structure and component is subject to an AMR." If the dryer and compressor assemblies are treated as complex assemblies, identify the boundaries of the dryer and air compressor assemblies so that the staff may determine whether the subcomponents are within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The air compressors are classified as fully active components and are specifically excluded in the text of 10 CFR 54.21(a)(1)(i) from the requirement of an aging management review. NEI 95-10 Revision 3, which is endorsed by the NRC in Regulatory Guide 1.188, states that air compressors do not require an aging management review. The boundary of the air compressors begins from the entrance of the inlet piping to the compressor and ends where the discharge piping joins the air compressors. This is consistent with the guidance in the Standard Review Plan (NUREG-1800) Table 2.1-2 for complex assemblies.

The air dryer assemblies are complex active assemblies. Consistent with the requirements of complex assemblies, SNC broke the assembly down into individual components and performed separate evaluations. The air dryer skids contain passive pressure boundary components that SNC included in the aging management review and are shown on boundary drawings D170131L, Sheet 3 (for air dryers N1P19F001A and F001B) and D170131L, Sheet 4 (for N1P18F001A). For the purposes of the LRA, SNC rolled the components up into a single component type "Air Dryer" (LRA Table 3.3.2-7, page 3.3-63) because the aging management strategy for the components could be effectively represented that way. The boundary of the air dryer component type begins where 3" HBD-433 enters the dryer skid (note the demarcation line for SSI /Piping Contractor scope and Paul Trinity Scope highlighted in red at the flanged connections), and ends where the line leaves the skid (again note the highlighted demarcation line).

RAI 2.3.3.7-4

License renewal boundary drawing D-170131, sheet 5 at location G8, shows a Y-strainer, which is noted as "strainer by field," as within the scope of license renewal. Strainers are passive and long-lived components, and serve debris protection and pressure boundary intended functions. Justify why the Y-strainer is excluded from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

The strainer body is in scope (as indicated on the boundary drawing) for the pressure boundary intended function and is screened as carbon steel pipe (see LRA Table 2.3.3.7). The strainer element is also in scope for debris protection and was inadvertently omitted from tables 2.3.3.7 and 3.3.2-7. Below is the additional information that should have appeared in the tables.

The "Strainers (element)" component type should have been included in the Compressed Air System LRA Table 2.3.3.7 as follows:

Component Type	Intended Function
Strainers (element)	Debris Protection

Correspondingly, the Compressed Air System aging management review summary Table 3.3.2-7 should have included the following:

Component Type *GALL Reference*	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Strainers (element)	Debris Protection	Stainless Steel	Air / Gas (wetted)	Loss of Material	One-Time Inspection Program			J

RAI 2.3.3.14-1

License renewal boundary drawing D-170060L shows the storage tanks and day tanks as within scope of license renewal. These tanks are also listed in Tables 2.3.3.14 as being subject to an AMR. However, the details of the day tanks shown on drawings B-170058, Sheets 24 through 28, and the storage tanks shown on Sheets 32 through 36, are not included in the license renewal boundary drawings provided for review. Confirm that all internal and external subcomponents of the day tanks and storage tanks (for example, manholes and manhole covers) are within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively, or provide the tank drawings B-170058, Sheets 24 through 28 and the storage tanks shown on Sheets 32 through 36 for review.

Response

The subcomponents of the day tanks and the storage tanks, to the extent that they meet the criterion of 10CFR54.4(a), are in the scope of renewal. The B-drawings referred to in this RAI (drawings B-170058, Sheets 24 through 28 and 32 through 36) do not detail the internal and external parts of the reactor makeup water storage tanks. These drawings are equipment instrumentation diagrams that provide an enlarged view of the various piping and instrumentation lines that connect to the tanks and the associated instrumentation and control devices. SNC has performed a review of these B-drawings to confirm the boundary drawings provided with the LRA identify all of the components associated with the day tanks and storage tanks.

With regard to the fuel oil day tanks, the components shown on sheets 24 through 28 of B170058 are also shown on the boundary drawings provided with the LRA. Boundary drawings D170808L sheets 1 and 2, D170809L sheets 1 and 2, and D200213L sheet 1 show in highlight all of the components in the scope of license renewal with the exception of one in-scope level switch per tank that is shown in highlight on D170060L, sheet 1. These components are in scope for renewal. The passive and long-lived components have received an aging management review (AMR), and are included in the LRA Tables 2.3.3.14 and 3.3.2-14.

With regard to the fuel oil storage tanks, each sheet of B170058 (32 through 36) shows a vent line for the access compartment and a level transmitter (with associated tubing) for the storage tank that is not shown on the corresponding license renewal boundary drawing (D170060L Sheet 1). The vent line does not perform a safety related function and its failure would not adversely affect a safety related component or the performance of a safety related function. Therefore, the vent lines for the access compartments are not in the scope of 10 CFR 54.4(a). The level transmitter with associated tubing provides tank level and is conservatively being included in scope for renewal. The level transmitter is an active component and not subject to an AMR. The associated tubing has received an AMR and the results are already included under the component type "Piping" in LRA Tables 2.3.3.14 and 3.3.2-14.

D170060L, sheet 1, shows in highlight all the fuel oil storage tank components of a mechanical nature that are in scope for license renewal. The highlighted dashed line on D170060L around the storage tanks represents the "manhole shell" that is also shown on B170058, sheets 32 through 36. This is also called the access compartment for the storage tanks. The manhole, manhole covers, and access compartment (including the

roof of the compartment and the compartment access doors) are all in scope for renewal, have received an AMR and are included in the LRA Tables 2.3.3.14 and 3.3.2-14.

RAI 2.3.3.14-2

LRA Table 2.3.3.14 lists pipe guards as components that are subject to an AMR. Also, license renewal boundary drawings D-170808L, Sheets 1 and 2, and D-200213L show pipe guards from the fuel day tanks vent line to the diesel bay wall as being within scope of license renewal. However, pipe guards on 1 ½" HBC-224 pipe lines from the valve boxes to the day tank containment bay are shown on the license renewal boundary drawing D-170060L as excluded from the scope of license renewal. These pipe guards provide shelter protection for the fuel oil transfer lines, and are passive and long-lived components. Justify the exclusion of these pipe guards from being within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The pipe guards in question are located in the rear hallway of the diesel generator building. These pipe guards are conservative measures that were installed in the original construction of FNP to protect the diesel fuel lines. The pipe guard does not perform any safety-related function, and it's failure cannot prevent a safety-related function. The guard pipes are not required for any of the regulated events defined in 10CFR 54.4(a)(3). In particular, the guard pipes are not relied upon in the FNP licensing basis for compliance with the Commission's regulations for fire protection, 10 CFR 50.48. The guard piping therefore performs no intended function within the scope of 10 CFR 54.4(a). And therefore, an AMR is not required for these guard pipes.

RAI 2.3.3.14-3

License renewal boundary drawing D-170060L shows that portions of the 3" HBD-443 line, at locations G3, G5, G8, G10 and G12 are within the scope of license renewal. However, the isolation valves (NSY52-V514, V513, V512, V511 and V510; at locations H3, H5, H8, H10 and H13, respectively) and the portions of the line HBD-443 downstream of the valves are shown as outside the scope of license renewal. It appears that these valves provide a pressure boundary isolation for the portions of the pipe that are within the scope of license renewal. The isolation valve bodies are passive and long-lived. Explain why these isolation valves are excluded from the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The Fuel Oil Storage Tanks shown on D-170060L are buried tanks with an access compartment that sits above each tank. Inside the access compartment are the safety related fuel oil transfer pumps. The gravity fill line for the storage tanks enters the access compartment above the pumps and is seismically supported inside the compartment. The portion of the line outside the access compartment, up to the flanged connection, is also robustly supported. Since these lines are gravity-fill, the isolation valves do not perform an intended function.

For the convenience of screening, the portions of 3" HBD-443 are shown highlighted. The line from the compartment up to the flange connection prevents moisture intrusion into the tank from the outside and was conservatively included in scope.

For the remainder of the line (including the isolation valves mentioned in the RAI), there is no failure mode of the line that would adversely impact the safety functions of the diesel fuel oil system or adversely impact the safety related components. The rest of the fill line is not in the scope of license renewal as it does not support a system intended function per 10 CFR 54.4(a).

RAI 2.3.3.14-4

License renewal drawings D-170808L, Sheets 1 and 2; D-170809L, Sheets 1 and 2; and D-200213L show an instrumentation symbol that is not identified on the "Standard P&ID Legend" on drawing D-175016L. Instrumentations designated as NSR43MA506 on D-170808L, Sheet 1 at location H7; N1R43MA507 on D-170808, Sheet 2 at location H6; NSR43MA508 on D-170809L, Sheet 1 at location F7; N1R43MA510 on D-170809, Sheet 2 at location F7; and N2R43MA509 on D-200213L, at location H7 are not defined in the Farley LRA, nor are they described in the UFSAR. Define these instrumentation components and clarify whether they penetrate the fuel oil supply tank pressure boundary. If so, explain why they are excluded from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

The instruments in question are water detectors and are in scope for the pressure boundary intended function, including the tubing (piping in LRA Table 2.3.3.14) to the detectors, as shown on license renewal boundary drawings referenced above. Although the tubing (piping) is passive and requires an AMR, the detector itself is active and therefore does not require an AMR.

Legend drawing D175016L sheet 2 contains the symbolic representation for this device under "Instruments." In the circle labeled "local instrument including transmitter for single measured variable" is inserted the letters "M" for moisture and "A" for alarm.

RAI 2.3.3.15-1

The non-safety-related air dryers/after coolers in the air start systems for the emergency diesel generators (EDG) are shown as excluded from scope of license renewal on the license renewal boundary drawings. The staff is concerned that the safety-related air reservoir tank could not perform its intended function should the air dryer/after cooler fail. Since the air dryer/after cooler removes moisture and cools down air entering the reservoir, it prevents the EDG starting air system from clogging due excessive moisture. Explain why these dryers/after coolers are excluded from the scope of license renewal and from being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

SNC performed an additional review of the air dryer/aftercooler assemblies for the Diesel Generator Air Start subsystem with respect to the criteria of 10 CFR 54.4(a) and determined that these components are within the scope of the Rule, but for reasons other than those cited in this request for additional information.

The safety related function of the air start system is to provide air to support up to five attempts to start the diesel generator associated with each air start train. To assure this function, SNC determined the in-scope safety related boundary of the air start subsystems begins at the inlet isolation check valves for the air receivers in the subsystem, includes the receivers, and continues on the outlet side of the receivers all the way to the diesel generator engine block (note that the engine block is also in the scope of the Rule). The ability to support additional start attempts on the diesel generators is ensured through the volume of air in the air receivers.

For the purposes of 10 CFR 54.4(a)(2) scoping, the boundary also includes the attached piping and associated supports on the inlet side of the receivers. The air dryer / aftercooler assembly is the anchor for the seismic analysis of the safety related inlet piping. Therefore, the air dryer / aftercooler assemblies and the intervening piping and components up to the air receiver are in the scope of the Rule. The component function of serving as an anchor is the only reason the air dryer/aftercooler assemblies require an aging management review.

The "Air Dryer/Aftercooler Asembly" component type should have been included in LRA Table 2.3.3.7 as follows:

Component Type	Intended Function
Air Dryer/Aftercooler Asembly	Structural Support

SNC has performed an aging management review for the air dryer/aftercooler assemblies. The EDG System aging management review summary table 3.3.2-15 should have included the following:

Component Type *GALL Reference*	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Dryer/Aftercooler Asembly	Structural Support	Carbon Steel	Air/Gas (wetted)	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1-5	C
			Inside	Loss of Material	External Surfaces Monitoring Program	VII.I.1-b	3.3.1-5	A

RAI 2.3.3.15-2

The staff is unable to determine how sight glasses, air distributors and vacuum manometers shown at many locations on the EDG boundary drawings (D-170800L, D-170801L, D-170804L, D-170805L, D-170806L, D-170807L, D-200209L, D-200211L, D-200212L) are addressed in the LRA. These components are shown as being within the scope of license renewal on the license renewal boundary drawings, however, they are not listed in LRA Table 2.3.3.7 for EDG components subject to an AMR. These components are passive and long-lived, and serve a pressure boundary function. Clarify whether the aforementioned components are included in the component types listed in LRA Table 2.3.3.7. If not, justify the exclusion of these components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

SNC agrees that the sight glasses and air distributors are passive and long-lived, serve a pressure boundary function, and are subject to an aging management review (AMR). Vacuum manometers are an active indicator and therefore are classified as an active component and not subject to an AMR (nor listed in LRA Table 2.3.3.7).

With respect to the air distributor assemblies, the depiction on the boundary drawing is confusing. SNC models the air distributors as valve bodies, the associated tubing as piping, and the filter casings as filter casings.

With respect to the sight glasses that serve a pressure boundary intended function in the liquid bearing subsystems associated with the diesel generator, SNC should have included a component type "Sight Glasses" in the LRA tables.

The component type "Sight Glasses" should have been included in LRA Table 2.3.3.7 as follows:

Component Type	Intended Function
Sight Glasses	Pressure Boundary

SNC has performed an AMR for the sight glasses and determined there is no aging effect requiring management. The components are made of glass, exposed on the interior to jacket water (closed cooling water) or lubricating oil, and on the exterior to an inside environment. There are no aging effects requiring management for these components.

The EDG System aging management review summary table 3.3.2-15 should have included the following:

Component Type *GALL Reference*	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Sight Glasses	Pressure Boundary	Glass	Closed Cooling Water	None	None Required			J
			Lube Oil	None	None Required			J
			Inside	None	None Required			J

RAI 2.3.3.15-3

License renewal diagram D-506446L shows the following components as within the scope of license renewal. However, these components are not listed in Table 2.3.3-15 as a component type subject to an AMR. These components are passive and long-lived components. Clarify whether these components are included with another component type. If not, explain why they are not included in Table 2.3.3-15 in accordance with the requirements of 10 CFR 54.21(a)(1), or update the corresponding tables to include these components.

a. Intake silencers QSR43F503A-A, QSR43F503C-A, QSR43F503E-B, QSR43F503B-B, and QSR43F503D-B at locations G10, G9, G7 and G3, respectively

b. Large and small mufflers (silencers) QSR43F502A-A, QSR43F502E-B, and QSR43F502B-B, QSR43F503C-A, and QSR43F503D-B at locations C10, C6, C4, E9, and E4, respectively

c. Expansion joints at locations E10, E9, E7, E5, and E3

Response

The intake silencers, large and small mufflers (silencers), and expansion joints are included in Table 2.3.3.15. The "equipment frames and housings" component type is used to model the intake silencers and the mufflers. The "ductwork and fittings" component type is used to model the expansion joints. Please note that, as described in the response to RAI 2.2-5a, the rubber boot installed on the intake side of the diesel generator has a pressure boundary intended function but was omitted from the table. For more information on the rubber boot, refer to the response to RAI 2.2-5a.

RAI 2.3.3.15-4

Clarify whether the components of the EDGs are scoped and screened in the LRA as complex assemblies. Regarding complex assemblies, Table 2.1-2 of NUREG-1800 states that "Some structures and components, when combined, are considered a complex assembly .... An applicant should establish the boundaries for each assembly by identifying each structure and component that makes up the complex assembly and determining whether or not each structure and component is subject to an AMR." If the EDGs are treated as complex assemblies, identify the boundaries of the EDGs so that the staff may determine whether the subcomponents (turbo chargers, turbo charger after coolers, governors, etc.) are within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

SNC's treatment of the emergency diesel generators (EDGs) for scoping, screening and aging management review is consistent with guidance provided in Table 2.1-2 of NUREG-1800. As indicated in LRA Section 2.3.3.15, the EDG system includes the EDGs and several EDG support systems. Interfaces between the EDG support systems and other LRA systems (e.g., cooling water supplied by the service water system) were established and are indicated on the license renewal boundary drawings. Boundaries between the diesel-generator active component and the EDG support systems were also determined during the scoping and screening process.

In determining the boundary between the active diesel-generator and the EDG support systems, SNC considered the requirements 10 CFR 54.21(a)(1), the guidance provided in Table 2.1-2 of NUREG-1800, and the Statement of Considerations (SOCs) for the Rule. Passive parts of structures and components that only perform an active function do not require aging management review in accordance with 10 CFR 54.21(a)(1) and the SOCs for the Rule (60 FR 22472). The SOCs (and the Rule) cite the diesel generators as an example of a component that is fully active and can be excluded from aging management review. The SOCs go on to state, "The Commission believes that considerable experience has demonstrated that its regulatory process, including the performance-based requirements of the maintenance rule, provide adequate assurance that degradation due to aging of structures and components that perform active functions will be appropriately managed to ensure their continued functionality during the period of extended operation." Therefore, SNC's determination of the boundaries between the diesel generator active component and the EDG support systems takes into consideration the applicability of the Maintenance Rule to the EDG.

In general, SNC utilizes the engine block and its integral attachments as the starting point for defining the active diesel-generator component. SNC also considers if the item is accessed during the normal engine maintenance and overhaul activities. The turbochargers, exhaust manifold (though not the exhaust ducts), turbocharger aftercoolers, and governors are included as part of the active diesel generator component. Their performance is validated under the Maintenance Rule because of the frequent testing of the EDGs and the periodic maintenance and overhaul activities.

RAI 2.3.3.15-5

UFSAR Section 9.5.7.2.1 states that, "The built-in lubricating oil sump is driven from the engine drive gear and draws oil from the oil sump through a mesh screen intake screen." Similarly, Section 9.5.7.2.2 states that, "The built-in lubricating oil pump is driven by the engine through a flexible drive coupling and draws oil from the oil sump through a mesh intake screen." However, these mesh intake screens are not shown on the license renewal boundary drawings for the EDG system, and nor are they are listed in LRA Tables 2.3.3.15 and 3.3.2-15. The mesh screens provide the debris protection intended function for the pipelines, and are passive and long-lived components. Identify these mesh intake screens and justify the exclusion of these components from being within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4 (a) and 10 CFR 54.21(a)(1), respectively.

Response

SNC understands the question to ask "The built-in lubricating oil *pump* is driven...."

The intake mesh screens are in scope (the drawing shows them indirectly in the suction strainer). The corresponding component is covered in Table 2.3.3.15-1 and Table 3.3.2-15 as "Strainers (element)" with an intended function of debris protection in a lube oil environment.

RAI 2.3.3.15-6

a. The first paragraph of FNP UFSAR Section 9.5.7.3, which describes the internal oil system for the diesel engine 1C and 2C, states that "Oil flows through the lower header toward the blower end where a vertical header will not readily drain." However, the 1C/2C EDG internal blower is not shown on the license renewal boundary drawings for the EDG system, nor is it listed in LRA Tables 2.3.3.15. Although a blower is an active component, the blower housing can be considered as being subject to an AMR. Explain how this blower housing is addressed in the LRA; if required, justify its exclusion from the scope of license renewal and being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

There is no blower in lube oil system of the FNP emergency diesel generators. The blower referred to in UFSAR Section 9.5.7.3 is a positive displacement type blower that provides scavenging air under pressure to the cylinders for starting and light load operation. It is integrally attached to the engine block and only required to function during diesel generator operation. Therefore, SNC included the blower as an integral part of the diesel-generator active component.

Passive parts of structures and components that only perform an active function do not require aging management review in accordance with 10 CFR 54.21(a)(1) and the Statement of Considerations (SOCs) for the Rule (60 FR 22472). The SOCs (and the Rule) cite the diesel generators as an example of a component that is fully active and can be excluded from aging management review. The diesel generator (including the blower) performs only an active function; therefore, its passive parts do not require aging management review. Age-related degradation of the active diesel generator (including the blower housing) is managed under the requirements of the Maintenance Rule.

See RAI 2.3.3.15-4 for additional discussion of the treatment of the emergency diesel generator systems as complex active assemblies.

RAI 2.3.3.15-6

b. The second paragraph of UFSAR Section 9.5.7.3 adds that, "The cooling oil from each lower piston is discharged through a hole in the insert . . . .This oil then drains either toward the blower or the control end and down to the oil pan or subbase." However, the 1C/2C EDG oil pan is not shown on the license renewal boundary drawings for the EDG system, nor is it listed in LRA Tables 2.3.3.15. The intended function of the oil pan/subbase is not specifically stated; typically, the oil collection pan intended function is to ensure that leaking oil will not lead to a fire that could damage safety-related equipment. Justify the exclusion of this component from the scope of license renewal and being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a)(2) and 10 CFR 54.21(a)(1), respectively.

Response

The entire emergency diesel generator is considered within the scope of 10 CFR 54.4(a). The oil pan referred to in UFSAR Section 9.5.7.3 is not a pan for collecting "leaking oil" but rather the typical oil sump provided for an engine by a pan mounted on the bottom of the block. In the screening of the diesel generators, SNC treated the oil pan as an integral part of the engine components. It is integrally attached to the engine block and only required to function during diesel generator operation. Therefore, SNC included the oil pan as an integral part of the diesel generator active component.

Passive parts of structures and components that only perform an active function do not require aging management review in accordance with 10 CFR 54.21(a)(1) and the Statement of Considerations (SOCs) for the Rule (60 FR 22472). The SOCs (and the Rule) cite the diesel generators as an example of a component that is fully active and can be excluded from aging management review. The diesel generator (including the oil pan) performs only an active function and therefore its passive parts do not require aging management review. Age-related degradation of the diesel generator (including the oil pan) is managed under the requirements of the Maintenance Rule.

See RAI 2.3.3.15-4 for discussion of the treatment of the emergency diesel generator systems as complex active assemblies.

RAI 2.3.3.15-7

a. License renewal boundary drawings D-170806L, Sheets 1 and 2, show that lube oil engine driven pumps of the EDGs "1-2A" and "1B," at location C4, and their associated piping to the shuttle valve "V810" are excluded from the scope of license renewal. However, license renewal boundary drawing D-200212L, Sheet 1, shows that the lube oil engine driven pumps of the EDGs "2B," at location D5, and its associated piping are within the scope of the license renewal. Describe how the aforementioned components for the EDGs "1-2A" and "1B" differ from the components for EDG "2B." Explain how these differences were considered in the scoping and screening process for EDGs "1-2A" and "1B."

Response

The lube oil engine driven pumps should have been highlighted on D170806L, sheet 1 and Sheet 2. The Engine Driven Lube Oil Pump shown on D170806L, sheet 1, is QSR43P0526, shown in highlight on D170801L, Sheet 1. Similarly, the same pump shown on D170806L, Sheet 2, is QSR43P0505, shown in highlight on D170801L, Sheet 2. This is an error in the highlighting on the boundary drawings. The lube oil engine driven pumps for the 1-2A and 1B EDGs, and their associated piping to the shuttle valve V810 are in the scope of license renewal.

RAI 2.3.3.23-1

UFSAR Section 9.2.7.2.1 states that the reactor makeup water storage tank contains a diaphragm membrane and the Unit 1 tank contains a 150-gal/min recirculating vacuum degasifier to exclude oxygen from the makeup water. License renewal boundary drawings D-175036L, Sheet 1; D-205036L, Sheet 1; D-170118L, Sheet 1 and D-200012L, Sheet 1 depict the diaphragm as used in the reactor water makeup and condensate storage tanks. The diaphragm is shown as being within the scope of license renewal on license renewal boundary drawing D-205036L, at location B3. However, the diaphragm is not shown as being within the scope of license renewal on license renewal boundary drawings D-175036L, at location B3; D-170118L, at locations B8 and B4 and D-200012L, at locations D6 and D10. In addition, these diaphragms are not listed in LRA Table 2.3.3.23 as being subject to an AMR. These diaphragm membranes provide a pressure boundary intended function for the reactor makeup water storage tanks, and are passive and long-lived components. Justify the exclusion of the reactor makeup water storage tank diaphragms for Unit 1 and 2 (with the exception of the one shown on license renewal boundary drawing D-205036L, Sheet 1) from being within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a). Explain why these components are not listed in LRA Table 2.3.3.23 as being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

The stainless steel reactor makeup water storage tanks contain a diaphragm membrane that excludes oxygen from the makeup water. SNC has determined these diaphragms do not perform an intended function for license renewal.

The failure of the diaphragm would not result in the loss of any safety related function. Should the diaphragm become perforated, the reactor make-up water in the tank remains available to provide adequate make-up to the CCW surge tank and spent fuel pool. The pressure boundary for the reactor make-up water storage is provided by the tank and connecting piping.

The diaphragm is correctly shown as not being within the scope of license renewal on boundary drawing D-175036L at location B3; drawing D-170118L at locations B8 and B4, and on drawing D-200012L. However, boundary drawing D-205036L incorrectly highlighted the diaphragm as being in scope.

RAI 2.3.3.15-7

b. License renewal boundary drawing D-170803L, Sheets 1 and 2, show air coolers for the EDGs "1C" and "2C", at location D4-5, as being within scope of license renewal. However, these air coolers are not listed in LRA Table 2.3.3.15 as components subject to an AMR. Air coolers are passive and long-lived components. Justify the exclusion of the air coolers from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

In the screening of the diesel generators, SNC treated the air coolers as an integral part of the engine components. The air coolers in question are bolted onto the engine block, are only required to function during diesel generator operation, and must be unbolted, removed, and inspected during the periodic overhauls of the engines. The engine block and its integral components are part of the active part of the engine. Therefore, SNC included the air coolers as an integral part of the diesel generator active component.

Passive parts of structures and components that only perform an active function do not require aging management review in accordance with 10 CFR 54.21(a)(1) and the Statement of Considerations (SOCs) for the Rule (60 FR 22472). The SOCs (and the Rule) cite the diesel generators as an example of a component that is fully active and can be excluded from aging management review. The diesel generator (including the air cooler) performs only an active function; therefore, its passive parts do not require aging management review. Age-related degradation of the active diesel generator (including the air cooler) is managed under the requirements of the Maintenance Rule.

See RAI 2.3.3.15-4 for discussion of the treatment of the emergency diesel generator systems as a complex assemblies.

RAI 2.3.3.17-1

LRA Table 2.3.3.17 list piping and valve bodies as component types subject to an AMR. However, license renewal boundary drawings D-175022L, D-175033L, D-175039L, D-175071L, D-175073L, D-205022L, D-205033L, D-205039L, D-205071L and D-205073L, which show the high energy line break (HELB) detection instruments, do not show the piping or valves associated with these instruments. Appendix 3K of the Farley UFSAR does not provide any description of the piping and valves associated with the HELB pressure and level sensors. Provide descriptive information or drawings to allow the staff to confirm that the identification of components in the HELB system, within the scope of license renewal and subject to an AMR, meet the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The High Energy Line Break detection instruments are pressure switches that are installed with an isolation valve and piping/tubing routed to the room being sensed. The piping/tubing is 3/8" A-213 Gr. 304 stainless steel, and the fittings are forged stainless steel compression fittings per A-182, Gr.-316. The valves are 3/8" globe type instrument valves with forged stainless steel bodies of A479, Gr. 316. The internal and external surface of these components are exposed to the inside environment of the Auxiliary Building.

RAI 2.3.3.23-2

a. License renewal boundary drawings D-1701181L, Sheet 1, and D-200012L, Sheet 1, show a 3-inch vent line (HCD-262) at locations C8 and D7 and a 3-inch nitrogen purge line (HCD-263) at locations B7 and D6 as outside the scope of license renewal. These lines serve a pressure boundary function. Justify the exclusion of these lines from being within the scope of licenses renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

The tank connections for the 3-inch vent line and the 3-inch nitrogen purge are used during the filling operation of the RMWST to evacuate air underneath the diaphragm. These lines are located 3'-6" above the normal water level in the tank. Therefore, these lines do not provide a pressure boundary for the required inventory of the reactor make-up water in the tank and thus were excluded from being in-scope for license renewal in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1).

RAI 2.3.3.23-2

b. License renewal boundary drawings D-170118L, Sheet 1 and D-200012L, Sheet 1 show a 1-inch pipeline connected to a level controller (MK274 and MK774) at locations B9 and C6, respectively. These lines serve a pressure boundary intended function. Justify the exclusion of these lines from the scope of license renewal and from being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

Response

Further evaluation of the subject level controller lines has determined these lines do serve a pressure boundary intended function relative to maintaining the pressure boundary of the RMWS tank and therefore are in the scope of license renewal.

The only component types in these lines are the 1-inch stainless steel piping and the level controllers. The level controllers are not subject to an AMR since they are active components. The piping is passive and long lived and therefore subject to an AMR. A review of LRA Section 2.3.3.23 shows that the component type – piping and the intended function – pressure boundary are already identified in Table 2.3.3.23 as a component type subject to an AMR. In addition, the AMR results summary Table 3.3.2-23 includes the AMR summary for stainless pipe in treated water and outside environment. Therefore, no change is required to the LRA Tables.

RAI 2.3.3.23-3

On license renewal boundary drawings D-175036L, Sheet1, and D-205036L, Sheet 1, the license renewal boundary for this system is shown to end at valves Q1G22V063A, and Q1G22V063B, location F11, and Q2G22V063A and Q2G22V063B, location G3. These valves appear to be normally open, and a piping class change occurs at this valve. Normally open manual valves can be used as a license renewal pressure boundary if failure of the downstream piping has no short-term effects, can be quickly detected, and will be closed by the operators prior to any adverse consequences. Explain why it is acceptable to terminate the license renewal boundary at these normally open valves.

Response

The piping associated with open valves identified in the RAI consists of reactor makeup water providing seal water to the waste gas compressor (WGC). This reactor makeup water supply to the WGC is not an in-scope function for the system. The waste processing system has no safety related function and there are no in-scope functions for the Waste Gas system. The valve alignment depicted on the boundary drawing assumes the system is aligned to support Waste Gas system operation.

The Reactor Makeup Water Storage (RMWS) System is in scope as a source of long-term make-up water for the component cooling water (CCW) system surge tank and for the spent fuel pool. The makeup supply from the RMWS System to the CCW surge tank is to address loss of inventory from minor leakage sources during long-term post-accident recovery in the event the Demineralized Water System is unavailable. Similarly, use of the RMWS System for make-up water to the spent fuel pool by the use of a temporary hose connection is also a long-term recovery action in the unlikely event of a failure of both safety-related trains of the Spent Fuel Pool Cooling System and the Demineralized Water System. Summarizing, the ability to supply water from the RMWS is not an immediate response action.

The ¾ inch piping downstream of the isolation valves (Q1/2G22V063A and Q1/2G22V063B) is located outside of the WGC rooms as well as inside the rooms. A failure of this line has no short term effects – the WGC equipment is non-safety related and there is no short-term need for make-up water to the CCW surge tank or spent fuel pool. Detection of the leak is dependent on the size of the leak. For a worst-case complete failure equivalent to a ¾ inch line break, the flow out of the break would reduce the level in the RMWS tank slowly due to the large capacity of the tank (approx. 200,000 gallons). The reduction in level would be detected from the unusual increase in waste tank/sump levels or from the changes in RMWS tank level and associated alarm readings. The leak would be isolated before any inventory loss that would compromise the intended function of the RMWS due to the large capacity of the RMWS tank, the small size of the potential leak (¾ inch).

RAI 2.3.3.24-1

Gross failed fuel detectors are shown on license renewal boundary drawing D-175009L, Sheet 1, at location F6 and LR boundary drawing D-205009L, Sheet 1, at location E5. These detectors are considered as being within the scope of license renewal. However, gross failed fuel detectors are not listed in LRA Table 2.3.3.24. The gross failed fuel detector housing serves a pressure boundary function and is shown to be within the scope of license renewal. Clarify if the pressure boundary retaining components of the gross failed fuel detectors are subject to an AMR. If not, justify the exclusion of these components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

The Gross Failed Fuel Detector (GFFD) is an assembly with the pressure boundary component types individually scoped, screened and an AMR performed. The sub-components of the GFFD assembly (with component type indicated in parentheses) that provide this pressure boundary function are: tubing (Piping), valves (Valve Bodies), sample cooler tubing (Sample Cooler Heat Exchanger tubes), and neutron detector coil tubing (Piping). These pressure boundary components are included in the LRA Tables 2.3.3.24 and 3.3.2-24 under the component types indicated.

RAI 2.3.4.1-1

Air reservoirs are shown as being within the scope of license renewal on license renewal boundary drawings D-175033 and D-205033, Sheet 1, at locations F7 and F8 and Sheet 2, at locations E8, D8, on both drawings. However, air reservoirs are not listed as a component type subject to an AMR in LRA Table 2.3.4.1. Air reservoirs serve a pressure boundary intended function, and are passive and long-lived components. Justify the exclusion of these air reservoirs from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

Response

These air reservoirs are an integral part of the valve operator, directly support the active function of the operator, and are included as part of the valve operator component for license renewal. The valve operator only performs an active function and therefore is not subject to an aging management review. Age-related degradation of the valve operator is managed under the requirements of the Maintenance Rule. See the response to RAI 2.2-5b.

RAI 2.3.4.1-2

LRA Table 2.3.4.1 lists steam/fluid traps as being subject to an AMR. A review of the license renewal boundary drawings for the main steam system showed that the symbol for steam trap appears only on boundary drawings D–175033L and D-205033L (Sheet 1, at locations A6, C6, E6, B10, G10, on both drawings). However, these components are shown to be outside the scope of license renewal on these boundary drawings. Identify the within-scope steam traps referred to in Table 2.3.4.1. If the license renewal boundary drawings that show these components have not been provided to the staff, provide them for review.

Response

The steam traps are in-scope for 10 CFR 54.4(a)(2) but are not highlighted on the boundary drawings because only components in-scope for 10 CFR 54.4(a)(1) and (a)(3) are shown highlighted on boundary drawings. D506447L lists systems and associated boundary drawings with components that are in-scope for 10 CFR 54.4(a)(2). The in-scope steam traps that are on the referenced boundary drawings are as follows: N1N11NK001A, 1B, 1C, 2A, 2B, 3A, 3B, & 3C for Unit 1 (D175033L sheet 1) and N2N11NK001A, 1B, 1C, 2A, 2B, 3A, 3B, & 3C for Unit 2 (D205033L sheet 1).

RAI 2.3.4.1-3

The component represented by a dashed line symbol (e.g., license renewal boundary drawings D-170114L and D-200007L, at locations E12 - G12) is not defined on the drawing legend. Symbols used for various lines appearing on license renewal boundary drawings are shown on drawing D-175016, Sheet 3 (Units 1 and 2 Standard P&ID Legend), at locations A2 through H2. However, this type of dashed line symbol does not appear on the legend. Identify the components represented by these dashed lines and explain how they were considered in the scoping and screening process.

Response

The component represented by a dashed line symbol is "piping by others". "Piping by others" is shown on both D-175016, sheet 1, at location E-3, and D-175016, sheet 3, at location H-2. While the symbols are not an exact match due to variations between different vendors' standard symbols, the intent is the same.

The piping shown as "piping by others" on license renewal boundary drawings D-170114L and D-200007L indicates that the piping isn't in the scope of the designer that originally supplied those drawings. In this case the "piping by others" was supplied by the turbine vendor. The vendor supplied piping is shown so that the relative locations of the designer-supplied components can be provided.

This division of responsibility is defined on license renewal boundary drawings D-170114L and D-200007L by the demarcation lines shown from locations B-5 to D-5 and E-5 to F-5. The demarcation lines indicate the point where responsibility changed from SSI (now Southern Company) to Westinghouse.

This piping was considered in the scoping and screening process using the methodology described in LRA Section 2.1 and was determined to not be in scope for License Renewal.

RAI 2.3.4.3-1

License renewal boundary drawing D-175071, Sheet 1 shows the boundary of the in-scope portion of the steam generator blowdown (SGBD) system at the containment isolation valves. Pipe segments and components downstream of the containment isolation valves are considered out-of-scope.

The SGBD blowdown valves, located downstream of the containment isolation valves, perform the intended function of isolating the SGBD system in the event of high radiation detected in the blowdown system or a pipe break downstream of these valves and therefore should be within the scope of license renewal. The exact location of the SGBD system blowdown isolation valves is not identified on the above license renewal boundary drawing. Provide additional information such as a text description or a revised license renewal boundary drawing which identifies the location of the blowdown isolation valves.

Also, the piping and components located between the containment isolation valves and the blowdown isolation valves perform a pressure boundary intended function. Therefore, these components should be within the scope of license renewal and subject to an AMR. Justify the exclusion of the piping and components up to and including the SGBD blowdown isolation valves from the scope of license renewal and being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and l0 CFR 54.21(a)(1), respectively.

Response

Part of the Steam Generator Blowdown (SGBD) System piping and valves that are discussed in this request for additional information are in the scope of license renewal, but not for the reasons implied in the request. The components are not in-scope for either criteria 10 CFR 54.4(a)(1) or 10 CFR 54.4(a)(3) but are in scope for 10 CFR 54.4(a)(2). A short explanation of the scoping of these components follows.

This system includes three (3) different functions that automatically isolate the system and utilize three (3) different sets of "SGBD isolation valves." These functions isolate the system on a containment isolation signal, high room pressure signal due to a high energy line break, and a high radiation signal.

Per Section 10.4.8 of the FNP UFSAR, Steam Generator Blowdown Processing System, the system is not essential to nuclear plant safety downstream of the blowdown isolation valves (Q1G24V003A, B, and C and Q2G24V003A, B, and C, shown on boundary drawings D-175071L, sheet 1, and D-205071L, Sheet 1). These blowdown isolation valves are located at the class change from nuclear safety (Safety Class 2A) to non-nuclear safety and function to isolate the SGBD system on a containment isolation signal. These containment isolation valves and the components upstream to the steam generators are in-scope for license renewal as indicated on the boundary drawings.

The second type of automatic SGBD isolation valves in the system are the high energy line break isolation valves (Q1G24V005A, B, and C and Q1G24V006A, B, and C in Unit 1 and Q2G24V005A, B, and C and Q2G24V006A, B, and C in Unit 2) located upstream of the containment isolation valves. These valves automatically isolate the system on a high room pressure signal (from any of the instruments listed in Table A on

boundary drawings D-175071 sheet 1 for Unit 1 and D-205071 sheet 1 for Unit 2). These isolation valves are in-scope for the intended function of providing pressure boundary to the safety related portion of the SGBD system and isolating the system in the event of a high energy line break.

The third type of automatic isolation valve isolates the system in the event high activity is detected in the blowdown fluid. If the activity exceeds a specific level, the radiation monitors upstream of the blowdown surge tank will alarm in the control room and cause a signal to be sent to close the isolation valve, N1G24V002 or N2G24V002, located downstream of the heat exchanger. The function of the radiation monitors and isolation valve is to isolate or divert process streams on high radiation signal to minimize releases during normal plant operations to meet 10 CFR 20 ALARA requirements and alert the plant staff that additional processing is needed (e.g., through the SGBD demineralizers). This function supports normal operations and is not safety-related and not in-scope for licensing renewal.

Although not highlighted on D175071L, sheet 1, and D205071L, sheet 1, all Class CBD lines from the containment isolation valves (blowdown isolation valves) to the SGBD heat exchanger are in-scope for 10 CFR 54.4(a)(2). These lines are in-scope because they are classified as high energy lines and run through spaces where there is a potential spatial interaction with safety related SSCs if the lines experience a loss of pressure boundary. Portions of the lines are also considered attached piping (form part of the boundary for the seismic analysis for safety related piping and valves).