

#### 2.3.3.14.1 Technical Information in the Application

The diesel generator fuel oil system is relied upon to maintain two trains of fuel oil storage and supply for the EDGs for a period of operation of no fewer than 5 days at McGuire and for 7 days at Catawba.

The applicant described the process for identifying the SSCs within the scope of license renewal in Section 2.1.1 of the LRA. Using that scoping methodology, the applicant determined that the diesel generator fuel oil system was within the scope of license renewal and listed it on page 2.2-3 in Table 2.2-1 for McGuire and page 2.2-7 in Table 2.2-2 for Catawba of the LRA. The LRA included system drawings that were highlighted to indicate the license renewal evaluation boundary.

The applicant described the process for identifying the SCs subject to an AMR in Section 2.1.2 of the LRA. Using that screening methodology, the applicant listed the mechanical components that are subject to an AMR on Tables 3.3-18 and 3.3-19 of the LRA for McGuire and Catawba, respectively. These tables also listed the intended function of each component and the materials of construction. For McGuire, the applicant identified the following components from the diesel generator fuel oil system that are subject to an AMR—pump casings (engine-driven, booster, and transfer), tanks (day and storage), filters (duplex and transfer), flame arrestors, flow meters, orifices, pipe, strainers, tubing, and valves bodies. For Catawba, the applicant identified the following components from the diesel generator fuel oil system that are subject to an AMR—pump casings (engine-driven and motor-driven), strainer baskets (engine-driven and motor-driven), strainer bodies (engine-driven and motor-driven), filters, tanks (day and storage), flexible hoses, pipe, tubing, and valves bodies. The applicant further identified the intended functions of these component types to be maintaining the integrity of the diesel generator fuel oil system pressure boundary and filtration.

#### 2.3.3.14.2 Staff Evaluation

The staff reviewed Section 2.3.3.14 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the diesel generator fuel oil system that are within the scope of license renewal and that the applicant appropriately identified the mechanical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and applicable drawings submitted by the applicant in Section 2.3.3.14 of the LRA and the McGuire and Catawba UFSARs to verify that the applicant adequately identified the portions of the diesel generator fuel oil system that meet the scoping requirements of 10 CFR 54.4 and that these portions were included within the scope of license renewal in Section 2.3.3.14 of the LRA. The staff focused its review on those portions of the diesel generator fuel oil system that were not identified as within the scope of license renewal to verify that they did not meet the scoping requirements of 10 CFR 54.4.

The staff reviewed Tables 3.3-18 and 3.3-19 of the LRA, which list the mechanical components subject to an AMR for the diesel generator fuel oil system for McGuire and Catawba, respectively. The staff verified that the applicant had properly identified the mechanical components that were subject to an AMR from among those portions of the diesel generator fuel oil system that were identified as within the scope of license renewal. The staff sampled the

components that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no component that performs its intended functions without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from Tables 3.3-18 and 3.3-19.

During its review of Section 2.3.3.14 of the LRA, the staff determined that additional information was needed to complete its review. On McGuire drawings MCFD-1609-03.00, MCFD-1609-03.01, and MCFD-2609-03.01, the flexible hose connections on either side of the diesel generator engine are shown to be within the scope of license renewal. Although these components appear to have a pressure boundary intended function, they are not listed on Table 3.3-18 as subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.14-1, that the applicant provide the basis for excluding these flexible hose connections from the lists of components subject to an AMR. In its response dated April 15, 2002, the applicant stated that these flexible hose connections are replaced during periodic maintenance on the diesel engine and, in accordance with 10 CFR 54.21(a)(1)(ii), are not considered long-lived components and are not subject to an AMR. By electronic correspondence dated July 11, 2002 (ADAMS Accession No. ML023300317), the staff requested clarification of the applicant's reference to periodic maintenance to determine if the flexible hose connections are replaced on condition or replaced based on a qualified life. This issue was characterized as SER open item 2.3.3.14.2-1. In its response to this open item, dated October 28, 2002, the applicant stated that the flexible hoses in the diesel generator fuel oil system are replaced on a qualified life every 6 years and, therefore, are not subject to an AMR. Since the component is replaced on a specified interval, the staff agrees with this conclusion. Therefore, open item 2.3.3.14.2-1 is closed.

The McGuire diesel generators are equipped with features that collect leaking fuel oil and route it to the used oil storage tank. It seems that the intended function of the fuel oil leakage collection features is to ensure that leaking oil will not lead to a fire that will damage safety-related equipment, and therefore the features meet the scoping criteria of 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3). On McGuire 1 drawings MCFD-1609-03.00 and MCFD-1609-03.01, it appears that the fuel oil collection system is not within the license renewal boundary. On McGuire 2 drawings MCFD-2609-03.00 and MCFD-2609-03.01, however, it seems that a portion of the piping of the fuel oil collection system is shown to be within the license renewal boundary. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.14-2, that the applicant provide clarification in regard to its scoping of the fuel oil leakage collection system piping and components for license renewal (e.g., diesel generator fuel oil drip tank, and diesel generator fuel oil drip tank pump) and the basis for the results of its scoping.

In its response dated April 15, 2002, the applicant stated that, although MCFD-1609-03.00 and MCFD-1609-03.01 show the license renewal boundary flag on the schematic representation of the diesel engine body, and MCFD-2609-03.00 and MCFD-2609-03.01 show the license renewal boundary flag at the connection nozzle coordinates 2-L, this highlighting inconsistency between McGuire 1 and 2 drawings does not represent a physical difference in scope. The connection point is at the diesel engine, as shown on the drawings for both units. The applicant also stated that the piping and components associated with the fuel oil leaking collection system are not within the license renewal evaluation boundary because they do not perform a function that meets the criteria of 10 CFR 54.4. The applicant specified that the components are not safety-related and do not perform any function that meets the criteria of 10 CFR 54.4(a)(1). Their

failure will not prevent the accomplishment of a safety-related function and, therefore, they do not meet the criteria of 10 CFR 54.4(a)(2). And, finally, this fuel oil leakage collection feature is not credited to meet any of the Commission's regulations as specified in 10 CFR 54.4(a)(3). Fire barriers and fire suppression are provided for compliance with 10 CFR 50.48. The staff found the applicant's response acceptable because the components do not serve a support function necessary for the diesel to perform its intended function.

According to Catawba UFSAR, the fuel oil day tank retaining wall contains any leakage that may occur in the day tank or in its piping, and a high level of oil sensed inside the retaining wall initiates an alarm in the control room to alert operators of an abnormal operating condition. On Catawba drawings CN-1609-3.0, CN-1609-3.1, CN-2609-3.0, and CN-2609-3.1, the fuel oil day tank retaining walls are not highlighted as components within the scope of license renewal, even though the intended functions of the walls seem to meet the criteria of 10 CFR 54.4(a)(2). By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.14-3, that the applicant provide the basis for not including the fuel oil day tank retaining walls within the scope of license renewal. In its response dated April 15, 2002, the applicant explained that the highlighted flow diagrams show the flow boundaries of mechanical systems and that structural components are generally not represented on flow diagrams. The applicant further clarified that in cases where structural components, such as the fuel oil day tank retaining walls, are shown on the diagrams, they are not highlighted. The applicant confirmed that each fuel oil day tank retaining wall had been identified as within the scope of license renewal and was listed in Table 3.5-2 of the LRA. Therefore, the staff finds the applicant's response acceptable.

On Catawba drawing CN-2609-3.1, it appears that the piping from valve 2FD41 to valve 2FD43 is not within the scope of license renewal, even though these components are ASME Class 3 components that meet the criteria of 10 CFR 54.4(a)(2). By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.14-4, that the applicant indicate if this pipe segment is within the scope of license renewal and whether it is included in Table 3.3-19 as subject to an AMR. In its response dated April 15, 2002, the applicant confirmed that the piping from valve 2FD41 to valve 2FD43 is within the scope of license renewal and that the highlighting was inadvertently left off that pipe segment. The applicant also stated that this piping segment and valves 2FD41 and 2FD43 were included in Table 3.3-19 as subject to an AMR. The staff found the applicant's response acceptable.

#### **2.3.3.14.3 Conclusion**

The staff reviewed the information contained in Section 2.3.3.14 of the LRA, the supporting information from both UFSARs, applicable LRA drawings, and in responses to RAIs and the SER open item. With the resolution of SER open item 2.3.3.14.2-1, the staff concluded that there is reasonable assurance that the applicant has identified those portions of the diesel generator fuel oil system that are within the scope of license renewal and those that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### ***2.3.3.15 Diesel Generator Lube Oil System***

In LRA Section 2.3.3.15, "Diesel Generator Lube Oil System," the applicant described the components of the diesel generator lube oil system that are within the scope of the license renewal and subject to an AMR. This system is described in Section 9.5.7 of the McGuire and Catawba UFSARs. The staff reviewed the LRA and the UFSARs for McGuire and Catawba to

determine if the applicant adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

The LRA refers to the “diesel generator lube oil system” for McGuire, but to the “diesel generator engine lube oil system” for Catawba. For simplicity, the system will be referred to as the “diesel generator lube oil system” for both McGuire and Catawba.

#### 2.3.3.15.1 Technical Information in the Application

The diesel generator lube oil system supplies lubricating oil to the diesel engine and its bearings, crankshaft, thrust faces, and other friction surfaces during both standby mode and operation mode of the diesel generators.

The applicant described the process for identifying the SSCs within the scope of license renewal in Section 2.1.1 of the LRA. Using that scoping methodology, the applicant determined that the diesel generator lube oil system was within the scope of license renewal and listed it on page 2.2-3 in Table 2.2-1 for McGuire and on page 2.2-7 in Table 2.2-2 for Catawba of the LRA. The LRA included system drawings that were highlighted to indicate the license renewal evaluation boundary.

The applicant described the process for identifying the SCs subject to an AMR in Section 2.1.2 of the LRA. Using that screening methodology, the applicant listed the mechanical components that are subject to an AMR in Tables 3.3-20 and 3.3-21 of the LRA for McGuire and Catawba, respectively. These tables also listed the intended function of each component and the materials of construction.

For McGuire, the applicant identified the following components from the diesel generator lube oil system that are subject to an AMR—pump casings (engine-driven and before and after), coolers (tubes, tube sheet, shell, and channel head), strainers, filters, heaters, pipe, tubing, and valve bodies. For Catawba, the applicant identified the following components from the diesel generator lube oil system that are subject to an AMR—pump casings (engine driven and engine prelube), coolers (tubes, tube sheets, shell, and channel head), strainer (lube and prelube), filters (lube, prelube, and sump tank), sump tanks, flexible hoses, pipe, tubing, and valve bodies. The applicant further identified the intended functions of these component types to be filtration, transferring of heat, and maintaining the integrity of the diesel generator lube oil system pressure boundary.

#### 2.3.3.15.2 Staff Evaluation

The staff reviewed Section 2.3.3.15 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the diesel generator lube oil system that are within the scope of license renewal and that the applicant appropriately identified the mechanical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and applicable drawings submitted by the applicant in Section 2.3.3.15 of the LRA and the McGuire and Catawba UFSARs to verify that the applicant adequately identified the portions of the diesel generator lube oil system that meet the scoping requirements of 10 CFR 54.4, and that these portions were included within the scope of license

renewal in Section 2.3.3.15 of the LRA. The staff focused its review on those portions of the diesel generator lube oil system that were not identified as within the scope of license renewal to verify that they did not meet the scoping requirements of 10 CFR 54.4.

The staff reviewed Tables 3.3-20 and 3.3-21 of the LRA, which list the mechanical components subject to an AMR for the diesel generator lube oil system for McGuire and Catawba, respectively. The staff verified that the applicant had properly identified the mechanical components that were subject to an AMR from among those portions of the diesel generator lube oil system that were identified as within the scope of license renewal. The staff sampled the components that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no component that performs its intended functions without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from LRA Tables 3.3-20 and 3.3-21.

During its review of Section 2.3.3.15, the staff determined that additional information was needed to complete its review. McGuire drawings MCFD-1609-02.00, MCFD-1609-02.01, MCFD-2609-02.00, and MCFD-2609-02.01, and the McGuire UFSAR do not reflect the existence of a system that collects lube oil leakage. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.15-1, that the applicant indicate which system, if any, collects lube oil leakage, and how that system is addressed in the LRA given the potential fire hazard it represents. In its response dated April 15, 2002, the applicant stated that the diesel engines at McGuire do not have a lube oil leakage collection system. The leaking lube oil drips to the floor and enters the floor drains to be routed to the sump. The staff finds the applicant's response acceptable.

Catawba drawings CN-1609-02.00, CN-1609-02.02, CN-2609-02.00, and CN-2609-02.02 do not reflect the existence of a system that collects lube oil leakage. The UFSAR for Catawba states that oil leakage from the diesel is collected in a sump in the diesel room. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.15-2, that the applicant indicate what is the intended function of this oil collection feature and how it is addressed in the LRA, given the potential fire hazard it represents. In its response dated April 15, 2002, the applicant stated that the diesel engines at Catawba do not have a lube oil leakage collection system. The leaking lube oil drops to the floor and enters the floor drains to be routed to the sump. The applicant specified that leaking lube oil would not contact any component hot enough to ignite the oil and cause a fire that would threaten the functionality of the diesel engines. The staff finds the applicant's response acceptable.

During the review of McGuire drawings MCFD-2609-02.00 and MCFD-2609-02.01, the staff noticed an inconsistency. On drawing MCFD-2609-02.00, the 1-inch system low-point drain piping and associated valve 2LD0092, and the 1-inch system drain piping and associated valve 2LD0060, are not shown to be within the scope of license renewal. On drawing MCFD-2609-02.01, the equivalent piping and valves are shown to be within the scope of license renewal. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.15-3, that the applicant verify the accuracy of the information contained in drawing MCFD-2609-02.00 and provide the basis for excluding the drain piping and associated valves from the scope of license renewal. In its response dated April 15, 2002, the applicant stated that highlighting had been inadvertently left off from that segment of piping. The applicant further stated that the piping and valves associated with that segment were listed on Table 3.3-20 of the LRA as being subject to an AMR. The staff finds the applicant's response acceptable.

On McGuire drawings MCFD-1609-02.00, MCFD-1609-02.01, MCFD-2609-02.00, and MCFD-2609-02.01, the diesel generator lube oil heater pump is shown as within the scope of license renewal. The passive portion of this component (i.e., pump housing) has a pressure boundary intended function and therefore meets the criteria of 10 CFR 54.4(a). However, it is not listed on LRA Table 3.3-20 as subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.15-4, the applicant to explain why the diesel generator lube oil heater pump was not subject to an AMR. In its response dated April 15, 2002, the applicant stated that the diesel generator lube oil heater pump had been inadvertently omitted from LRA Table 3.3-20 and that Table 3.3-20 was supplemented to add an entry for the diesel generator lube oil heater pump as follows—

Component Type	Component Function	Material	Internal Environment	Aging Effects	Aging Management Programs and Activity
			External Environment		
D/G Lube Oil Heater Pump Casings	PB	CS	Oil	None Identified	None Required
			Sheltered	Loss of Material	Inspection Program for Civil Engineering Structures and Components

The staff finds the applicant’s response acceptable. The staff’s evaluation of the AMR results is documented in Section 3.3.15.2.1 of this SER.

**2.3.3.15.3 Conclusion**

On the basis of its review of the information contained in Section 2.3.3.15 of the LRA, the supporting information from both UFSARs, applicable LRA drawings, and the RAI response from the applicant, the staff concluded that there is reasonable assurance that the applicant has identified those portions of the diesel generator lube oil system that are within the scope of license renewal and those that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

**2.3.3.16 Diesel Generator Room Sump Pump System**

In LRA Section 2.3.3.16, “Diesel Generator Room Sump Pump System,” the applicant described the components of the diesel generator room sump pump system that are within the scope of the license renewal and subject to an AMR. This system is described in Sections 9.5.10 and 9.5.9 of the McGuire and Catawba UFSARs, respectively. The staff reviewed the LRA and the UFSARs for McGuire and Catawba to determine if the applicant adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

**2.3.3.16.1 Technical Information in the Application**

The diesel generator room sump pump system removes leakage from equipment drains in the diesel building and protects the diesel generator from flooding due to a nuclear service water pipe rupture in the adjacent diesel room and turbine building flood.

The applicant described the process for identifying the SSCs within the scope of license renewal in Section 2.1.1 of the LRA. Using that scoping methodology, the applicant determined that the diesel generator room sump pump system was within the scope of license renewal and listed it on page 2.2-3 in Table 2.2-1 for McGuire and page 2.2-7 in Table 2.2-2 for Catawba. The LRA included system drawings that were highlighted to indicate the license renewal evaluation boundary.

The applicant described the process for identifying the SCs subject to an AMR in Section 2.1.2 of the LRA. Using that screening methodology, the applicant listed the mechanical components that are subject to an AMR in LRA Table 3.3-22 for McGuire and Catawba. This table also listed the intended function of each component and the materials of construction. For McGuire and Catawba, the applicant identified the following component types from the diesel generator room sump pump system that are subject to an AMR—pump casings, orifices (McGuire only), pipe, and valve bodies. The applicant further identified the intended functions of these component types to be maintaining the integrity of the diesel generator room sump pump system pressure boundary, throttling flow, and transferring heat.

#### 2.3.3.16.2 Staff Evaluation

The staff reviewed Section 2.3.3.16 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the diesel generator room sump pump system that are within the scope of license renewal, and that the applicant appropriately identified the mechanical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and applicable drawings submitted by the applicant in Section 2.3.3.16 of the LRA and the McGuire and Catawba UFSARs to verify that the applicant adequately identified the portions of the diesel generator room sump pump system that meet the scoping requirements of 10 CFR 54.4, and that these portions were included within the scope of license renewal in Section 2.3.3.16 of the LRA. The staff focused its review on those portions of the diesel generator room sump pump system that were not identified as within the scope of license renewal to verify that they did not meet the scoping requirements of 10 CFR 54.4.

The staff also reviewed Table 3.3-22 of the LRA, which lists the mechanical components subject to an AMR for the diesel generator room sump pump system for McGuire and Catawba. The staff verified that the applicant had properly identified the mechanical components that were subject to an AMR from among the portions of the diesel generator room sump pump system that were identified as within the scope of license renewal. The staff sampled the components that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no component that performs its intended function(s) without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from LRA Table 3.3-22.

During its review of Section 2.3.3.16, the staff determined that additional information was needed to complete its review. On McGuire and Catawba drawings, the diesel generator room sump is shown not to be within the scope of license renewal. Yet, the sump is a component of the diesel generator room sump pump system, whose function is to protect the diesel generators from flooding. As a non-safety structure whose failure could prevent the diesel generator room sump pump system from remaining functional during a design basis event, the sump meets the criteria

of 10 CFR 54.4(a)(2). By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.16-1, the applicant to provide the basis for not including the diesel generator room sump within the scope of license renewal. In its response dated April 15, 2002, the applicant stated that the diesel generator room sump is within the scope of license renewal and is listed in LRA Table 3.5-2 (page 3.5-11, row 3). The applicant explained that highlighted flow diagrams show mechanical system flow boundaries and that structural components are generally not represented on flow diagrams. The applicant further clarified that, in cases where structural components, such as the diesel generator room sump, are shown on the diagrams, they are not highlighted. The staff finds the applicant's response acceptable.

### 2.3.3.16.3 Conclusion

On the basis of its review of the information contained in Section 2.3.3.16 of the LRA, the supporting information from both UFSARs, applicable LRA drawings, and RAI response from the applicant, the staff concluded that there is reasonable assurance that the applicant has identified those portions of the diesel generator room sump pump system that are within the scope of license renewal and those that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.17 Diesel Generator Starting Air System

In LRA Section 2.3.3.17, "Diesel Generator Starting Air System," the applicant described the components of the diesel generator starting air system that are within the scope of the license renewal and subject to an AMR. This system is described in Sections 9.5.6 of McGuire and Catawba UFSARs. The staff reviewed the LRA and the UFSARs for McGuire and Catawba to determine if the applicant adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

The LRA refers to the "diesel generator starting air system" for McGuire and the "diesel generator engine starting air system" for Catawba. For simplicity, the system will be referred to as the "diesel generator starting air system" for both McGuire and Catawba.

#### 2.3.3.17.1 Technical Information in the Application

The diesel generator starting air system provides fast-start capability for the emergency diesel engine by using compressed air to roll the engine until it starts, and it also supplies air to the diesel controls to operate or shut down the engine.

The applicant described the process for identifying the SSCs within the scope of license renewal in Section 2.1.1 of the LRA. Using that scoping methodology, the applicant determined that the diesel generator starting air system was within the scope of license renewal and listed it on page 2.2-3 in Table 2.2-1 for McGuire and page 2.2-7 in Table 2.2-2 for Catawba of the LRA. The LRA included system drawings that were highlighted to indicate the license renewal evaluation boundary.

The applicant described the process for identifying the SCs subject to an AMR in Section 2.1.2 of the LRA. Using that screening methodology, the applicant listed the mechanical components that are subject to an AMR in Tables 3.3-23 and 3.3-24 of the LRA for McGuire and Catawba, respectively. These tables also listed the intended function of each component and the materials

of construction. For McGuire, the applicant identified the following components from the diesel generator starting air system that are subject to an AMR—filters (control and starting air line), tank, expansion joints, pipe, tubing, and valve bodies. For Catawba, the applicant identified the following components from the diesel generator starting air system that are subject to an AMR—afterfilters, aftercoolers (tubes, tube sheet, channel head, and shells), filter (compressor inlet and distributor), tank, flow meters, moisture separators, orifices, pipe, prefilters, silencers, tubing, valve bodies, and Y-strainers. The applicant further identified the intended functions of these component types to be maintaining the integrity of the diesel generator starting air system pressure boundary and filtration.

#### 2.3.3.17.2 Staff Evaluation

The staff reviewed Section 2.3.3.17 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the diesel generator starting air system that are within the scope of license renewal and that the applicant appropriately identified the mechanical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and applicable drawings submitted by the applicant in Section 2.3.3.17 of the LRA and the McGuire and Catawba UFSARs to verify that the applicant adequately identified the portions of the diesel generator starting air system that meet the scoping requirements of 10 CFR 54.4, and that these portions were included within the scope of license renewal in Section 2.3.3.17 of the LRA. The staff focused its review on those portions of the diesel generator starting air system that were not identified as within the scope of license renewal to verify that they did not meet the scoping requirements of 10 CFR 54.4.

The staff reviewed Tables 3.3-23 and 3.3-24 of the LRA, which list the mechanical components subject to an AMR for the diesel generator starting air system for McGuire and Catawba, respectively. The staff verified that the applicant had properly identified the mechanical components that were subject to an AMR from among those portions of the diesel generator starting air system that were identified as within the scope of license renewal. The staff sampled the components that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no component that performs its intended functions without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from LRA Tables 3.3-23 and 3.3-24.

During its review of Section 2.3.3.17, the staff determined that additional information was needed to complete its review. During the review of McGuire drawings MCFD-1609-04.00 and MCFD-2609-04.00, the staff noticed an inconsistency. The 1¼-inch drain piping and associated valve 2VG0040 coming off starting air tank 2B2 at coordinates B-7 are not shown to be within the scope of license renewal. The equivalent 1¼-inch drain piping and associated valves 2VG0037, 2VG0038, and 2VG0039 for starting air tanks 2A1, 2A2, and 2B1 are shown to be within the scope of license renewal. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.17-1, that the applicant verify that the highlighting on drawing MCFD-2609-04.00 was accurate. In its response dated April 15, 2002, the applicant stated that highlighting had been inadvertently left off that segment of piping. The applicant further stated that the piping and valves associated with that segment were listed in Table 3.3-23 of the LRA as being subject to an AMR. The staff finds the applicant's response acceptable.

According to the highlighting on McGuire drawings MCFD-1609-04.00 and MCFD-2609-04.00, the diesel generator filter moisture traps are not within the scope of license renewal. Yet Table 3-4 of McGuire UFSAR states that the diesel generator “filter-moisture traps” are Safety Class 3 components. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.17-2, that the applicant provide the basis for excluding these components from the scope of license renewal. In its response dated April 15, 2002, the applicant stated that the filters and associated moisture traps immediately downstream of the diesel generator starting air compressor aftercoolers on drawings MCFD-1609-04.00 and MCFD-2609-04.00, are Duke Class G components, are different from the filter-moisture traps in Table 3-4 of the McGuire UFSAR, and are not within the scope of license renewal. The applicant further explained that (1) the traps on the filter-moisture traps referred in Table 3-4 of the McGuire UFSAR are valves, (2) these valves are included in Table 3.3-23 of the LRA under “valve bodies,” (3) the filter component of the filter-moisture traps referred to in Table 3-4 of the McGuire UFSAR have a pressure boundary function, and (4) these filter components were mistakenly omitted from Table 3.3-23. The applicant provided the following supplemental information to Table 3.3-23 for the starting air distributor filter—

Component Type	Component Function	Material	Internal Environment	Aging Effects	Aging Management Programs and Activity
			External Environment		
Starting Air Distributor Filter	PB	CS	Air (Dry)	None Identified	None Required
			Sheltered	None Identified	None Required

Since the applicant clarified that the filter-moisture traps referred to in Table 3-4 of the McGuire UFSAR are valves, and that these valves are included in Table 3.3-23 of the LRA under valve bodies, the staff is satisfied with this aspect of its response. Since the filter was identified as within the scope of license renewal, the staff also finds this aspect of the applicant’s response acceptable. The staff’s evaluation of the AMR results is documented in Section 3.3.17.2 of this SER.

On Catawba drawings CN-1609-4.0, CN-1609-4.1, CN-2609-4.0, and CN-2609-4.1, the diesel generator starting air compressor body, the diesel generator starting air dryers, and the governor oil pressure boost cylinder are shown to be within the scope of license renewal. These components are passive and long-lived with a pressure boundary intended function. Therefore, they appeared to meet the criteria of 10 CFR 54.4(a) and 10 CFR 54.21. However, these components were not listed in Table 3.3-24 as subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.17-3, that the applicant provide the basis for excluding these components from Table 3.3-24. In its response dated April 15, 2002, the applicant stated that the diesel generator starting air compressor is within the scope of license renewal but is not subject to an AMR. The applicant explained that air compressors, without sub-component exceptions, are explicitly excluded from an AMR by 10 CFR 54.21(a)(1)(i). The staff finds the applicant’s response acceptable because it is the staff’s position that, even though the starting air compressor body is a passive component, the air compressor body is part of the air compressor and, as such, is not subject to an AMR, in accordance with 10 CFR 54.21(a)(1)(i).

In response to the staff’s question about the diesel generator starting air dryers not being listed on Table 3.3-24 as subject to an AMR, the applicant stated that Table 3.3-24 lists the air dryer components that make up the air dryer package. The air dryer components appear in

Table 3.3-24 as filters, moisture separators, pipe, silencers, and valves. In response to the staff's question about the diesel generator governor oil pressure boost cylinder filters not being listed on Table 3.3-24 as subject to an AMR, the applicant responded that a visual inspection confirmed that there are no diesel generator governor oil pressure boost cylinder filters at Catawba. Since diagrams CN-2609-4.0 and CN-2609-4.1 erroneously show diesel generator governor oil pressure boost cylinder filters at coordinates B-7, the applicant stated that a corrective action report had been entered into the corrective action program to correct the diagrams in question. The staff also finds the applicant's response in regard to the starting air dryers and the governor oil pressure boost cylinder filter acceptable.

#### 2.3.3.17.3 Conclusion

On the basis of its review of the information contained in Section 2.3.3.17 of the LRA, the supporting information from both UFSARs, applicable LRA drawings, and of the April 15, 2002, response from the applicant to the January 28, 2002, staff's letter, the staff concluded that there is reasonable assurance that the applicant has identified those portions of the diesel generator starting air system that are within the scope of license renewal and those that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.3.18 Drinking Water System

In LRA Section 2.3.3.18, "Drinking Water System," the applicant described the components of the Catawba drinking water system that are within the scope of license renewal and subject to an AMR. This system is further described in Section 9.2.4 of the Catawba UFSAR. The LRA notes that no portion of the McGuire drinking water system is within the scope of license renewal. The staff reviewed the LRA and UFSAR for Catawba to determine if the applicant adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

##### 2.3.3.18.1 Technical Information in the LRA

The Catawba drinking water system is a municipal water system consisting of a water tower, pumps, and chemical treatment equipment providing chlorinated drinking water to the plant.

The applicant described the process for identifying the SSCs within the scope of license renewal in LRA Section 2.1.1 and its process for identifying the SSCs subject to an AMR in LRA Section 2.1.2. Using the methodology described in LRA Section 2.1.1, the applicant listed the systems and structures that are within the scope of license renewal in LRA Tables 2.2-1 and 2.2-2 for McGuire and Catawba, respectively. The Catawba drinking water system is listed in LRA Table 2.2-2.

The LRA notes that the only portions of the drinking water system subject to an AMR are the Duke Class F portions of the drinking water system that are in scope at Catawba. McGuire has no Class F components in the drinking water system. Using the methodology described in Section 2.1.2 of the LRA, the applicant listed the Catawba mechanical components that are subject to an AMR in Table 3.3-25, "Aging Management Results - Drinking Water System." This table also lists the intended function of each component and the materials of construction. The applicant identified the following components of the drinking water system that are subject to an AMR—pipes and valve bodies. The applicant identifies maintaining pressure boundary integrity as the only intended function of the SCs subject to an AMR.

### 2.3.3.18.2 Staff Evaluation

The staff reviewed Section 2.3.3.18 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the drinking water system that are within the scope of license renewal in accordance with 10 CFR 54.4, and to verify that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information presented in Section 2.3.3.18 of the LRA, the applicable piping and instrument drawings referenced therein, and the Catawba UFSAR to determine if the applicant adequately identified the portions of the drinking water system that are within the scope of license renewal. The Catawba drinking water system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). The applicant included all components within the seismically designed piping boundaries of this system within the scope of license renewal per 10 CFR Part 54.4(a)(2). The staff verified that those portions of the drinking water system that meet the scoping requirements of 10 CFR 54.4 were included within the scope of license renewal and were so identified by the applicant in Section 2.3.3.18 of the LRA. To verify that the applicant did include the applicable portions of the drinking water system as within the scope of license renewal, the staff focused its review on those portions of the drinking water system that were not identified as within the scope of license renewal to verify that they did not meet the scoping criteria of 10 CFR 54.4. In addition, the staff reviewed the Catawba UFSAR to identify any additional system intended functions that were not identified in the LRA, and verified that these additional intended functions did not meet the scoping requirements of 10 CFR 54.4. The staff did not identify any omissions in the applicant's scoping review.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the drinking water system that are identified as within the scope of license renewal. The applicant listed the SCs subject to an AMR for the drinking water system in Table 3.3-25 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER.

The applicant identified the portions of the drinking water system that are within the scope of license renewal by highlighted Catawba 1 and 2 drawings referenced in LRA Section 2.3.3.18. In addition, the applicant lists the pipe and valve body mechanical component commodity groups that are subject to an AMR and their intended function(s) in Table 3.3-25 of the LRA.

The piping and instrumentation drawings were highlighted by the applicant to identify those portions of the drinking water system that meet at least one of the scoping criteria of 10 CFR 54.4. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended function(s) without moving parts or without a change in configuration or properties, and that are not subject to replacement on the basis of qualified life or specified time period, was excluded from an AMR. The staff did not identify any omissions.

### 2.3.3.18.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.18 of the LRA, the supporting information in the Catawba UFSAR, and LRA drawings, the staff did not identify any omissions in the scoping of the drinking water system by the applicant. The staff concludes that there is reasonable assurance that the applicant has identified those portions of the Catawba drinking water system that are within the scope of license renewal, and the SCs that are subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.19 Fire Protection System

LRA Section 2.1.1.3.1, "Fire Protection System," identified that SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrated compliance with 10 CFR 50.48, the FP rule, are within the scope of license renewal. In LRA Section 2.3.3.19, "Fire Protection," the applicant identified the FP flow diagrams that had been marked to show the license renewal evaluation boundary for the interior and exterior FP systems for McGuire and Catawba. The applicant also identified the components of the FP system that are subject to an AMR for McGuire and Catawba in LRA Tables 3.3-26 and 3.3-27, respectively. In the letters which summarize teleconferences dated October 15, 2001 and November 2, 2001, and in a letter to the applicant dated January 28, 2002, the NRC requested additional information regarding the FP systems at Catawba and McGuire. In a letter to the NRC dated January 28, 2002, the applicant provided additional information in response to the staff's RAIs.

In accordance with 10 CFR 54.4(a)(3), the SSCs that are relied on in safety analyses or plant evaluations to demonstrate compliance with 10 CFR 50.48 are included within the scope of license renewal. The FP system is relied upon to meet the requirements of 10 CFR 50.48 at Catawba and McGuire.

#### 2.3.3.19.1 Technical Information in the Application

In accordance with 10 CFR 50.48, the applicant is required to implement and maintain a FP program. As stated in LRA Section 2.1.1.3.1, the CLB, with regard to fire protection, differs for McGuire and Catawba. McGuire and Catawba are both licensed to 10 CFR 50.48(b) as specifically stated in SERs and the respective facility operating licenses. License Conditions 2.C.(3) and 2.C.(7) apply for the McGuire FP program and License Conditions 2.C.(8) and 2.C.(6) apply for the Catawba FP program. The NRC SER, NUREG-0422, provides the staff evaluation, which documents McGuire's compliance with Appendix A of Branch Technical Position (BTP) Auxiliary Power Conversion Systems Branch (APCSB) 9.5-1, "FP for Nuclear Power Plants." The NRC SER, NUREG-0954, provides the staff evaluation, which documents the Catawba compliance with Appendix A to BTP Chemical Engineering Branch (CMEB) 9.5-1. As part of the licensee's response to satisfy Appendix A to BTP APCS 9.5-1 during the original licensing, Duke committed to install a dedicated standby shutdown system (SSS) at McGuire and Catawba that would be used only in the event of a fire or plant security emergency.

In addition, LRA Section 2.1.1.3.1 stated that Catawba and McGuire both use a quality condition designation, Duke QA Condition 3, that applies uniquely to FP SSCs and services. Systems designated as QA Condition 3 are described in the LRA as those systems that promptly detect, control, and extinguish fires to limit their damage and to provide protection for SSCs and services so that a fire will not prevent the safe shutdown of the plant.

LRA Section 2.1.1.3.1 stated that the FP system at McGuire is designed to provide automatic and manual means to control and extinguish fires that may occur within building, yard, and transformer areas. The McGuire FP program is based on an evaluation of the potential fire hazards throughout the auxiliary and reactor buildings and areas adjacent to these facilities. The Catawba FP system is designed to provide automatic and manual means to control and extinguish fires that may occur within building, yard, and transformer areas. The Catawba FP program is based on an evaluation of the potential fire hazards throughout the auxiliary, diesel generator, and reactor buildings, the nuclear service water pump structure, and portions of the turbine and service buildings adjacent to these facilities.

The applicant states, in LRA Section 2.1.1.3.1, that its evaluation demonstrates that the plant will maintain the ability to perform safe-shutdown functions and minimize radioactive releases to the environment. On the basis of the methodology described above, the applicant identified that the highlighted components, shown on the FP flow diagrams listed in LRA Section 2.3.3.19, are included within the scope of license renewal.

In the LRA, Tables 2.2-1 and 2.2-2, the applicant identified that the FP system is within the scope of license renewal. In LRA Tables 3.3-26 and 3.3-27, for McGuire and Catawba, respectively, the applicant identified the mechanical components subject to an AMR, their intended functions, and the materials of construction. For McGuire, the applicant identified the following component types from the fire protection system that are subject to an AMR—cylinders (halon), fire hose rack, rupture discs, spray nozzles, sprinklers, orifices, pipe, pulsation dampeners, pump casings, standpipes, and valve bodies. For Catawba, the applicant identified the following component types from the fire protection system that are subject to an AMR—cylinders (CO<sub>2</sub>), fire hose rack, spray nozzle, sprinkler, tanks (CO<sub>2</sub>), orifices, pipe, pump casing and valve bodies. The applicant further identified that the intended functions of these component types to be maintaining the integrity of the fire protection system pressure boundary, filtration, and inducing spray flow.

#### 2.3.3.19.2 Staff Evaluation

The Commission's regulations in 10 CFR 54.21(a)(1) state that for those SSCs that are within the scope of Part 54, as delineated in 10 CFR 54.4, the applicant must identify and list those SSCs that are subject to an AMR. The staff reviewed Section 2.3.3.19 of the LRA, as supplemented by conference call summaries dated October 15, 2001, and November 2, 2001, and the applicant's RAI responses dated April 15, 2002, to determine whether there was reasonable assurance that the applicant had appropriately identified the SSCs that serve FP-intended functions that are within the scope of license renewal in accordance with 10 CFR 54.4, and are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

LRA Section 2.3.3.19 stated that the McGuire and Catawba UFSARs, in Section 9.5.1, "Fire Protection Systems," provide additional information concerning the interior and exterior fire protection system. The staff sampled portions of each UFSAR to identify any additional FP system function that met the scoping requirements of 10 CFR 54.4 but was not identified as an intended function in the LRA.

The staff also reviewed NUREG-0422 for McGuire and NUREG-0954 for Catawba. These NUREGs are referenced directly in the McGuire and Catawba FP license conditions, and they both summarize the FP program and commitments to 10 CFR 50.48 using the guidelines of

Appendix A to BTP APCS 9.5-1 for McGuire and Appendix A to BTP CMEB 9.5-1 for Catawba. The staff reviewed these NUREGs to verify that the function(s) of the FP components relied upon to satisfy the provisions of Appendix A to BTP APCS 9.5-1 and Appendix A to BTP CMEB 9.5-1 were included in the Quality Assurance (QA) Condition 3 designation and in the scope of license renewal as intended functions in the LRA.

The staff then compared the FP SSCs identified in the flow diagrams to verify that the required components were highlighted as being within the evaluation boundaries on the flow diagram, and were not excluded from the scope of license renewal. As part of the evaluation, the staff also sampled portions of the same flow diagrams for the FP system to determine if there were any additional portions of the system piping or components located outside of the evaluation boundary that should have been identified as within the scope of license renewal.

During the staff's review, a technical concern was identified regarding the appropriateness of the applicant's QA Condition 3 designation applied during the scoping evaluation to identify all FP SSCs required for compliance with 10 CFR 50.48. The QA Condition 3 designation is the primary means applied by Duke to identify FP SSCs. As noted in RAI 2.3.3.19-1, issued to Duke by letter dated January 28, 2002, UFSAR Chapter 17, "Quality Assurance Topical Report," Amendment 28, states that "QA Condition 3 covers those systems, components, items, and services which are important to fire protection as defined in the Hazards Analysis for each station. The Hazards Analysis is in response to Appendix A of NRC Branch Technical Position APCS 9.5-1."

To ensure that all QA Condition 3 SSCs were included within the scope of license renewal, the applicant stated in conference calls, conducted on September 18 and 20, 2001, and summarized in a memorandum dated October 15, 2001, that it reviewed mechanical drawings and other QA Condition 3 program documents developed in the mid-1980s to perform their FP scoping evaluation. The QA Condition 3 designation had been identified on the mechanical drawings at the time the drawings were developed in the mid 1980s. In addition, the applicant stated in a October 3, 2001, conference call, summarized by memorandum dated November 2, 2001, that it also reviewed the UFSARs during its scoping evaluation. However, the applicant also stated that some of the SSCs referred to in the UFSARs were not identified as part of the QA Condition 3 program if they were not protecting equipment needed for safe shutdown.

By letter dated January 28, 2002, the staff stated that the exclusion of FP SSCs, on the basis that the intended function is not required for the protection of safe shutdown equipment or safety-related equipment, is not acceptable if the SSC is required for compliance with 10 CFR 50.48. Furthermore, the staff requested, in RAI 2.3.3.19-1, that the applicant provide justification for the exclusion of components that are relied upon in the staff's SERs as meeting the provisions of Appendix A to BTP APCS 9.5-1 and Appendix A to BTP CMEB 9.5-1.

In its response dated April 15, 2002, the applicant stated, in the background section of the FP RAI responses, that the SSCs within the scope of license renewal that are required for compliance with 10 CFR 50.48 are those SSCs that protect only safety-related SSCs so that a fire will not prevent the performance of necessary safe plant shutdown functions and will not significantly increase the risk of radioactive releases. The applicant also provided a detailed description to explain its view that the focus of SSCs relied on to comply with 10 CFR 50.48 (and any other FP regulations or guidance documents) is directly related to the ability to safely shut down the plant and minimize radioactive releases in the event of a fire. The applicant also

provided a discussion of the Commission's regulations on license renewal and fire protection, the staff's guidance related to these regulations, and Duke's plant-specific licensing documentation and technical evaluations related to 10 CFR 50.48.

The staff did not agree that the applicant's analysis of the FP regulations had completely captured the FP SSCs required for compliance with 10 CFR 50.48. Based on the information provided from the applicant pertaining to the scoping evaluation, the staff did not have reasonable assurance that the QA Condition 3 designation included in scope all of the FP SSCs required for compliance with 10 CFR 50.48. The scope of SSCs required for compliance to GDC 3 and 10 CFR 50.48 goes beyond preserving the ability to maintain safe shutdown in the event of a fire. The McGuire and Catawba FP license conditions state that "Duke Energy shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (FSAR), as updated, for the facility...and as approved in the applicable SERs." In addition, 10 CFR 50.48(b) states that plants whose fire protection features were accepted by the NRC as satisfying the provisions of Appendix A to BTP APCS 9.5-1 or were accepted in comprehensive SERs prior to publication of Appendix A to BTP APCS 9.5-1 in August 1976, were only required to meet the provisions of Sections III.G, III.J, and III.O of Appendix R. Commitments to meet Appendix A to BTP APCS 9.5-1 or Appendix A to BTP CMEB 9.5-1, as documented in SERs which are directly referenced in the fire protection license condition, are not considered to merely mention a system, structure, or component since the commitments support a specified regulatory function. Therefore, all FP SSCs required for compliance with 10 CFR 50.48, including GDC 3, are required to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(3).

In the following paragraphs, the staff describes the components that appear to perform FP intended functions because they are identified and discussed as commitments in SERs or in the UFSAR, both of which are referenced in the license conditions for McGuire and Catawba. Based on the staff's review, these components appear to be required for compliance with 10 CFR 50.48, but were not designated by the applicant as QA Condition 3 SSCs on the basis that they were not protecting safe shutdown equipment or safety-related equipment.

Fire Hydrants. By letter dated January 28, 2002, the staff questioned, in RAI 2.3.3.19-4, the applicant's methodology, which excluded fire hydrants that can be isolated from the flowpath from the scope of license renewal. In its response dated April 15, 2002, the applicant stated that, with the exception of two hydrants at Catawba that protect the nuclear service water pump structure, hydrants in the yard are not relied upon to protect safety-related SSCs required for safe shutdown. These two credited hydrants are included in scope, along with some hydrants that are located along the flowpath and cannot be isolated. The hydrants that cannot be isolated from the flowpath are included within license renewal scope. The applicant stated that the other hydrants are not in scope because they are not relied upon for fire suppression of safety-related SSCs to ensure safe shutdown and are isolable from the flowpath (via upstream isolation valves). The applicant explained in its RAI response that these isolable, downstream hydrants and piping are beyond the requirements of 10 CFR 50.48 and are not within the scope of license renewal. The staff found no basis for the argument that the isolable, downstream hydrants and piping are beyond the requirements of 10 CFR 50.48. GDC 3 provides for the protection of SSCs where a fire might also significantly increase the risk of radioactive releases which may not be associated with safe shutdown. Hydrants would provide for protection against fires in areas where radioactive releases could be released to the environment.

McGuire is required to meet Appendix A to BTP 9.5-1, and Catawba is required to meet the position documented in CMEB 9.5-1. Both documents state that "outside manual hose installation should be sufficient to reach any location with an effective hose stream. To accomplish this, hydrants should be installed approximately every 250 feet on the yard main system." Furthermore, the staff asked, in RAI 2.3.3.19-4, the applicant to verify that hydrants located on the yard main system were not excluded from the scope of license renewal. In its response dated April 15, 2002, the applicant did not verify or address this item. The staff is concerned that lack of maintenance of fire hydrants over time can result in partially closed or shut valves and clogging of hydrants with debris, which will affect the system flow results. Furthermore, fire hydrants are considered passive and long-lived components in accordance with 10 CFR 54.21. Therefore, this issue was characterized as SER open item 2.3.3.19-1.

The staff and the applicant met on October 1, 2002, to discuss SER open items pertaining to the scoping and screening of fire protection equipment. A summary of this meeting was issued on November 26, 2002 (ADAMS Accession No. ML023330429). During this meeting, Duke stated that the fire protection plant designs for McGuire and Catawba are unique. By design, most plants rely upon the hydrants for compliance with 10 CFR 50.48 as a backup means of suppression to ensure defense-in-depth. However, the fire protection system in the auxiliary buildings for McGuire and Catawba consists of two headers that feed the automatic and manual suppression systems. These headers provide sectional isolation capability between the automatic and manual suppression systems such that a single failure cannot cause loss of water supply to both the automatic and manual means of suppression in a given area. As such, defense-in-depth exists in the fire protection system design in the auxiliary building for McGuire and Catawba. In addition, Duke stated that no potential sources of radioactive releases are protected in the event of a fire by those hydrants that are excluded from the scope of license renewal at McGuire or Catawba. The staff acknowledged during this meeting that, since the applicant does not rely on the hydrants as a backup means of suppression or to protect against the release of radioactive releases for compliance to 10 CFR 50.48, this issue was confirmatory pending the staff's receipt of this explanation of the McGuire and Catawba design in a formal SER open-item response from Duke. The applicant provided this response to the staff in a letter dated October 28, 2002. The applicant's written response accurately reflects the information provided during the October 2, 2002, meeting. Therefore, SER open item 2.3.3.19-1 is closed.

Jockey Pump Casings. Flow diagrams MCFD-1599-01.00 and CN-1599-1.0 do not include the jockey pump casings within the scope of license renewal. The jockey pump's importance is to prevent the main fire pumps from cycling off and on with system pressure changes. This protects the main fire pumps, which are also required for compliance with 10 CFR 50.48, from excessive use which could prevent the fire pumps from being reliable when needed to provide water during a fire event. By letter dated January 28, 2002, the staff asked, in RAI 2.3.3.19-6, the applicant to (1) provide justification for excluding the jockey pumps, and (2) justify the appropriateness of the methodology used to identify FP systems and components that are within the scope of license renewal based solely upon their QA Condition 3 designation (or lack thereof). The staff also presented the regulatory basis, consistent with previous license renewal SERs, explaining how the jockey pumps were required to meet 10 CFR 50.48, in its RAI.

In its response dated April 15, 2002, the applicant stated that the jockey pump provided more of a support function and not an intended function, in that it refills the suppression system during standby mode when the system has lost water due to normal system leakage. The applicant also stated that the jockey pumps do not protect safety-related SSCs (so that a fire will not

prevent the performance of necessary safe plant shutdown functions and will not significantly increase the risk of radioactive releases) and that the jockey pump was therefore beyond the requirements of 10 CFR 50.48. The staff disagrees on the basis that the applicant did not address the fact that this component was accepted by the NRC staff in an SER as satisfying the provisions of Appendix A to BTP 9.5-1 for McGuire and Appendix A to CMEB 9.5-1 for Catawba, in accordance with 10 CFR 50.48(b). Furthermore, in its response to Appendix A to BTP 9.5-1 (McGuire, October 7, 1982) and Appendix A to CMEB 9.5-1 (Catawba, November 4, 1983), Duke described its approach to meeting each of the requirements in the BTPs and stated, for both McGuire and Catawba, that the jockey pumps are provided to maintain pressure in the system. The staff found this response from the applicant unacceptable and characterized this issue as SER open item 2.3.3.19-2.

During the staff's October 1, 2002, meeting with Duke, and as stated in a letter from the applicant dated October 28, 2002, Duke agreed that the jockey pumps are part of the current licensing basis of McGuire and Catawba in that they exist as a commitment to satisfy the provision of Appendix A to BTP 9.5-1 for McGuire and Appendix A to CMEB 9.5-1 for Catawba. However, Duke felt that the jockey pumps did not meet the criterion of 10 CFR 54.4(a)(3) on the basis that they are not relied on in a safety analysis or plant evaluation to perform a function to demonstrate compliance with 10 CFR 50.48. In the applicant's opinion, a function is not required to demonstrate compliance with 10 CFR 50.48 unless that function is to maintain the ability to safely shut down the plant and minimize radiation releases in the event of a design basis fire. The staff disagrees with Duke's position because, as the staff has consistently shown, the jockey pumps for McGuire and Catawba are credited in their respective FSARs and SERs (and other design basis documents) for maintaining pressure on the fire water header, which is a function that is clearly required for compliance with 10 CFR 50.48. Additionally, the FSARs and SERs are referenced in the fire protection plan license conditions for each plant.

In its October 28, 2002, letter, Duke identified the jockey pump casings, piping, and other components of the fire water pressure maintenance sub system as within the scope of license renewal. The applicant also provided the AMR results for the pressure maintenance subsystem of the fire protection system containing the jockey pump. Therefore, the staff is satisfied with the resolution of this issue. Open item 2.3.3.19-2 is closed. The staff's evaluation of the AMR results for the fire water pressure maintenance sub system is documented in Section 3.3.19.2 of this SER.

Suppression for Charcoal or Carbon Filters. Section 9.5.1.2.1 of the Catawba UFSAR states that the interior fire water (RF) system provides a fixed water suppression system for charcoal filters. The RF system provides water for interior fire protection from multiple connections to the yard loop. Fire protection piping to charcoal filter units is not highlighted on flow diagrams CN-1599-2.1(at J-7 and J-10) and CN-1599-2.2 (at H-2 and H-4). In the October 3, 2001, conference call, the applicant stated that the charcoal filters are associated with a non-safety-related containment ventilation system equipment that cools the containment building to make it habitable for maintenance, operations, and radiation protection of personnel during refueling outages. The staff is concerned that charcoal filters are typically inaccessible by personnel so that in the event of a fire, the water spray system is the only credited means to suppress this type of fire. By letter dated January 28, 2002, the staff requested the applicant, in RAI 2.3.3.19-9, to justify why RF piping to the charcoal filter units is not in scope. In its response dated April 15, 2002, the applicant stated that the subject filters are not charcoal filters but high-purity carbon filters, and that the carbon used in these filter beds has an ignition temperature of

approximately 330 °C. Since the air temperature in the process flowpath of this filter is not designed to reach temperatures this high, the applicant stated that the carbon filters are not combustible in the environment for which they are designed to operate. The applicant concluded that the need for a fixed water suppression system has been precluded by the use of the bed filter with an essentially noncombustible material.

The staff did not agree with this justification for excluding the fixed water suppression system from the scope of license renewal. The staff believes that the applicant's distinction between charcoal filters and carbon filters is not material because, irrespective of the term, the filter medium of carbon (charcoal) is combustible. Therefore, the need for suppression capability has not been precluded by this use of alternative terminology, and exclusion of these components from the scope of license renewal is not justified.

The staff also noted that Duke is committed to providing fire suppression features for carbon filters (purity is not a criterion). By letter from Hal B. Tucker (Duke) to Harold Denton (NRC), dated November 4, 1983, Duke submitted a revised response to BTP APCSB(CMEB) 9.5-1. In this response, Duke identified the containment auxiliary carbon filters and states, on pages 48-50, "Containment Auxiliary Carbon Filter," that carbon filters are protected with a built-in water spray system. This statement is directly related to the regulatory requirement of Appendix A to BTP CMEB 9.5-1 that "fire suppression systems should be installed to protect charcoal filters in accordance with Regulatory Guide 1.52." This issue was characterized as SER open item 2.3.3.19-3.

In a letter dated October 28, 2002, the applicant stated that it had performed further review and determined that the piping, sprinklers, and valve bodies associated with the Catawba reactor building charcoal filter unit sprinklers should have been identified as within the scope of license renewal and subject to aging management review. The components of this portion of the Catawba FP system are listed in Table 3.3-27 of the LRA. Since the fixedwater suppression system for the charcoal filters was included in scope and subject to an AMR, the staff is satisfied with its resolution. Open item 2.3.3.19-3 is closed. The staff's evaluation of the AMR results is documented in Section 3.3.19.2 of this SER.

Suppression Systems and Hose Stations. Sections 9.5.1.2.1 and 9.5.1.2.2 of the McGuire and Catawba UFSARs identify and describe water suppression systems and hose stations that protect various yard structures and selected areas in the McGuire and Catawba turbine buildings. However, the staff noted that these water suppression systems and hose stations were excluded from the scope of license renewal. By letter dated January 18, 2002, the staff asked, in RAIs 2.3.3.19-1, 2.3.3.19-3, and 2.3.3.19-8, why these fire protection features for the components listed in Sections 9.5.1.2.1 and 9.5.1.2.2 of the UFSAR (e.g., hydrants that are connected to the yard main, oil storage house, oxygen and acetylene gas storage yard area, compressed flammable gas cylinder storage area, main turbine piping and bearings, unit startup and standby oil-filled power transformers, main turbine lube oil reservoirs, hydrogen seal oil unit, and the feedwater pump turbines) were excluded from the scope of license renewal.

In its response dated April 15, 2002, the applicant stated that their UFSAR contained a general description of all of the FP features in each plant, and not just those FP SSCs required for 10 CFR 50.48. This is contrary to the applicant's license conditions for McGuire and Catawba, which show that the FP CLB is defined in part by the UFSAR. Furthermore, 10 CFR 54.2 defines the UFSAR as a means to document the CLB at each facility. Therefore, the staff does not

agree that the components listed in the UFSAR as satisfying the FP program can be excluded from the scope of license renewal. From a technical standpoint, water suppression systems and deluge systems are important to provide automatic suppression in areas where the fire is expected to either be controlled until the fire brigade arrives or where due to the hazard, the suppression system is provided to extinguish the fire. Manual hose stations are important because they allow the fire brigade to deliver water to quickly extinguish fires in the areas closest to the hose station. Age-related degradation of these components could lead to the inability to control or extinguish a fire, which would allow it to grow uncontrolled. Therefore, this issue was characterized as SER open item 2.3.3.19-4 for unresolved RAls 2.3.3.19-1, 2.3.3.19-3, and 2.3.3.19-8. The suppression systems of concern fall into two categories— (1) fire suppression in outlying areas, and (2) fire suppression in the McGuire and Catawba turbine buildings. Therefore, these categories are addressed separately in the following two sections of this SER.

Fire Suppression in Outlying Areas. The staff's concern with the suppression systems in the outlying plant areas was that these systems may be credited to mitigate an exposure hazard to surrounding buildings in the event of a fire. This item was discussed during the staff's October 1, 2002, meeting with Duke, and the applicant agreed to further research the licensing basis documents pertaining to these exposure hazards and to notify the staff of its findings. The staff agreed to perform a more detailed review as well. Subsequently, in its October 28, 2002, response to this open item, the applicant stated that it had reviewed submittals made to the NRC during original licensing. Duke concluded that separation was the only credited fire protection feature for those areas listed in the open item that are located in the yard. After reviewing the McGuire and Catawba licensing basis documentation, the staff agreed with the applicant's finding that the suppression systems in the outlying plant areas did not appear to be credited due to physical separation from surrounding buildings.

Fire Suppression in the Turbine Buildings. In its letter dated October 28, 2002, the applicant stated that, for the turbine buildings at McGuire and Catawba, the main turbine lubricating oil tank, which contains the largest volume of combustible fluid in the turbine building, is located approximately 100 feet from the fire barrier that separates the auxiliary building from the service building and turbine building. Based on the applicant's review, these areas did not present an exposure hazard to the auxiliary building.

However, the staff had also performed a more detailed review of the licensing basis for fire suppression in all areas of the plant, including the turbine buildings, and concluded that the NRC reviewers had relied on manual suppression (manual hose stations) to provide programmatic defense in depth in accordance with 10 CFR 50.48 during original licensing.

The staff reviewed the Statement of Considerations (SOC) for the proposed fire protection rule, 10 CFR 50.48, to understand the Commission's view of the defense-in-depth concept for fire protection. The SOC, published in the May 29, 1980, edition of the *Federal Register* (45 FR 36082), states—

The concept of defense in depth is here extended to fire protection (1) to prevent fires from starting, (2) to rapidly detect, control, and promptly extinguish those fires that do occur, and (3) to arrange the structures, systems and components important to safety so that a fire that starts in spite of the fire prevention activities and that is not promptly extinguished by the fixed automatic or manual fire suppression activities will not prevent the safe shutdown of the plant. (45 FR @ 36084)

The SOC also addresses Section C, “Manual Fire Fighting”, of the proposed rule, stating—

This section requires that manual fire fighting capability (a fire brigade) be provided in all areas containing or presenting a fire hazard to structures, systems, or components important to safety. (45 FR @ 36084)

The staff noted that a fire brigade would rely upon manual hose stations to combat a fire. The November 19, 1980, edition of the *Federal Register* (45 FR 76602), also addresses Section C, “Manual Fire Fighting”, of the final rule, stating—

Considerable reliance is placed on automatic fire suppression systems throughout a nuclear power plant. However, manual fire fighting activities often can control and extinguish slowly developing fires before an automatic fire suppression system is actuated. In addition, fires that are controlled or extinguished by automatic systems require a certain amount of manual response. Also, some areas of the plant do not warrant installation of automatic fire suppression systems. Manual response is the only fire suppression available for these areas; thus, it is important that manual fire fighting capability be present in all areas of the plant, and that standpipe and hose stations be located throughout the plant. The standpipe and hose stations are to be located so that at least one effective hose stream can be brought to bear at any location in the plant containing or presenting a hazard to structures, systems, or components important to safety. (45 FR @ 76605)

The fire protection regulations and guidance documents (Appendix R and Appendix A to BTP 9.5.1) define the concept of defense-in-depth for fire protection programs consistent with definition provided in the SOC. The guidance in Appendix A to BTP 9.5-1 and CMEB 9.5-1, which was implemented by Duke during original licensing, states in part that “interior manual hose stations should be provided in all buildings, including containment, on all floors.” This ensures that interior manual hose installation should be able to reach any location with at least one effective hose stream. Page 64 of the letter dated October 7, 1982, for McGuire, indicates that Duke implemented this guidance. Furthermore, Duke’s docketed response does not state that manual hose stations were not provided in the turbine building due to the presence of a 3-hour-rated fire barrier. Similarly, page 76 of the letter dated November 4, 1983, for Catawba, indicates that manual hose stations were installed per the guidance of CMEB 9.5-1. As with the response for McGuire, Duke’s response in this letter pertaining to Catawba does not state that manual hose stations were not installed in the turbine building due to the presence of a 3-hour-rated fire barrier.

The staff reviewed Duke’s fire protection reviews for both plants, which were documented in design basis specifications obtained during the NRC inspection for scoping and screening. McGuire’s “Plant Design Basis Specification for Fire Protection”, MCS-1465.00-00-0008, Revision 4, and Catawba’s Plant Design Basis Specification for Fire Protection, Spec. CNS-1465.00-00-0006, Revision 4, document the fire protection reviews for McGuire and Catawba, respectively. These documents also indicated that, in its response to Appendix A to BTP 9.5-1 and CMEB 9.5-1, Duke did not take any exception to the statement that “interior manual hose stations should be provided in all buildings, including containment, on all floors.”

For these reasons, the staff disagreed with the applicant’s finding that hose stations were not required for compliance with 10 CFR 50.48. Duke had placed total reliance on the 3-hour fire barrier and did not identify the manual hose stations, which would be utilized as part of defense-in-depth to suppress a turbine building fire, as within the scope of license renewal. Therefore, although the staff agreed with Duke’s finding that the suppression systems in the outlying plant

areas did not appear to be credited due to physical separation from surrounding buildings, open item 2.3.3.19-4 remained unresolved.

In a letter to Duke dated November 13, 2002, the staff notified the applicant that its response to SER open item 2.3.3.19-4 was inadequate to resolve the item. The staff also requested complete and sufficient information to complete its review of this issue. In its response, dated November 18, 2002, Duke stated that the main lubricating oil tank is the worst combustible load in the turbine building and that it does not present an unacceptable fire exposure hazard. The staff disagreed with this statement and believes that the main turbine lubricating oil tank does present an unacceptable fire exposure hazard because a lube oil fire typically produces high heat release rates that can challenge the integrity of a 3-hour-rated fire barrier. In the event that a lube oil fire starts, without manual suppression capability to control or limit the spread of fire, this type of fire could propagate through the walls or roof of the turbine building to other fire areas in less than 3 hours. The rated fire wall is only a passive structure (one aspect of defense-in-depth) installed to prevent a turbine lube oil fire from damaging equipment important to safety in adjacent fire areas (e.g., the auxiliary building). In addition, the fire barrier would not protect SSCs important to safety in the turbine building in accordance with GDC 3, which requires fire protection for SSCs that are important to safety.

In the November 18, 2002, letter, Duke contended that the guidance in Appendix A to BTP 9.5-1 was later clarified in the CMEB 9.5-1 with respect to manual hose station installation to only require manual hose stations for protection of safety-related SSCs. Appendix A to BTP 9.5-1 states in part that "Manual hose stations should be able to reach any location with at least one effective hose stream." CMEB 9.5-1, which was issued later, states that "Manual hose stations are located throughout the plant to ensure that an effective hose stream can be directed to any safety-related area in the plant." Both versions state that "To accomplish this, standpipes with hose connections should be provided in all buildings on all floors." No exceptions to either version were taken by Duke to exclude the turbine building. The guidance, when considered within the context of GDC 3 and 10 CFR 50.48, provides for the protection of all SSCs important to safety and not just for safety-related or safe shutdown equipment.

In its November 18, 2002, response to the staff's November 13, 2002, letter, the applicant stated that the regulations use the terms "safety-related" and "important-to-safety" interchangeably and that the turbine buildings did not contain equipment important to safety. The staff has referred to Generic Letter (GL) 84-01, "NRC Use of the Terms, 'Important to Safety' and 'Safety Related,'" for a discussion of the scope and meaning of SSCs important to safety. The staff also noted that all safety-related equipment is inherently important to safety, although the classification of equipment that is important to safety extends beyond that which is safety-related.

The staff also determined that, contrary to the applicant's statement, the McGuire and Catawba turbine buildings do in fact house equipment important to safety, including 6900/4160 volt transformers (for normal electrical power), sensing instrumentation and circuitry associated with main turbine operational inputs to the reactor protection system, sensing instruments and control circuitry for mitigating anticipated transient without scram (ATWS) events, and, for Catawba in particular, a backup suction source for auxiliary feedwater during certain design basis events involving the standby shutdown system.

In accordance with 10 CFR 54.4(a)(3), SSCs that are relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48 are required

to be in scope of license renewal. Therefore, it is the staff's position that Duke's licensing basis documentation, reviewed within the context of 10 CFR 50.48 and GDC 3, shows that the manual hose stations in the turbine building are relied upon for compliance with 10 CFR 50.48.

In its November 18, 2002, response to the staff's November 13, 2002, letter, the applicant stated that, although it disagreed with the staff's position with respect to manual hose stations in the turbine buildings, the equipment associated with these fire suppression features would be included in the scope of license renewal. The applicant also provided AMR results tables for the passive equipment brought into the scope of license renewal. Therefore, open item 2.3.3.19-4 is resolved. The staff's evaluation of the AMR results is documented in Section 3.3.19.2 of this SER.

Suppression for Reactor Building Purge Exhaust Filters. Section 9.5.1.2.3, "Fire Protection, Category I Safety Related," of the McGuire UFSAR states that the manually operated water spray systems provide fixed spray patterns of water for reactor building purge exhaust filters 1A, 1B, 2A, and 2B, which appear to be Category 1, safety-related components. However, drawing MCFD 1599-02.01, coordinates H-3, G-3, C-5, and B-7, indicates that piping and sprinklers associated with this function are excluded from the scope of license renewal. The fire protection rule, 10 CFR 50.48, states that each operating nuclear power plant must have a fire protection plan. A license condition for Catawba states that Duke Energy Corporation shall implement and maintain in effect all provisions of the approved fire protection program as described in the UFSARs for the respective facilities. Since the UFSAR states that the manually operated water spray systems provide fixed spray patterns of water for reactor building purge exhaust filters 1A, 1B, 2A, and 2B, the staff was concerned that the manually operated water spray systems for these filters were inappropriately excluded from the scope of license renewal and an AMR. This issue was characterized as SER open item 2.3.3.19-6.

In a letter dated October 28, 2002, Duke stated that the flexible hoses, piping, sprinklers, and valve bodies associated with the McGuire reactor building exhaust filters spray system should have been identified as within the scope of license renewal and subject to aging management review. The components of this portion of the McGuire FP system are listed in Table 3.3-26 of the LRA. The staff is satisfied with the resolution of this issue. Open item 2.3.3.19-6 is closed. The staff's evaluation of the AMR results provided in Table 3.3-26 of the LRA is documented in Section 3.3.19.2 of this SER.

In some cases, the applicant was able to demonstrate to the staff that some FP SSCs installed in certain plant-specific areas were not credited for compliance with 10 CFR 50.48. For example, RAIs 2.3.3.19-2 and 2.3.3.19-7 address plant-specific areas for McGuire and Catawba where automatic suppression systems or hose stations were excluded from the scope of license renewal. The staff sampled portions of the SERs referenced in each plant's license condition, as well as any Duke submittals upon which the NRC staff based its review. The staff found that these suppression systems were not credited in any staff SERs or licensing documentation which form the basis of the McGuire and Catawba license conditions. Therefore, RAIs 2.3.3.19-2 and 2.3.3.19-7 were resolved because the applicant was able to demonstrate that these particular FP SCs were not credited for compliance with 10 CFR 50.48.

After determining which components were within the scope of license renewal, the staff reviewed the components the applicant identified as being subject to an AMR. The staff reviewed selected components that the applicant identified as within the scope of license renewal to verify that the

applicant had identified those SCs that perform their intended functions without moving parts or without a change in configuration or properties, and are not subject to replacement based on qualified life or specified time period were subject to an AMR.

As documented in the conference call summary dated October 15, 2001, the staff noted that the system filters, fire extinguishers, fire hoses, and air packs were not subject to an AMR. The applicant clarified that, based on the NRC letter from C.I. Grimes to D.J. Walters, NEI, "Consumables," dated March 10, 2000, these SCs were excluded from an AMR because the applicant replaces them based on a qualified life. The applicant also noted that each SSC was identified and listed, and a site-specific evaluation for each of these SCs was included in LRA Section 2.1.2.1.2.

The staff reviewed Section 2.1.2.1.2 of the LRA and determined that filters are replaced on condition. The staff's evaluation of Section 2.1.2.1.2 and the treatment of filters is documented in Section 2.1.3.2.1 of this SER. With respect to fire extinguishers, fire hoses, and air packs, Section 2.1.2.1.2 states the following—

Portable equipment is within the scope of license renewal but is not subject to aging management review because it is replaced on condition. Such equipment is routinely inspected for degradation. For example, fire extinguishers, self-contained breathing air packs, fire hoses and portable ductwork, credited for compliance with the Fire Protection rule, are inspected in accordance with National Fire Protection Association (NFPA) standards. These standards require replacement of portable equipment based on their condition or performance during testing and inspection. These portable components are not long-lived and are subject to replacement per NFPA standards, therefore an aging management review is not required.

As stated in Table 2.1-3 of the SRP-LR, fire extinguishers, fire hoses, and air packs are typically replaced based on performance or condition monitoring that identifies whether these components are at the end of their qualified lives. Therefore these components may be excluded, on a plant-specific basis, from AMR under 10 CFR 54.21(a)(1)(ii), however, the applicant should identify the standards that are relied on for the replacement as part of the methodology description. Since the applicant stated that these components will be replaced based on their condition or performance testing in accordance with NFPA standards, the staff finds the applicant's treatment of these consumables acceptable because it conforms to 10 CFR 54.21(a)(1)(ii).

Main Fire Pump Suction Strainers. The staff also reviewed mechanical components from flow diagrams LRA-M-2219, Sheet 5 and LRA-M-219, Sheet 1, and compared them to the list of components and corresponding intended function(s) presented in Table 3.4-2 of the LRA. The staff noticed that strainers associated with the main fire pumps were incorrectly excluded from an AMR. Duke identified the fire pumps and associated strainers as within the scope of license renewal by indicating that these components are designated as within the license renewal evaluation boundary, but did not list the strainers in AMR results Tables 3.3-26 or 3.3-27. The staff's view is that strainers provide a filter function to protect the integrity of the fire pumps. Appendix A to BTP 9.5-1 and Appendix A to CMEB 9.5-1 both state that "details of the fire pump installation should as a minimum conform to NFPA 20, 'Standard for the Installation of Centrifugal Pumps.' Page 6 of the Catawba response to the BTP, dated November 4, 1983, states that "fire pumps are arranged in accordance with the intent of NFPA 20-1978." The staff determined that McGuire is committed to NFPA 20, 1978 edition. NFPA-20-1978, Section 4-3.4, "Suction Strainers," requires strainers for vertical shaft fire pumps. The staff's technical concern

is that Duke uses lake water to supply its fire protection suppression systems at McGuire and Catawba. Lake water is corrosive and may contain sedimentation that can potentially clog the fire pumps. In addition, the strainers keep debris from plugging the sprinkler nozzles in fire suppression systems in the event that sprinklers are actuated.

By letter dated January 28, 2002, the staff requested the applicant, in RAI 2.3.3.19-5, to explain why these passive, long-lived components were excluded from an AMR. In its response dated April 15, 2002, the applicant confirmed that the strainers are within the scope of license renewal and stated that the strainer can be excluded from an AMR on the basis that it is actually a sub-component of the pump installed in the pump bowl, does not contain any pressure-retaining parts, and is inspected and maintained along with the other non-pressure-retaining pump sub-components. However, the staff's understanding of the main fire pumps was that they are multiple-stage pumps with clip-on strainers on the bottom (at the suction) of the pump bowl assembly. Additionally, since the strainers are relied upon to filter debris and protect the main fire pumps and sprinklers, their function is unique and distinct from that of the pump or the pump bowl. Since the strainers are removable and perform a distinct function in accordance with NFPA 20, the staff did not consider them subcomponents of the pump. Therefore, the staff considered the strainers passive, long-lived components that perform a filtration function and are subject to an AMR. This issue was characterized as SER open item 2.3.3.19-5.

In a letter dated October 28, 2002, the applicant stated that it had performed an AMR for the main fire pump strainers and provided the results of its review. These AMR results for the strainer were generically applicable to both McGuire and Catawba. Each station has three main fire pumps. The pumps are normally in standby and are automatically started on low system pressure. Each pump has a strainer that is within the scope of license renewal and is subject to an AMR because it is a long-lived, passive component. This staff is satisfied with the resolution of this issue. Open item 2.3.3.19-5 is closed. The staff's evaluation of the AMR results is documented in Section 3.3.19.2 of this SER.

With the exception of the open items discussed above, the staff did not identify any further omissions in the SCs identified by the applicant as being subject to an AMR.

#### **2.3.3.19.3 Conclusion**

On the basis of the review described above, and with the resolution of six SER open items for the fire protection systems, the staff has reasonable assurance that the applicant adequately identified those portions of the FP system that are within the scope of license renewal and the associated SCs that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### ***2.3.3.20 Fuel Handling Building Ventilation System***

In LRA Section 2.3.3.20, "Fuel Handling Building Ventilation System," the applicant identified portions of the fuel handling building ventilation (VF) system and the components that are within the scope of the LRA and subject to an AMR. In the VF system section of the LRA, the applicant stated that the VF system is further described in Section 9.4.2 of the McGuire and Catawba UFSARs.

The applicant evaluated component supports for VF system ductwork listed in Table 3.5-3 of the LRA. The applicant evaluated electrical components that support the operation of the system in Section 2.1.2.3 of the LRA. The staff's scoping evaluation of structures and component supports is provided in Section 2.4 of this SER. The staff's evaluation of electrical components and instrumentation and controls in the VF system is documented in Section 2.5 of this SER.

#### 2.3.3.20.1 Technical Information in the Application

The VF system consists of a ventilation supply air handling unit subsystem with associated dampers, ductwork, and an exhaust subsystem consisting of filter trains, associated fans, dampers, ductwork, supports, and control systems. Outside air is supplied to the fuel building area by a supply system consisting of a fan with heating and cooling coils, a filter section, and associated ductwork. The filter section contains particulate type filters. This portion of the system has no standby capacity. The fuel building supply unit normally operates continuously, but will shut down when either the filtered exhaust fan is lost, a duct-mounted smoke detector is detected, or if the supply air temperature drops to 40 °F.

The VF system exhaust is an ESF. Each train of filter, fans, and motor-operated dampers is served by a separate train of the Emergency Class 1E standby power. This ensures the integrity and availability of the exhaust system in the event of any single active failure. Air exhausted from the building is monitored by a radioactive gaseous detector sampling the air in the exhaust duct header between the building and the inlet to the filter trains. Additional monitoring of exhaust air is provided in each unit vent. Indication of radioactivity above allowable limits will automatically divert the flow of air through the filter trains prior to discharge into the atmosphere through each unit vent. The VF system exhaust is available following a loss of offsite power but the fuel building supply will not be available.

In Section 2.3.3.20 of the LRA and Section 9.4.2 of the McGuire and Catawba UFSARs, the applicant identified the following VF system intended functions based on 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2)—

#### McGuire and Catawba

##### Section 2.3.3.20 of the LRA—

- to maintain ventilation in the spent fuel pool areas to permit personnel access
- to control airborne radioactivity in the fuel pool area during normal operation, anticipated operational transients, and following postulated fuel handling accidents

##### Section 9.4.2 of the McGuire and Catawba UFSARs—

- to provide a suitable environment for the operation of equipment and personnel access as required for inspection, testing and maintenance
- to provide exhaust purging of the building to the unit vent
- to monitor and filter VF system exhaust air so the limits of 10 CFR Part 20 and the TS are not exceeded
- to provide a suitable environment for the operation of vital equipment during an accident

On the basis of the intended functions identified above for the McGuire and Catawba VF system, the portions of this system that were identified by the applicant as within the scope include all VF system safety-related components (electrical, mechanical, and instruments). The applicant described its methodology for identifying the mechanical components subject to an AMR in Section 2.1 of the LRA. On the basis of this methodology, the applicant identified the portions of the VF system that are within the scope of license renewal on the flow diagrams listed in Section 2.3.3.20 of the LRA. Using the methodology described in Section 2.2.1 of the LRA, the applicant compiled a list of the mechanical components and component types subject to an AMR that are within the evaluation boundaries highlighted on the flow diagrams and classified their intended functions. The applicant provided this list in Table 3.3-28 of the LRA.

The following component types are identified as within LRA scope and subject to an AMR, and are listed in Table 3.3-28 of the LRA—air flow monitors, ductwork, filters, tubing, and valve bodies. The applicant indicated in Table 3.3-28 of the LRA that the pressure boundary function is the only applicable passive intended function of the VF system components subject to an AMR.

#### 2.3.3.20.2 Staff Evaluation

To verify that the applicant identified the components of the VF system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), the staff reviewed the flow diagrams listed in Section 2.3.3.20 of the LRA showing the evaluation boundaries for the highlighted portion of the VF system that is within scope, and Table 3.3-28 of the LRA, which lists the mechanical components and applicable intended functions subject to an AMR. The staff reviewed Section 9.4.2 of the McGuire and Catawba UFSARs to determine if there were any portions of the VF system that met the scoping criteria in 10 CFR 54.4(a), but were not identified as within the scope of license renewal. The staff also reviewed the McGuire and Catawba UFSARs to determine if any safety-related system functions were not identified as intended functions in the LRA, and if any structures or components that have intended functions were omitted from the list of structures or components that require an AMR. The staff compared the functions described in the UFSARs to those identified in the LRA.

The applicant identified the structures and components subject to an AMR for the VF system using the screening methodology described in Section 2.1 of the LRA and listed them in Table 3.3-28 of the LRA. The staff evaluated the scoping and screening methodology in Section 2.1 of this SER. The staff sampled structures and components from Table 3.3-28 of the LRA to verify that the applicant identified the structures and components subject to an AMR. The staff also sampled the structures and components that were within the scope of license renewal but not subject to an AMR. Based on the sample, the staff verified that these structures and components perform their intended functions without moving parts and without a change in configuration or properties, and are not subject to replacement on the basis of a qualified life or specified time period.

To ensure that those portions of the VF system excluded from scope are not performing any intended functions, the staff requested additional information. The staff noted that Section 2.3.3.20 of the LRA contains a summary description of the system functions and a listing of flow diagrams. The flow diagrams highlight the evaluation boundaries and Table 3.3-28 of the LRA tabulates the components within the scope of license renewal and subject to an AMR for the

VF system. The corresponding drawings and the UFSARs, however, show additional components that were not listed in Table 3.3-28 of the LRA.

The staff noted that the applicant did not identify housings for active components that require an AMR. The determination should consider whether failure of the housing would result in a failure of the associated active component to perform its intended function and whether the housing meets the long-lived and passive criteria as defined in the rule.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-1, specific information concerning the exclusion of fan housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that cooling fans are not included in the AMR results tables in the LRA. The applicant also states that cooling fans, without subcomponent exceptions, are explicitly excluded from an AMR by 10 CFR 54.21. The staff reviewed this response and determined that the applicant's basis for excluding fan housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the fan housings are passive and long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-1.

By letter dated January 23, 2002, the staff requested, in RAIs 2.3-2, 2.3-7(5), and 2.3-8(7), specific information concerning the exclusion of damper housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that dampers are not included in the AMR results tables in the LRA. The applicant added that ventilation dampers, without subcomponent exceptions, are explicitly excluded from an AMR by 10 CFR 54.21. The staff reviewed this response and has determined that the applicant's basis for excluding damper housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the damper housings are passive and long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-2.

In its response to open items 2.3-1 and 2.3-2, dated October 28, 2002, the applicant provided AMR results tables for the fuel handling building ventilation system fan and damper housings that are in scope at McGuire and Catawba. On the basis of the information provided, the staff finds the applicant's response sufficient to resolve open items 2.3-1 and 2.3-2. The applicant indicated that the aging effects will be adequately managed, such that the intended functions of the fans and dampers will be maintained consistent with the current licensing basis for the period of extended operation. The staff's evaluation of the AMR results is documented in Section 3.3.20.2 of this SER. Because these open items apply to a number of ventilation systems, their resolution is documented in multiple sub-sections of Sections 2.2 and 2.3 of this SER.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-4, specific information concerning the exclusion of building sealants from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that it does not classify materials such as sealants as structures or components. The applicant stated the pressure boundary function is addressed by TS surveillance testing. However, the applicant did not indicate that any of the TS surveillance requirements listed in its response were credited for aging management (and

identified as AMPs). Nor did the applicant furnish a description of or information pertaining to a TS surveillance AMP (including discussion of the 10 elements of the AMP) for the staff's review.

On page 2.1-24 of the LRA, the applicant stated that "seals associated with maintaining pressure boundary are limited to the divider barrier seals in the reactor building." Since the applicant does not discuss the treatment of structural sealants other than the divider barrier seal, it is not clear to the staff that building (structural) sealants were considered during an AMR of the structure (building) for which they are a subcomponent. Furthermore, according to page 3.5-10 of the LRA, the Inspection Program for Civil Engineering Structures and Components is credited by the applicant to monitor the aging of building concrete structural components (reinforced concrete beams, columns, floor slabs, and walls). According to Section B.3.21 of the LRA, the scope of the Inspection Program for Civil Engineering Structures and Components does not include structural sealants. Table 2.1-3, on page 2.1-15 of the SRP-LR, states that an applicant's structural AMP is expected to address structural sealants "with respect to an AMR program." The intent of this statement is that an applicant's structural AMP is expected to manage or monitor the aging effects of the structure and associated subcomponents that are identified during the AMR. The basis for this SRP guidance is documented in the summary (issued January 21, 2000) of a December 8, 1999, meeting to discuss the staff's position on the treatment of consumables. This summary clearly states, on page 3, that structural sealants would be implicitly included at the component level and considered during the AMR. Since the structural AMP identified for the concrete structural components does not address structural sealants, and since that applicant did not identify the TS surveillances listed in its response as AMPs or provide appropriate information to support the staff's review of these surveillances as AMPs, the staff characterized this issue as SER open item 2.3-3.

In its response to this open item, dated October 28, 2002, the applicant credited a visual inspection of the structural sealant used to maintain ventilation pressure boundary integrity of the control room area, emergency core cooling pump rooms, annulus, and fuel handling building. On the basis of the information provided, the staff finds the applicant's response sufficient to resolve open item 2.3-3. The staff's evaluation of the Ventilation Area Pressure Boundary Sealants Inspection Program is provided in Section 3.0.3.19 of this SER.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-3, specific information concerning the exclusion of housings for radiation monitors, smoke detectors, air flow monitors, and chlorine monitors from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that, based on guidance provided in NEI 95-10, Revision 3, radiation monitors, smoke detectors, and chlorine detectors are not considered passive components and are therefore not subject to an AMR. Because the monitors and detectors do not perform an intended function, the staff finds the applicant's response acceptable.

By letter dated January 23, 2002, the staff requested, in RAIs 2.3-8(6) and 2.3-9(3), specific information concerning the exclusion of housings for filters from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant clarified that filter housings are within license renewal evaluation boundaries, although the filter media are excluded because filters are replaced on condition. The staff finds the applicant's response acceptable.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-5, specific information concerning the exclusion of passive components associated with ductwork from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant identified

these passive components as subcomponents of ductwork. The applicant also stated that ventilation grilles were installed only for aesthetic purposes and perform no intended license renewal function. The staff finds the applicant's response acceptable based on the information provided related to passive components associated with ventilation ductwork.

Some components that are common to many systems, including the VF system, have been evaluated separately by the applicant in Section 2.1.2.1.2 of the LRA as "replace on condition" commodities. The staff's evaluation of applicant's treatment of these consumables is documented in Section 2.1.3.2.1 of this SER.

In Section 2.4.3 of this report, the staff evaluated component supports for piping, cables, and equipment that supported the design and operation of the VF system. In Section 2.5 of the LRA titled, "Scoping and Screening Results - Electrical and Instrumentation and Controls," the staff evaluated electrical and instrument components that support the operation of the VF system.

The staff reviewed the LRA, information in the UFSARs, and the applicant's RAI responses. In addition, the staff sampled several components from the VF system flow diagrams, as identified in Section 2.3.3.1 of the LRA, to determine whether the applicant properly identified the components within scope and subject to an AMR. No omissions were identified, except as identified in the RAIs.

#### 2.3.3.20.3 Conclusions

On the basis of its review, and with the resolution of the open items identified in this SER section, the staff has reasonable assurance that the applicant has adequately identified the VF system structures and components that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively.

#### 2.3.3.21 *Groundwater Drainage System*

In LRA Section 2.3.3.21, "Groundwater Drainage System," the applicant described the components of the groundwater drainage system that are within the scope of license renewal and subject to an AMR. Sections 9.5.11 and 9.5.8 of the Catawba and McGuire UFSARs, respectively, provides additional information concerning their respective groundwater drainage systems.

##### 2.3.3.21.1 Technical Information in the Application

The groundwater drainage systems are identical for purposes of license renewal for both facilities without any notable differences in system design. The groundwater drainage system prevents hydrostatic loads on the reactor and auxiliary building substructures. The groundwater drainage system maintains an acceptable groundwater level for the Auxiliary Building by transferring water out of the Auxiliary Building and mitigates the consequences of certain postulated flooding events. The applicant described its process for identifying the mechanical components within the scope of license renewal in Section 2.1.1, "Scoping Methodology," of the LRA. On the basis of its methodology described above, the applicant identified portions of the groundwater drainage system that are within the scope of license renewal on the flow diagrams listed in Section 2.3.3.21 of the LRA. Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component

commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire groundwater drainage systems are listed in LRA Table 3.3-29. In the LRA, Table 3.3-29, the applicant lists the following five component types as subject to an AMR—pipe, pump casings, orifices (Catawba only), tubing, and valve bodies. The applicant states that maintaining pressure boundary integrity is the only intended function of the SCs subject to an AMR.

#### 2.3.3.21.2 Staff Evaluation

The staff reviewed Section 2.3.3.21 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the components of the Catawba and McGuire groundwater drainage systems that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.3.21 of the LRA and the Catawba and McGuire UFSARs to determine if the applicant adequately identified the SSCs of the groundwater drainage system that are in the scope of license renewal. The staff verified that those portions of the groundwater drainage system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.3.21 of the LRA. The staff then focused its review on those portions of the groundwater drainage system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSARs to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant. Therefore, there is reasonable assurance that the applicant adequately identified all portions of the groundwater drainage system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the groundwater drainage system that are identified as within the scope of license renewal. The applicant identified and listed the SCs subject to an AMR for the groundwater drainage systems in Table 3.3-29 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determined as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the groundwater drainage system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which it believes meet at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSAR to ensure they were representative of the

groundwater drainage system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4.

### 2.3.3.21.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.21 of the LRA and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the groundwater drainage systems that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.22 Hydrogen Bulk Storage System

#### 2.3.3.22.1 Technical Information in the Application

The hydrogen bulk storage system supplies hydrogen to the volume control tank (VCT). The hydrogen bulk storage system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). All components within the seismically designed piping boundaries of this system are within the scope of license renewal per 10 CFR 54.4(a)(2).

The component types, component functions, materials of construction, environments, aging effects, and aging management programs/activities for the McGuire and Catawba hydrogen bulk storage systems are listed in Table 3.3-30 of the LRA. The component types that were identified in the table are pipe, tubing (Catawba only), and valve bodies. The applicant states that maintaining pressure boundary integrity is the only intended function of the components subject to an AMR.

#### 2.3.3.22.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the hydrogen bulk storage system, and associated pressure boundary components and supporting structures within the scope of license renewal and subject to an AMR, have been identified in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1). This was accomplished as described below.

As part of the evaluation, the staff determined whether the applicant had properly identified the systems, structures, and components within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for McGuire and Catawba for the hydrogen bulk storage system and associated pressure boundary components and compared the information in the UFSAR with the information in the LRA to identify those portions that the LRA did not identify as within the scope of license renewal and subject to an AMR. The staff then reviewed the structures and components that were identified as not being within the scope of license renewal to verify that these structures and components do not have any of the intended functions delineated under 10 CFR 54.4(a). For those structures and components that have applicable intended functions, the staff sought to verify that they either perform these functions with moving parts or a change

in configuration or properties, or that they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1).

The staff also reviewed the UFSAR for any function(s) delineated under 10 CFR 54.4(a) that were not identified as intended function(s) in the LRA, to verify that the systems, structures, and components with such function(s) will be adequately managed so that the function(s) will be maintained consistent with the CLB for the extended period of operation.

The staff did not identify any omissions.

#### 2.3.3.22.3 Conclusions

On the basis of its review of the information presented in Section 2.3.3.22 of the LRA and the supporting information in the McGuire and Catawba UFSARs, the staff did not find any omissions by the applicant. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the hydrogen bulk storage system, and the associated (supporting) structures and components that fall within the scope of license renewal and are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.3.23 Instrument Air System

In LRA Section 2.3.3.23, "Instrument Air System," the applicant identified the instrument air system as one that is within the scope of license renewal and subject to an AMR. This section refers to LRA Table 3.3-31, which lists the mechanical components, component functions, and materials of construction of the McGuire and Catawba instrument air system that are subject to an AMR. This system is further described in Section 9.3.1 of the McGuire and Catawba UFSARs. The function of this system is similar for both facilities with some differences in system design. Any notable differences are specifically identified and discussed in the staff's evaluation. Unless otherwise specified, the information provided below is applicable to both the Catawba and the McGuire instrument air system.

##### 2.3.3.23.1 Technical Information in the Application

The function of the instrument air system is to provide dry, oil-free compressed air for all air-operated instrumentation and valves for each unit at Catawba and McGuire. At McGuire, the instrument air system consists of three centrifugal compressors and three reciprocating compressors. The six compressors are oil free. The centrifugal compressors operate in "base mode," supplying all plant instrument air demands. The reciprocating compressors operate in "standby mode" and start on decreasing air pressure. At Catawba, instrument air is supplied by three centrifugal air compressors. Two centrifugal compressors operate "base loaded" to supply the normal requirements of the instrument air system. The third centrifugal compressor is used for standby service. The compressors' intakes at Catawba and McGuire are in the service building basement, and at both stations, the instrument air system is a subsystem of the compressed air system. The applicant described its process for identifying the mechanical components that are within the scope of license renewal in LRA Section 2.1.1, "Scoping Methodology." The applicant identified component types for the instrument air system that require an AMR. These are listed in LRA Table 3.3-31 for both Catawba and McGuire, along with the passive function, the aging effect, and the aging management program activities to be

applied. The applicant identified the following component types for the Catawba and McGuire instrument air system that are subject to an AMR—filter housings (McGuire only), supply accumulators (McGuire only), instrument air tanks (McGuire only), pipe, tubing, and valve bodies. The applicant further identified the only intended function of these component types to be maintaining the integrity of the instrument air system pressure boundary.

The applicant utilized a screening process to generate piping and instrumentation diagrams (P&IDs) applicable to the LRA. During initial scoping, the applicant identified plant systems and structures that were candidates for inclusion within the scope of 10 CFR Part 54. For systems and structures that were “scoped in,” screening was then performed to identify the passive components and structural members that support an intended function of the in-scope system or structure. These systems and structures are then subject to an AMR in accordance with 10 CFR 54.21(a). The results of the screening review were used to generate the P&IDs, which show components that are subject to an AMR as highlighted and marked by flags.

#### 2.3.3.23.2 Staff Evaluation

The staff reviewed Sections 2.1 and 2.2 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the Catawba and McGuire instrument air system that are within the scope of license renewal in accordance with 10 CFR 54.4. The staff reviewed Section 2.3 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the systems and structures of the instrument air system that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3 of the LRA, and the Catawba and McGuire UFSARs, to determine whether any systems and structures of the instrument air system that may have been omitted from the scope of license renewal meet the scoping criteria in 10 CFR 54.4. The staff verified that those portions of the instrument air system identified by the applicant as meeting the scoping requirements of 10 CFR 54.4, do in fact meet these requirements for both stations. The staff then focused its review on those portions of the instrument air system that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSARs to identify system functions that were not included in the LRA and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. Therefore, there is reasonable assurance that the applicant adequately identified all portions of the Catawba and McGuire instrument air system that are within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the in-scope systems and structures that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the systems and structures that are subject to an AMR for the instrument air system and listed them in Table 3.3-31 for both Catawba and McGuire. The staff performed its review by sampling the systems and structures that the applicant identified as within the scope of license renewal, but not subject to an AMR, to verify that these systems and structures perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. All systems and structures reviewed by the staff met the above criteria for both Catawba and McGuire.

In Section 2.3.3.23, "Instrument Air System," of the LRA, the applicant lists 25 P&IDs for McGuire and 5 for Catawba that were marked to indicate the license renewal evaluation boundary for the instrument air system. The staff compared the P&IDs to the system drawings and descriptions in the UFSARs to ensure that the diagrams were representative of the instrument air system for the respective plant. The applicant highlighted and flagged components on the P&IDs that are subject to an AMR. The staff sampled portions of the P&IDs that were not highlighted to ensure these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

#### 2.3.3.23.3 Conclusion

On the basis of its review of the information contained in Section 2.3.3.23 of the LRA, the supporting information in the Catawba and McGuire UFSARs, and the P&IDs, as described above, the staff did not identify any omissions in the scoping and screening of the Catawba and McGuire instrument air system by the applicant. Therefore, the staff concludes that there is reasonable assurance that the applicant has identified those portions of the Catawba and McGuire instrument air system that are within the scope of license renewal, and the systems and structures that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.3.24 Liquid Waste System

In LRA Section 2.3.3.24, "Liquid Waste System," the applicant described the components of the liquid waste system that are within the scope of license renewal and subject to an AMR. This system is described in Section 11.2 of the McGuire and Catawba UFSARs.

##### 2.3.3.24.1 Technical Information in the Application

The liquid waste system collects, segregates, and processes all radioactive and potentially radioactive liquids generated in the plant to control and minimize releases of radioactivity to the environment.

The applicant described the process for identifying the mechanical components that are within the scope of license renewal in LRA Section 2.1.1, "Scoping Methodology." As described in the scoping methodology, the applicant identified the portions of the liquid waste system that are within the scope of license renewal on the P&IDs that are listed in LRA Section 2.3.3.24. Consistent with the method described in LRA Section 2.1.2, "Screening Methodology," the applicant listed the liquid waste system mechanical components that are subject to an AMR in LRA Table 3.3-32. This table also lists the component functions. Specifically, the applicant identified the following components as subject to an AMR—valve bodies, piping, motor-driven auxiliary feedwater pump sump pumps (for Catawba only), residual heat removal pump and containment spray pump room sump pumps (for Catawba only), orifice (for Catawba only), separators (for Catawba only), strainers (for Catawba only), turbine-driven auxiliary feedwater pump sump pumps (for Catawba only), tubing (for Catawba only), and waste drain tanks (for Catawba only). All these components have the intended component function of PB, which is defined by the applicant as maintaining pressure boundary, affecting containment isolation, or preventing interaction with safety-related equipment. In addition to the PB function, separators and strainers have the FI (filtration) function.

### 2.3.3.24.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.24 to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the liquid waste system that are within the scope of license renewal in accordance with 10 CFR 54.4(a), and that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information provided in LRA Section 2.3.3.24, the applicable P&IDs referenced therein, and the McGuire and Catawba UFSARs to determine if the applicant adequately identified the portions of the liquid waste system that are within the scope of license renewal. The staff verified that those portions of the liquid waste system that meet the scoping requirements of 10 CFR 54.4(a) were included within the scope of license renewal and were identified by the applicant in Section 2.3.3.24 of the LRA.

In LRA Section 2.3.3.24, the applicant listed applicable P&IDs for the liquid waste system. The detailed diagrams are highlighted to identify those portions of the system that are within the scope of license renewal. The staff compared the LRA diagrams to the system drawings and descriptions in the UFSARs to ensure that the diagrams were representative of the liquid waste system. To verify that the applicant included the applicable portions of the liquid waste system within the scope of license renewal, the staff focused its review on those portions of the liquid waste system that were not identified as within the scope of license renewal and verified that they did not meet the scoping criteria of 10 CFR 54.4(a). In addition, the staff reviewed the UFSARs for each facility to identify any additional system functions that were not identified in the LRA, and verified that no additional functions met the scoping requirements of 10 CFR 54.4(a). Based on the experience of reviewing the previous LRAs, the staff recognized that the radioactive waste management function of the radwaste systems, in general, did not meet the scoping requirements of 10 CFR 54.4(a) because the dose consequences of a failure would be much lower than the dose limits specified in 10 CFR 54.4(a)(1)(iii). However, other plant-specific system functions (such as containment isolation) may meet some of the requirements in 10 CFR 54.4(a). LRA Section 2.3.3.24 describes the radioactive waste management function of the system, but does not identify which system functions meet the requirements in 10 CFR 54.4(a).

By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.24-1, the applicant to identify the intended system functions of the liquid waste system that the applicant used for its scoping determination. In its response dated April 15, 2002, the applicant stated that the system intended functions were not used to determine whether the liquid waste system is within the scope of license renewal. Instead, the applicant determined the portions of the liquid waste system within the scope of license renewal according to the following scoping criteria—(1) portions of the systems that are safety-related (Duke Class A, B, or C), (2) portions of the systems that are designated as non-safety-related Class F piping, (3) portions of the systems that are required to remain functional for fire protection and station blackout, and (4) portions of the systems that are environmentally qualified. The staff finds this response consistent with the methodology described in Section 2.1 of the LRA, which the staff evaluated and found acceptable (refer to Section 2.1.3.1 of this SER). However, the staff sought to understand whether or not equipment that performs the radioactive waste management function of this system was identified by the applicant as within the scope of license renewal.

To accomplish this, the staff reviewed Section 3.2.2 of the McGuire UFSAR, which indicates that portions of the radioactive waste management systems whose failure would adversely affect the health and safety of the public are upgraded to Duke Class C. The staff also reviewed Catawba UFSAR Section 3.2.2, which states that portions of the radioactive waste management systems whose failure would result in dose consequences greater than 0.5 rem to the whole body or equivalent offsite doses are upgraded to Duke Class C. The applicant included Duke Class C piping and components within the scope of license renewal. The dose criteria in 10 CFR 54.4(a)(1)(iii) are exposures comparable to the guidelines in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11. The dose limits specified in the above regulations are 25 rem to the whole body or 300 rem to the thyroid. The applicant's scoping criteria for radioactive waste management systems are more conservative than the criterion specified in 10 CFR 54.4(a)(1)(iii) and, therefore, are acceptable. On the basis of the information in the RAI responses and the UFSARs, the staff verified that portions of the radioactive waste management system that met the scoping criteria of 10 CFR 54.4 were within the scope. Therefore, the staff's question in RAI 2.3.3.24-1 was resolved. The staff's evaluation also resolves a similar concern identified in RAI 2.3.3.38-2 for the waste gas system (see Section 2.3.3.38.2 of this SER).

Table 3-4 of the McGuire and Catawba UFSARs indicates that the reactor coolant drain tank heat exchanger and the groundwater drainage sump pump of the liquid waste system are safety-related. However, the staff was not able to find these components listed in LRA Section 2.3.3.24 as within the scope of the license renewal. Through a cross-system review, the staff found that the shells of the reactor coolant drain tank heat exchanger were included in the component cooling system (LRA Section 2.3.3.5) as within the scope of license renewal and subject to an AMR. The pump casing of the groundwater drainage sump pump was included in the groundwater drainage system (LRA Section 2.3.3.21) as within the scope of license renewal and subject to an AMR. In addition, the staff noted that one of the liquid waste system flow diagrams, CN-1565-1.3, contains highlighted piping and valves, but the diagram is not listed in LRA Section 2.3.3.24. Through a cross-system review, the staff found that this drawing and these highlighted components were included in LRA Section 2.3.3.28, "Nuclear Service Water System." The staff found that the applicant had properly included the above components within the scope of license renewal and subject to an AMR. However, the LRA does not have the above cross-references.

In reviewing the AMR results tables for this system, the staff noticed that more components (such as sump pumps, orifices, separators, strainers, tubing, and waste drain tank) were listed for Catawba than for McGuire. The staff believed that the scoping differences resulted from design differences between Catawba and McGuire, but could not understand the design differences when it compared the system descriptions in the respective UFSARs for McGuire and Catawba. In a conference call on September 12, 2001, summarized in a memorandum dated October 10, 2001, the staff asked the applicant to explain the differences in design between Catawba and McGuire because of which components, such as sump pumps, orifices, separators, strainers, tubing, and waste drain tank, were determined to be within the scope of license renewal for Catawba but not for McGuire. The applicant explained that a significant portion of the liquid waste system was credited in Catawba's design basis for removing discharged fire water system inventory from flooded areas during and following fire water actuation to prevent safety-related equipment from flood-induced failure. The design basis for McGuire did not include this provision. In addition, there are more non-safety-related pipe runs (Class F) at Catawba than at McGuire, and the failure of these pipe runs at Catawba might adversely impact safety-related equipment. Therefore, more components of the liquid waste

system were determined to be within the scope of license renewal at Catawba than at McGuire. The applicant's discussion of the system design differences between Catawba and McGuire provided a reasonable explanation of the differences in scoping for the liquid waste system. On the basis of its review, the staff did not identify any omissions in the applicant's scoping of mechanical components according to 10 CFR 54.4(a).

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the liquid waste system that were identified as within the scope of license renewal. The applicant used the screening methodology described in LRA Section 2.1.2 to identify the SCs subject to an AMR. The staff evaluation of the scoping and screening methodology is documented in Section 2.1 of this SER. In the LRA, the applicant identified the portions of the liquid waste system that are within the scope of license renewal in the P&IDs and listed the mechanical components that are subject to an AMR and their intended component functions in LRA Table 3.3-32. The staff performed its review by sampling the SCs that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended function without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from an AMR. The staff did not identify any omissions by the applicant in screening SCs according to 10 CFR 54.21(a)(1).

#### 2.3.3.24.3 Conclusions

On the basis of its review of the information contained in LRA Section 2.3.3.24, the supporting information in the P&IDs, and the McGuire and Catawba UFSARs, as described above, the staff did not identify any omissions by the applicant. Therefore, the staff finds that there is reasonable assurance that the applicant adequately identified those portions of the liquid waste system that are within the scope of license renewal and the associated SCs that are subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### 2.3.3.25 *Miscellaneous Structures Ventilation System*

In LRA Section 2.3.3.25, "Miscellaneous Structures Ventilation System," the applicant identified components of the Catawba miscellaneous structures ventilation (VK) system that are within the scope of license renewal and subject to an AMR. This specific system is only applicable to Catawba. The applicant further stated in Section 2.3.3.25 of the LRA that the McGuire turbine building ventilation system performs the same functions as the Catawba VK system.

The applicant evaluated component supports for equipment, piping, ductwork, and instrument lines within this system in Section 2.4.3 and Table 3.5-3 of the LRA. The applicant evaluated electrical components that support the operation of the system in Section 2.1.2 of the LRA. The staff's scoping evaluation of structures and component supports is provided in Section 2.4 of this SER. The staff's evaluation of electrical components and instrumentation and controls in the VK system is documented in Section 2.5 of this SER.

#### 2.3.3.25.1 Technical Information in the Application

The Catawba VK system includes the standby shutdown facility (SSF) heating ventilation and air-conditioning subsystems. The SSF heating ventilation and air-conditioning portion of the VK system provides the environmental controls necessary to ensure that SSF equipment is

maintained operable during postulated fires and station blackout. The mechanical components subject to an AMR, their intended functions, and the materials of construction for the SSF heating ventilation and air-conditioning portion of the Catawba VK system are listed in Table 3.3-33 of the LRA. A Catawba flow diagram (CN-1579-4.3) has been highlighted to indicate the LRA evaluation boundary for the SSF heating ventilation and air-conditioning portion of the Catawba VK system.

In Section 2.3.3.25 of the LRA, the applicant identified the following Catawba VK system intended function based on 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2)—

- to provide the environmental controls necessary to ensure that standby shutdown facility equipment is maintained operable during postulated fires and station blackout

The applicant described its methodology for identifying the mechanical components subject to an AMR in Section 2.1 of the LRA. On the basis of this methodology, the applicant identified the portions of the VK system that are within the scope of license renewal on the flow diagram listed in Section 2.3.3.25 of the LRA. Using the methodology described in Section 2.1.2 of the LRA, the applicant compiled a list of the mechanical components and component types subject to an AMR that are within the evaluation boundaries highlighted on the flow diagrams and identified their intended functions. The applicant provided this list in Table 3.3-33 of the LRA.

The following component types are identified as within the scope of license renewal and subject to an AMR and are listed in Table 3.3-33—air handling unit, ductwork, flexible connectors, and plenum section. The applicant indicated in Table 3.3-33 of the LRA that the VK system pressure boundary function is the only applicable intended function subject to an AMR.

#### 2.3.3.25.2 Staff Evaluation

To verify that the applicant identified the components of the VK system that is within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), the staff reviewed the flow diagram listed in Section 2.3.3.25 of the LRA. The diagram highlights the evaluation boundaries for the portions of the VK system that are within the scope of license renewal. The staff reviewed Table 3.3-33 of the LRA, which lists the mechanical components and the applicable intended functions subject to an AMR, and Table 3-4 of the Catawba UFSAR to determine if there were any portions of the VK system that met the scoping criteria in 10 CFR 54.4(a) but were not identified in the LRA. The staff also reviewed the McGuire and Catawba UFSARs to determine if any safety-related system functions were not identified as intended functions in the LRA and if any structures or components that have intended functions were omitted from the scope of structures or components that require an AMR. The staff compared the functions described in the UFSARs to those identified in the LRA.

The applicant identified the structures and components subject to an AMR for the VK system using the screening methodology described in Section 2.1 of the LRA and listed them in Table 3.3-33 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this report. The staff sampled the structures and components listed in Table 3.3-33 of the LRA to verify that the applicant did identify the structures and components subject to an AMR. The staff also sampled the structures and components that are within the scope of license renewal but not subject to an AMR. Based on this sample, the staff verified that these structures and components perform their intended

functions without moving parts and without a change in configuration or properties, and are not subject to replacement on the basis of a qualified life or specified time period.

The NRC staff noted that Section 2.3.3.25 of the LRA provides a summary description of the system functions and specified a flow diagram. The flow diagram highlights the evaluation boundaries, and Table 3.3-33 of the LRA lists the components of the VK system within the scope of license renewal and subject to an AMR. The corresponding drawings and the UFSARs, however, show additional components that were not listed in Table 3.3-33 of the LRA.

The staff noted that the applicant did not identify housings for active components that require an AMR. The determination should consider whether failure of the housing would result in a failure of the associated active component to perform its intended function and whether the housing meets the long-lived and passive criteria as defined in the rule.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-9, specific information concerning the exclusion of Catawba refrigerant coils serving the shutdown panel areas from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated the refrigerant coils associated with the auxiliary shutdown panel room air-conditioning sub system are within the scope of license renewal and should have been highlighted on flow diagram CN-1577-1.8. The coils are listed in AMR Table 3.3-1 with tubes, tube sheets, shells, and bonnets. On the basis of the information provided, the staff finds the applicant's response acceptable.

Some components that are common to many systems, including the VK system, have been evaluated separately by the applicant in Section 2.1.2.1.2 of the LRA as "replace on condition" commodities. The staff's evaluation of applicant's treatment of these consumables is documented in Section 2.1.3.2.1 of this SER.

In Section 2.4.3 of this report, the staff evaluated component supports for piping, cables, and equipment, which are discussed in LRA Section 2.4 titled, "Scoping and Screening Results: Structures." In Section 2.5 of this report, the staff evaluated electrical components that support the operation of the VK system. These are discussed in LRA Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Controls."

The staff reviewed the LRA and supporting information in the Catawba UFSAR. In addition, the staff sampled several components from the VK system flow diagram, as identified in Section 2.3.3.25 of the LRA, to determine whether the applicant properly identified the components within scope and subject to an AMR. No omissions were identified, except as identified in the RAI.

#### 2.3.3.25.3 Conclusions

On the basis of its review, the staff has reasonable assurance that the applicant has adequately identified the Catawba VK system structures and components that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively.

#### 2.3.3.26 Nitrogen System

In LRA Section 2.3.3.26, "Nitrogen System," the applicant identified the nitrogen system as being within the scope of license renewal and subject to an AMR. This section references Table 3.3-34

of the LRA, which lists mechanical components, component functions, and materials of construction that are subject to an AMR for the McGuire and Catawba nitrogen system. This system is non-safety-related for Catawba. For McGuire, a part of the nitrogen system is safety-related. The function of the nitrogen system is similar for both facilities with some differences in system design. Any notable differences are specifically identified and discussed in the staff's evaluation. Unless otherwise specified, the information provided below is applicable to both the Catawba and McGuire nitrogen system.

#### 2.3.3.26.1 Technical Information in the Application

The function of the nitrogen system is to provide a supply of nitrogen to valves that have pneumatic actuators. For McGuire, the nitrogen system provides a safety-related supply of nitrogen to the pneumatic actuators on the feedwater isolation valves. The applicant has indicated that for Catawba, the nitrogen system is a non-safety-system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. The applicant described its process for identifying the mechanical components that are within the scope of license renewal in LRA section 2.1.1, "Scoping Methodology." The applicant identified component types for the nitrogen system that require AMR. These are listed in LRA Table 3.3-34 for both Catawba and McGuire, along with the passive function, the aging effect, and the aging management program activities to be applied. The applicant identified the following component types for the Catawba and McGuire nitrogen system that are subject to an AMR—nitrogen supply tanks (McGuire only), pipe, tubing (McGuire only), and valve bodies. The applicant identified the only intended function of these component types to be maintaining the integrity of the nitrogen system pressure boundary.

The applicant utilized a screening process to generate P&IDs applicable to the LRA. During initial scoping, the applicant identified plant systems and structures that were candidates for inclusion within the scope of 10 CFR Part 54. For systems and structures that were "scoped in," screening was then performed to identify the passive components and structural members that support an intended function of the in-scope system or structure. These systems and structures are then subject to an AMR in accordance with 10 CFR 54.21(a). The results of the screening review were used to generate the P&IDs which show components that are subject to an AMR as highlighted and marked by flags.

#### 2.3.3.26.2 Staff Evaluation

The staff reviewed Sections 2.1 and 2.2 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the Catawba and McGuire nitrogen systems that are within the scope of license renewal in accordance with 10 CFR 54.4. The staff reviewed Section 2.3 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the systems and structures of the nitrogen system that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3 of the LRA and the Catawba and McGuire UFSARs to determine whether any systems and structures of the nitrogen system that may have been omitted from the scope of license renewal meet the scoping criteria in 10 CFR 54.4. The staff verified that those portions of the nitrogen system identified by the applicant as meeting the scoping requirements of 10 CFR 54.4 do in fact meet these requirements for both stations. The staff then focused its review on those portions of the

nitrogen system that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSARs to identify system functions that were not included in the LRA and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. Therefore, there is reasonable assurance that the applicant adequately identified all portions of the Catawba and McGuire nitrogen systems that are within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the in-scope systems and structures that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the systems and structures that are subject to an AMR for the nitrogen system and listed them in Table 3.3-34 for both Catawba and McGuire. The staff performed its review by sampling the systems and structures that the applicant identified as within the scope of license renewal, but not subject to an AMR, to verify that these systems and structures perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. All systems and structures reviewed by the staff met the above criteria for both Catawba and McGuire.

In Section 2.3.3.26, "Nitrogen System," of the LRA, the applicant listed four P&IDs for McGuire and one for Catawba that were marked to indicate the license renewal evaluation boundary for the nitrogen system. The applicant highlighted and flagged components on the P&IDs that are subject to an AMR. The staff sampled portions of the P&IDs that were not highlighted to ensure these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

Catawba P&ID CN-1602-1.0, "Nitrogen System," depicts nitrogen supply lines that are not in scope supplying pressure for the NW. The NW system prevents leakage of containment atmosphere past certain CIVs following a LOCA by injecting seal water at a pressure exceeding containment accident pressure between the two seating surfaces of the CIVs. The water that gets injected comes from one of two trains of surge chambers depicted on P&ID CN-1602-1.0 as being pressurized by nitrogen. The nitrogen pressure drives the water between the valves. Section 6.2.4.2.2 of the Catawba UFSAR states that the NW system is designed to meet all regulatory and testing requirements set forth in paragraph III-C of 10 CFR Part 50, Appendix J, and ASME Code Section IX. Following a LOCA, containment isolation would be required on an ongoing basis for an extended period of time. The staff believed this function of the nitrogen system to fall under the scoping requirements of 10 CFR 54.4(a)(2) for non-safety-related systems "whose failure could prevent satisfactory accomplishment of functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section." In this case paragraph (iii) (the capability to mitigate the consequences of accidents...) appeared to apply. The staff concluded that the nitrogen supply piping up to the containment valve injection water surge chambers and the surge chambers, depicted on CN-1602-1.0, should be included in the evaluation boundary for AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.26, the applicant to provide the basis for not including these components in scope.

In its response dated April 15, 2002, the applicant indicated that the nitrogen "overpressure" on the NW system is used only under normal operating conditions and not relied upon during a design basis event. The applicant further indicated that during a design basis event, the nuclear service water system is relied upon to inject seal water at a pressure exceeding containment accident pressure between the two seating surfaces of the CIVs. The applicant indicated that

the nuclear service water system essential header piping is highlighted to show that it is within the scope of license renewal. The staff verified this by inspecting P&IDs CN-1574-2.4, "Flow Diagram of Nuclear Service Water System," and CN-1569-1.0, "Flow Diagram of Containment valve Injection Water System." The staff finds that the applicant has appropriately identified the nuclear service water piping as in scope for the above safety function, and that the nitrogen supply lines discussed above are not in scope because they do not support a safety-related function.

The staff's review of the Catawba UFSAR indicated that a PORV is provided in the safety grade portion of each main steam line upstream of the isolation valve. These PORVs are required to achieve and maintain a hot-shutdown condition and are therefore safety-related. The safety grade mode of operation of the PORVs is provided by the use of an environmentally and seismically qualified nitrogen control system. Nitrogen is supplied by seismically mounted cylinders located in the "doghouse." The staff noted that these cylinders, and the piping between them and the main steam line PORVs, are apparently not depicted on any nitrogen system drawing. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.26-2, clarification of the status of this run of piping and the nitrogen cylinders (i.e., whether or not they were in scope). In its response dated April 15, 2002, the applicant confirmed that the Catawba main steam line PORVs are supplied with a nitrogen control system as a backup to the normal instrument air supply. This backup nitrogen control system consists of valves, tubing, and nitrogen bottles. The applicant supplemented Table 3.3-34 with the AMR results for valve bodies and tubing associated with this backup nitrogen control system. The staff's evaluation of the AMR results are documented in Section 3.3.26.2.1 of this SER. The applicant stated that the nitrogen bottles are periodically replaced and, therefore, are not subject to an AMR. However, the applicant did not specify the details of the periodic replacement. Since the staff could not determine if the nitrogen bottles are replaced based on qualified life or on condition in accordance with performance criteria or a governing program, the applicant provided supplemental information in electronic correspondence dated July 16, 2002 (ADAMS Accession No. ML023290649). In this correspondence, the applicant stated the following—

Catawba TS surveillance requirement (TSSR) 3.7.4.1 requires verification that one of the nitrogen bottles on each SG PORV is pressurized to greater than 2100 psig once every 24 hours. This TSSR is performed with a Catawba procedure entitled "Procedure for Checking and Replacing Steam Generator PORV Nitrogen Cylinders and Setting Cylinder Regulators." There are two nitrogen cylinders per SG PORV. Initial pressure in each cylinder is greater than 2500 psig. This procedure requires that if the pressure in either nitrogen cylinder is less than or equal to 2420 psig, then the nitrogen cylinder is replaced. Replacement cylinders are obtained from a warehouse. The used cylinders are returned to the warehouse. The cylinders are not permanently installed in the plant.

The applicant further stated that replacement of the nitrogen cylinders is based on gas pressure and, therefore, performance monitoring consistent with the SRP-LR. Pending the staff's receipt of this information in official correspondence, this issue was characterized as SER confirmatory item 2.3.3.26.2-1. In its response to this confirmatory item, dated October 28, 2002, the applicant formally provided the information that had been furnished in electronic correspondence. The staff finds that the response provides an acceptable basis for excluding these nitrogen bottles from an AMR. Therefore, confirmatory item 2.3.3.26.2-1 is closed.

On Catawba P&ID CN-1602-1.0, "Nitrogen System," at the lower right hand corner of the drawing, an independent nitrogen system is depicted as not in scope. The system is shown

supplying actuators 1CF42, 1CF51, 1CF33, and 1CF60. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.26-3, the applicant to identify the function of the system. Also, at the point on the P&ID where the nitrogen system is shown supplying the actuators listed, the diagram references "Note 8." Note 8 was missing from the P&ID. The RAI also requested the applicant to provide Note 8. In its response dated April 15, 2002, the applicant indicated that the independent nitrogen system depicted on P&ID CN-1602-1.0 has no function and, in fact, has been abandoned. The applicant also indicated that since the time the P&IDs were highlighted for license renewal, P&ID CN-1602-1.0 was revised to show the independent nitrogen system as cut and capped, nitrogen bottles removed, and the system abandoned in place with Note 10 added to indicate this status. The staff's question regarding Note 8 is moot because the system has been abandoned. The staff finds this response acceptable.

#### 2.3.3.26.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.26 of the LRA, the supporting information in the Catawba and McGuire UFSARs, and the P&IDs, as described above, the staff did not identify any other omissions in the scoping and screening of the Catawba and McGuire nitrogen system by the applicant. Therefore, the staff concludes that, with the resolution of confirmatory item 2.3.3.26.2-1, there is reasonable assurance that the applicant has identified those portions of the Catawba and McGuire nitrogen system that are within the scope of license renewal, and the systems and structures that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### 2.3.3.27 Nuclear Sampling System

In LRA Section 2.3.3.27, "Nuclear Sampling System," the applicant described the components of the nuclear sampling system that are within the scope of license renewal and subject to an AMR. Section 9.3.2 of the Catawba and McGuire UFSARs provides additional information concerning their respective nuclear sampling systems.

##### 2.3.3.27.1 Technical Information in the Application

The nuclear sampling systems are essentially the same and perform the same function at Catawba and McGuire. The system provides a means of obtaining the more frequently taken samples during normal plant operation from the station's nuclear-safety-related systems in a convenient, shielded, and safe environment. The system also provides a means of sampling the reactor coolant and containment atmosphere following a LOCA to monitor the reactor and determine the degree of core damage. The mechanical components subject to an AMR, their intended functions, and materials of construction for the nuclear sampling system are listed in Table 3.3-35. Using the methodology described in LRA Section 2.1.2, "Screening Methodology," the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. In LRA Table 3.3-35, the applicant lists the following four component commodity groups as subject to an AMR—pipe, orifices, tubing, and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR. The orifices also perform a throttling function.

### 2.3.3.27.2 Staff Evaluation

The staff reviewed Section 2.3.3.27 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the nuclear sampling system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.3.27 of the LRA and the Catawba and McGuire UFSARs to determine if the applicant adequately identified the SSCs of the nuclear sampling system that are in the scope of license renewal. The staff verified that those portions of the nuclear sampling system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal and are identified by the applicant in Section 2.3.3.27 of the LRA. The staff then focused its review on those portions of the nuclear sampling system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSARs to determine if there were any additional system functions that were not identified in the LRA, and verified that no additional function met the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the nuclear sampling system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the nuclear sampling system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the nuclear sampling systems in Table 3.3-35 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, and were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the nuclear sampling system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which it believes meets at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSAR to ensure they were representative of the nuclear sampling system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4.

### 2.3.3.27.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.27 of the LRA and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the nuclear sampling system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### *2.3.3.28 Nuclear Service Water System*

In Section 2.3.3.28, “Nuclear Service Water System,” of the LRA, the applicant identified the nuclear service water system (NSW) as one that is within the scope of license renewal and subject to an AMR. This section refers to LRA Tables 3.3-36 and 3.3-37, which lists mechanical components, component functions, and materials of construction subject to an AMR, for both the McGuire and Catawba nuclear service water systems. This system is further described in Section 9.2.2 of the McGuire UFSAR and in Section 9.2.1 of the Catawba UFSAR. This system is similar for both facilities with some differences in system design. Any notable differences are specifically identified and discussed in the staff’s evaluation. Unless otherwise specified, the information provided below is applicable to both the Catawba and McGuire nuclear service water systems.

#### **2.3.3.28.1 Technical Information in the Application**

The applicant identified the piping and mechanical components of the NSW system for Catawba and McGuire in the LRA. The NSW system at Catawba and McGuire provides cooling water for various safety-related and non-safety related heat loads. The system at both Catawba and McGuire provides two redundant “essential headers” serving two trains of equipment necessary for safe shutdown, and a “non-essential header” serving equipment not required for safe shutdown. The NSW system is designed to meet design flow rates and heads for normal station operation, and also those required for safe shutdown normally or as the result of a postulated LOCA. The ultimate heat sink for McGuire consists of Lake Norman and the standby nuclear service water (SNSW) pond. The ultimate heat sink for Catawba consists of Lake Wylie and the standby nuclear service water pond.

The applicant described its process for identifying the mechanical components that are within the scope of license renewal in Section 2.1.1, “Scoping Methodology,” of the LRA. The applicant stated in Section 2.3.3.28 of the LRA that the McGuire NSW system acts as an assured source of makeup water for various requirements and the normal supply of water for the containment ventilation cooling water system. The applicant further stated in this section for Catawba that the NSW system supplies emergency makeup water to various safety-related systems during normal operation and design basis events, water for fire protection hose stations in the diesel buildings and nuclear service water pumphouse, and cooling flow and flush water for non-QA heat loads and functions during normal operation. The applicant identified component types for the McGuire and Catawba NSW system that require AMR. These are listed in LRA Table 3.3-36 for McGuire, along with the passive function, the aging effect, and the aging management program activities to be applied. The applicant identified the following component types for the McGuire NSW system that are subject to an AMR—oil coolers (tubes, tube sheets, shells, and channel heads), expansion joints, pump casings, strainers, orifices, pipe, tubing, and valve bodies. The applicant further identified the intended function of these component types, in Table 3.3-36 of the LRA, to be maintaining the integrity of the NSW system pressure boundary, throttling flow, and transferring heat. Component types for the Catawba NSW system that require AMR are presented in Table 3.3-37 of the LRA. The applicant identified the following component types for the Catawba nuclear service water system that are subject to an AMR—annubars, flexible hoses, manways, pump casings, orifices, pipe, strainers, tubing, and valve bodies. The applicant further identified the intended function of these component types, in Table 3.3-37 of the LRA, to be maintaining the integrity of the NSW system pressure boundary and throttling flow.

The applicant utilized a screening process to generate P&IDs applicable to the LRA. During initial scoping, the applicant identified plant systems and structures that were candidates for inclusion within the scope of 10 CFR Part 54. For systems and structures that were “scoped in,” screening was performed to identify the passive components and structural members that support an intended function of the “in-scope” system or structure. These systems and structures are then subject to an AMR in accordance with 10 CFR 54.21(a). The results of the screening review were used to generate the P&IDs which show components that are subject to an AMR, as highlighted and marked by flags.

#### 2.3.3.28.2 Staff Evaluation

The staff reviewed Sections 2.1 and 2.2 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the Catawba and McGuire nuclear service water system that are within the scope of license renewal in accordance with 10 CFR 54.4. The staff reviewed Section 2.3 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the systems and structures of the NSW system that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3 of the LRA and the Catawba and McGuire UFSARs to identify any systems and structures of the NSW systems that may have been omitted from the scope of license renewal that meet the scoping criteria in 10 CFR 54.4. The staff verified that those portions of the NSW systems identified by the applicant as meeting the scoping requirements of 10 CFR 54.4 do in fact meet these requirements for both stations. The staff then focused its review on those portions of the NSW systems that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSARs to identify system functions that were not included in the LRA and verified that those functions met the scoping requirements of 10 CFR 54.4. Therefore, there is reasonable assurance that the applicant has adequately identified all portions of the Catawba and McGuire NSW systems that are within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the in-scope systems and structures that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the systems and structures that are subject to an AMR for the NSW system and noted them in Table 3.3-36 for McGuire and Table 3.3-37 for Catawba. The staff performed its review by sampling the systems and structures that the applicant identified as within the scope of license renewal, but not subject to an AMR, to verify that these systems and structures perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. All systems and structures reviewed by the staff met the above criteria for both Catawba and McGuire.

In Section 2.3.3.28 of the LRA, “Nuclear Service Water System,” the applicant listed 28 P&IDs for McGuire and 27 P&IDs for Catawba that were marked to indicate the license renewal evaluation boundary for the NSW system. The staff compared the flow diagrams to the information and descriptions in the UFSARs to ensure that the diagrams were representative of the NSW system for the respective plant. The applicant highlighted and flagged components on the P&IDs that are subject to an AMR. The staff sampled portions of the P&IDs that were not

highlighted to ensure these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

Paragraph 2.1.1.2.1 of the LRA states that some Duke Class G (non-safety related) components may be relied upon to remain functional during and following design basis events. Nuclear service water P&ID CN-1574-1.5, Note 16, indicates that buried Class G piping, from the auxiliary building to isolation valves 1RL054 and 1RL062, is seismically designed. The staff inferred that Class G piping may be relied upon to remain functional during and following design basis events. It was not discernable from the P&ID whether or not this piping is in scope. By letter dated January 28, 2002, the staff asked, in RAI 2.3.3.28-1, the applicant if the Duke Class G piping discussed above is within the scope of license renewal, and if it is not, to provide the basis for the exclusion. In its response dated April 15, 2002, the applicant indicated that the Class G piping discussed above is not within the scope of license renewal. The applicant further indicated that this piping is the normal NSW discharge and is not relied upon to remain functional during or following design basis events. The failure of the piping will not impact the system's safety-related function because the assured, safety-related nuclear service water discharge, which is within the scope of license renewal, is provided by a separate discharge line routed to the nuclear service water pond. The applicant also stated that the intent of Note 16 on CN-1574-1.5 is that, since the piping is underground, it is inherently missile-protected and seismically designed. The note was not meant to imply that the piping is required to have seismic design features. The staff concludes that this is acceptable because failure of the relevant Class G piping will not impair the function of the assured, safety-related nuclear service water discharge piping, which is within the scope of license renewal.

#### 2.3.3.28.3 Conclusion

On the basis of its review of the information contained in Section 2.3.3.28 of the LRA, the supporting information in the Catawba and McGuire UFSARs, and the P&IDs, as described above, the staff did not identify any omissions in the scoping and screening of the Catawba and McGuire NSW system by the applicant. Therefore, the staff concludes that there is reasonable assurance that the applicant identified those portions of the Catawba and McGuire nuclear service water system that are within the scope of license renewal, and the systems and structures that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### *2.3.3.29 Nuclear Service Water Pump Structure Ventilation System*

In Section 2.3.3.29 of the LRA titled, "Nuclear Service Water Pump Structure Ventilation System," the applicant identified portions of the nuclear service water pump structure ventilation (VZ) system and the components that are within the scope of license renewal and subject to an AMR. The applicant noted, in Section 2.3.3.29 of the LRA, that a system corresponding to the Catawba VZ system does not exist at McGuire. McGuire has no nuclear service water pump structure.

The applicant evaluated component supports for the VZ system ductwork in Table 3.5-3 of the LRA. The staff's scoping evaluations of component supports and electrical components are provided in Sections 2.4 and 2.5, respectively, of this report. Instrument line components in the VZ system were evaluated in Section 2.1 of the LRA.

### 2.3.3.29.1 Technical Information in the Application

The VZ system is an ESF. Two full-capacity supply fans in each pump compartment are served from separate trains of the emergency power system. Each essential fan is provided with a check damper on the fan discharge to prevent backflow through the standby fan. This ensures the integrity and availability of the ventilation system in the event of a loss of offsite power or any single active failure. A nonessential fan is provided in both pump compartments to supply ventilation air to the pool area below the pumps when maintenance or inspection is performed in this area. Modulating outside air and return air dampers are proportionally controlled to maintain space temperature.

In Section 2.3.3.29 of the LRA and Section 9.4.8 of the Catawba UFSAR, the applicant identified the following intended functions of the Catawba VZ system based on 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2)—

Section 2.3.3.29 of the LRA—

- to maintain a suitable environmental temperature for the operation of equipment located in the nuclear service water pump structure

Section 9.4.8 of the Catawba UFSAR—

- to provide a suitable environment for the operation of equipment and personnel access for inspection, testing, and maintenance
- to maintain ambient temperature inside the nuclear service water pump structure within acceptable temperature limits

On the basis of the intended functions identified above for the Catawba VZ system, the portions of this system that were identified by the applicant as within the scope of license renewal include all VZ system safety-related components (electrical, mechanical, and instruments). The applicant described its methodology for identifying the mechanical components subject to an AMR in Section 2.1.2.1.2 of the LRA. On the basis of this methodology, the applicant identified the portions of the VZ system that are within the scope on the flow diagram listed in Section 2.3.3.29 of the LRA. Using the methodology described in Section 2.2.1 of the LRA, the applicant compiled a list of the mechanical components and component types subject to an AMR that are within the evaluation boundaries highlighted on the flow diagrams and identified their intended functions. The applicant provided this list in Table 3.3-38 of the LRA.

The following component types are identified as within the scope of license renewal and subject to an AMR and are listed in Table 3.3-38 of the LRA—ductwork, pipe, tubing, and valve bodies. The applicant further noted in Table 3.3-38 of the LRA that the VZ system pressure boundary function is the only applicable intended function subject to an AMR.

### 2.3.3.29.2 Staff Evaluation

To verify that the applicant identified the components of the VZ system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), the staff reviewed the flow diagram listed in Section 2.3.3.29 of the LRA to confirm the evaluation boundaries for the highlighted portions of the VZ system that are within

the scope of license renewal. The staff reviewed Table 3.3-38 of the LRA, which lists the mechanical components and the applicable intended functions that are subject to an AMR. The staff also reviewed Sections 7.6.21 and 9.4.8 of the Catawba UFSAR to determine whether any portions of the VZ system that met the scoping criteria in 10 CFR 54.4(a) were not identified as within the scope of license renewal. The staff also reviewed the McGuire and Catawba UFSARs to determine if any safety-related system functions were not identified as intended functions in the LRA, and if any structures or components that have intended functions were omitted from the scope of structures or components that require an AMR. The staff compared the functions described in the UFSARs to those identified in the LRA.

The applicant identified the structures and components subject to an AMR for the VZ system using the screening methodology described in Section 2.1 of the LRA and listed them in Table 3.3-38 of the LRA. The staff sampled the structures and components in Table 3.3-38 of the LRA to verify that the applicant did identify the structures and components subject to an AMR. The staff also sampled the structures and components that are within the scope of license renewal, but not subject to an AMR, to verify that these structure and components performed their intended functions without moving parts or without a change in configuration or properties, and are not subject to replacement on the basis of a qualified life or specified time period.

To ensure that those portions of the VZ system excluded from scope do not perform any intended functions, the staff requested additional information based on a review of the UFSAR and LRA description. The staff noted that Section 2.3.3.29 of the LRA provides a summary description of the system functions and references a flow diagram. The flow diagram highlights the evaluation boundaries, and Table 3.3-38 of the LRA tabulates the components within the scope and subject to an AMR for the VZ system. The corresponding drawings and the UFSARs, however, show additional components that were not listed in Table 3.3-38 of the LRA.

The staff noted that the applicant did not identify housings for active components that require an AMR. The determination should consider whether failure of the housing would result in a failure of the associated active component to perform its intended function and whether the housing meets the long-lived and passive criteria as defined in the rule.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-9, specific information concerning the exclusion of the nuclear service water pump structure ventilation system fan housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that cooling fans are not included in the AMR results tables in the LRA. The applicant stated that cooling fans, without subcomponent exceptions, are explicitly excluded from an AMR by 10 CFR 54.21. The staff reviewed this response and determined that the applicant's basis for excluding fan housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the fan housings are passive long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-1.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-8, specific information concerning the exclusion of the VZ ventilation damper (or valve) housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that VZ system dampers are not included in the AMR results tables in the LRA. The applicant stated that ventilation dampers, without sub-component exceptions, are explicitly excluded from an

AMR by 10 CFR 54.21. The staff reviewed this response and has determined that the applicant's basis for excluding damper housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the damper housings are passive long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-2.

In its response to open items 2.3-1 and 2.3-2, dated October 28, 2002, the applicant provided AMR results tables for the nuclear service water pump structure ventilation system fan and damper housings that are in scope at McGuire and Catawba. On the basis of the information provided, the staff finds the applicant's response sufficient to resolve open items 2.3-1 and 2.3-2. The applicant indicated that the aging effects will be adequately managed such that the intended functions of the fans and dampers will be maintained consistent with the current licensing basis for the period of extended operation. The staff's evaluation of the AMR results is documented in Section 3.3.2 of this SER. Because these open items apply to a number of ventilation systems, their resolution is documented in multiple sub sections of Sections 2.2 and 2.3 of this SER.

Some components that are common to many systems, including the VZ system, have been evaluated separately by the applicant in Section 2.1.2.1.2 of the LRA as "replace on condition" commodities. The staff's evaluation of applicant's treatment of these consumables is documented in Section 2.1.3.2.1 of this SER.

In Section 2.4.3 of this SER, the staff evaluated component supports for piping, cables, and equipment that supported the design and operation of the VZ system. In LRA Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Controls," the staff evaluated electrical and instrument components that support the operation of the VZ system.

The NRC staff reviewed the LRA, supporting information in the UFSAR, and the applicant's responses to the RAI. In addition, the staff sampled several components from the VZ system flow diagram, as identified in Section 2.3.3.29 of the LRA, to determine if the applicant properly identified the components within scope and subject to an AMR. No omissions were identified, except as identified in the RAIs.

#### **2.3.3.29.3 Conclusions**

On the basis of its review, and with the open items identified in this SER section resolved, the staff has reasonable assurance that the applicant has adequately identified the VZ system structures and components that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively.

#### ***2.3.3.30 Nuclear Solid Waste Disposal System***

In LRA Section 2.3.3.30, "Nuclear Solid Waste Disposal System," the applicant described the components of the nuclear solid waste disposal system that are within the scope of license renewal and subject to an AMR. The system is described in Section 11.5 of the McGuire UFSAR and Section 11.4 of the Catawba UFSAR.

### 2.3.3.30.1 Technical Information in the Application

The nuclear solid waste disposal system contains and stores radioactive waste materials and prepares the waste for eventual shipment to a licensed offsite disposal facility. The applicant described the process for identifying the mechanical components that are within the scope of license renewal in LRA Section 2.1.1, "Scoping Methodology." As described in the scoping methodology, the applicant identified the portions of the nuclear solid waste disposal system that are within the scope of license renewal on the P&IDs that are listed in LRA Section 2.3.3.30. Consistent with the method described in LRA Section 2.1.2, "Screening Methodology," the applicant listed the nuclear solid waste disposal system mechanical components that are subject to an AMR in LRA Table 3.3-39. This table also lists the component functions. The applicant identified the following components as subject to an AMR—valve bodies, piping, screens (McGuire only), spent resin storage tanks (McGuire only), and tubing (McGuire only). All these components, except screens, have the intended component function of PB, which is defined by the applicant as maintaining pressure boundary, affecting containment isolation, or preventing interaction with safety-related equipment. The screens have the FI (filtration) function.

### 2.3.3.30.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.30 to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the nuclear solid waste disposal system that are within the scope of license renewal in accordance with 10 CFR 54.4(a) and that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information provided in LRA Section 2.3.3.30, the applicable P&IDs referenced therein, and the McGuire and Catawba UFSARs to determine if the applicant adequately identified the portions of the nuclear solid waste disposal system that are within the scope of license renewal. The staff verified that those portions of the nuclear solid waste disposal system that meet the scoping requirements of 10 CFR 54.4(a) were included within the scope of license renewal and were identified by the applicant in Section 2.3.3.30 of the LRA.

In LRA Section 2.3.3.30, the applicant listed applicable P&IDs for the nuclear solid waste disposal system. The detailed diagrams are highlighted to identify those portions of the system that are within the scope of license renewal. The staff compared the LRA diagrams to the system drawings and descriptions in the UFSARs to ensure that the diagrams were representative of the nuclear solid waste disposal system. To verify that the applicant included the applicable portions of the nuclear solid waste disposal system within the scope of license renewal, the staff focused its review on those portions of the nuclear solid waste disposal system that were not identified as within the scope of license renewal and verified that they did not meet the scoping criteria of 10 CFR 54.4(a). In addition, the staff reviewed the UFSARs for each facility to identify any additional system functions that were not identified in the LRA, and verified that the additional functions did not meet the scoping requirements of 10 CFR 54.4(a).

The staff reviewed McGuire UFSAR Table 3-4 for the solid waste disposal system and found the only components identified as safety Class 3 are the spent resin storage tank and some valves. The staff confirmed that the spent resin storage tanks and associated piping, screens, and valve bodies are included in LRA Table 3.3-39 as subject to an AMR. For Catawba, portions of the non-safety-related solid waste disposal system whose postulated failure could prevent

satisfactory accomplishment of certain safety-related functions were classified as Duke Class F components. These components meet the scoping criterion of 10 CFR 54.4(a)(2). The staff confirmed that these components are highlighted in the P&IDs of the LRA. On the basis of the information in the P&IDs and UFSARs, the staff did not identify any omissions by the applicant in scoping of mechanical components according to 10 CFR 54.4(a).

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the solid waste disposal system that were identified as within the scope of license renewal. The applicant used the screening methodology described in LRA Section 2.1.2 to identify the SCs subject to an AMR. The staff evaluation of the scoping and screening methodology is documented in Section 2.1 of this SER. In the LRA, the applicant identified the portions of the solid waste disposal system that are within the scope of license renewal in the P&IDs and listed the mechanical components that are subject to an AMR and their intended component functions in LRA Table 3.3-39. The staff performed its review by sampling the SCs that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended function without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from an AMR. The staff did not identify any omissions by the applicant in screening SCs according to 10 CFR 54.21(a)(1).

#### 2.3.3.30.3 Conclusions

On the basis of its review of the information contained in LRA Section 2.3.3.30, the supporting information in the P&IDs, and the McGuire and Catawba UFSARs, as described above, the staff did not identify any omissions by the applicant. Therefore, the staff finds that there is reasonable assurance that the applicant adequately identified those portions of the solid waste disposal system that are within the scope of license renewal and the associated SCs that are subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### *2.3.3.31 Reactor Coolant Pump Motor Oil Collection Subsystem*

LRA Section 2.3.3.31, "Reactor Coolant Pump Motor Oil Collection Subsystem," identified that structures, systems, and components (SSCs) relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, the FP rule, are within the scope of license renewal. In LRA Section 2.3.3.31, the applicant identified the FP flow diagrams that had been marked to show the license renewal evaluation boundary for the RCP motor oil collection subsystem for McGuire and Catawba. The applicant also identified the SSCs for the RCP motor oil collection subsystem that are subject to an AMR for McGuire and Catawba in LRA Table 3.3-40. In a letter to the applicant dated January 28, 2002, the NRC requested additional information regarding the RCP motor oil collection subsystem. In a letter to the NRC dated April 15, 2002, the applicant provided additional information in response to the staff's RAIs.

#### 2.3.3.31.1 Technical Information in the Application

In accordance with 10 CFR 54.4(a)(3), SSCs that are relied on in safety analyses or plant evaluation to demonstrate compliance with 10 CFR 50.48 are within the scope of license

renewal. The RCP motor oil collection subsystem is relied upon to meet the requirements of 10 CFR Part 50, Appendix R, Section III.O, "Oil Collection System for Reactor Coolant Pump."

In accordance with 10 CFR 50.48, the applicant is required to implement and maintain an FP program. As stated in LRA Section 2.1.1.3.1, the licensing basis with regard to fire protection differs at McGuire and Catawba. McGuire and Catawba are both licensed to 10 CFR 50.48(b) as specifically stated in the plants' SERs and the facility operating licenses. License conditions 2.C.(3) and 2.C.(7) apply for McGuire and license conditions 2.C.(8) and 2.C.(6) apply for Catawba. The NRC SER, NUREG-0422, provides the staff evaluation which documents the McGuire compliance with Appendix A of BTP APCS 9.5-1, "FP for Nuclear Power Plants." The NRC SER, NUREG-0954, provides the staff evaluation which documents the Catawba compliance with Appendix A to BTP APCS 9.5-1.

McGuire and Catawba are both committed to provide an RCP oil collection system in accordance with the requirements of Appendix R. The RCP lube oil is a significant fire hazard and the underlying purpose of the lube oil collection system is to ensure that leaking oil will not lead to a fire that could damage safety-related equipment during normal conditions or design basis conditions. Appendix R, Section III.O, states the following—

Such collection systems shall be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage shall be collected and drained to a vented closed container that can hold the entire lube oil system inventory. A flame arrester is required in the vent if the flash point characteristics of the oil present the hazard of fire flashback. Leakage points to be protected shall include lift pump and piping, overflow lines, lube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and lube oil reservoirs where such features exist on the reactor coolant pumps. The drain line shall be large enough to accommodate the largest potential oil leak.

As described in the LRA, the applicant listed the mechanical components subject to an AMR for this system and their intended functions in LRA Table 3.3-40. On the basis of the methodology described above, the applicant identified that the highlighted components, shown on the flow diagrams listed in LRA Section 2.3.3.31, are included within the scope of license renewal. These component types identified in this Table 3.3-40 include—flexible hoses, level gauges, tanks, pump casings, lower oil catcher, lower oil pot (McGuire only), oil lift enclosure, upper oil cooler enclosures, pipe, and valve bodies. The applicant further identified that the only intended function of these component types is to maintain the integrity of the RCP motor oil collection subsystem pressure boundary.

#### 2.3.3.31.2 Staff Evaluation

The Commission's regulations in 10 CFR 54.21(a)(1) state that for those SSCs that are within the scope of Part 54, as delineated in 10 CFR 54.4, the applicant must identify and list those SCs that are subject to an AMR. The staff reviewed Section 2.3.3.31 of the LRA, as supplemented by a letter to the NRC dated January 28, 2002, to determine whether there was reasonable assurance that the applicant has appropriately identified the SSCs that serve RCP oil collection system intended functions that are within the scope of license renewal in accordance with 10 CFR 54.4, and are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The applicant is required to meet the requirements of Appendix R, Section III.O to 10 CFR Part 50. Therefore, SSCs relied on in safety analyses or plant evaluations to demonstrate compliance with 10 CFR 50.48 are included in scope of license renewal. Section 2.3.3.31 of the LRA states that each RCP for McGuire and Catawba is equipped with an oil collection system that meets the requirements of Appendix R, Section III.O.

The staff reviewed portions of the flow diagrams listed in LRA Section 2.3.3.31 for McGuire and Catawba to identify any additional RCP oil collection subsystem functions that met the scoping requirements of 10 CFR 54.4 but that were not identified as intended functions in the LRA. The staff also reviewed the SERs (NUREG- 0422 for McGuire and NUREG -0954 for Catawba) which summarize the FP programs.

The staff then compared the RCP oil collection subsystem components identified in the flow diagrams to verify that the required components were highlighted as being within the evaluation boundaries on the flow diagram, and were not excluded from the scope of license renewal. As part of the evaluation, the staff also sampled portions of the same flow diagrams for the RCP oil collection subsystem to determine if there were any additional portions of the system piping or components located outside of the evaluation boundary that should have been identified as within the scope of license renewal.

The staff was concerned that the applicant had excluded a portion of the RCP oil collection subsystem piping from within the scope of license renewal. By letter dated January 28, 2002, the staff asked, in RAI 2.3.3.31-1, the applicant to discuss why the portion of the RCP motor oil collection subsystem within the dashed lines on flow diagrams CN-1553-1.3 and MCFD-1553-04.00, is excluded from the scope of license renewal, and to verify that this portion of the system is not required for compliance with Appendix R, Section III.O. In its response dated April 15, 2002, the applicant stated that the portion of the RCP motor oil collection subsystem within the dashed lines on flow diagrams CN-1553-1.3 and MCFD-1553-04.00 is not required for compliance with Appendix R, Section III.O. This excluded portion of the system is a portable skid that is connected to the system only when needed to refill the motor with oil. Because the portable skid is used for maintenance purposes and is not relied upon to mitigate a fire, the staff was satisfied with the applicant's response.

After determining which components were within the scope of license renewal, the staff reviewed the components the applicant identified as being subject to an AMR. The staff reviewed selected components that the applicant identified as within the scope of license renewal to verify that the applicant determined those SCs that performed their intended functions without moving parts or without a change in configuration or properties, and that are not subject to replacement based on qualified life or specified time period, were subject to an AMR.

The staff also reviewed mechanical components from the flow diagrams identified in LRA Section 2.3.3.31 and compared them to the list of components and corresponding intended function(s) in Table 3.3-40 of the LRA. On the basis of this review, the staff did not identify any omissions in the SCs identified by the applicant as being subject to an AMR.

#### 2.3.3.31.3 Conclusions

On the basis of the review described above, the staff finds that there is reasonable assurance that the applicant has adequately identified those portions of the RCP motor oil collection

subsystem that are included within the scope of license renewal, and the associated SSCs that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

### *2.3.3.32 Reactor Coolant System (Non-Class 1 Components)*

In LRA Section 2.3.3.32, "Reactor Coolant System (Non-Class 1 Components)," the applicant described the non-Class 1 components of the reactor coolant system that are within the scope of license renewal and subject to an AMR.

#### **2.3.3.32.1 Technical Information in the Application**

The non-Class 1 portions of the reactor coolant system (excluding the reactor coolant pump motor oil collection subsystem) are relied upon to provide and maintain containment isolation and closure and maintain system pressure boundary integrity. An additional intended function identified in Table 3.3-41 (for orifices only) is throttling flow. The reactor vessel leak off line is included within this set of components and is relied upon only in the event the reactor vessel flange inner seal leaks.

The component types, component functions, materials of construction, environments, aging effects, and aging management programs/activities for the McGuire and Catawba reactor coolant system (non-Class 1 components) are listed in Table 3.3-41 of the LRA. The following component types are listed—orifices, pipe, tubing, and valve bodies.

#### **2.3.3.32.2 Staff Evaluation**

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the reactor coolant system (non-Class 1 components), and associated pressure boundary components and supporting structures within the scope of license renewal and subject to an AMR, have been identified in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1). This was accomplished as described below.

As part of the evaluation, the staff determined whether the applicant had properly identified the systems, structures, and components within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively. The staff reviewed the relevant portions of the UFSARs for McGuire and Catawba for the reactor coolant system (non-Class 1 components) and associated pressure boundary components, and compared the information in the UFSAR with the information in the LRA to identify those portions that the LRA did not identify as within the scope of license renewal and subject to an AMR. The staff then focused on those portions of the reactor coolant system (non-Class 1 components) that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. For those structures and components that have applicable intended functions, the staff sought to verify that they either perform these functions with moving parts, or a change in configuration or properties, or that they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1).

The staff also reviewed the UFSAR for any function(s) delineated under 10 CFR 54.4(a) that were not identified as intended function(s) in the LRA, to verify that the systems, structures, and

components with such function(s) will be adequately managed so that the function(s) will be maintained consistent with the CLB for the extended period of operation.

The staff did not identify any omissions.

### 2.3.3.32.3 Conclusions

On the basis of its review of the information presented in Section 2.3.3.32 of the LRA, and the supporting information in the McGuire and Catawba UFSARs, the staff did not find any omissions by the applicant and, therefore, concludes that there is reasonable assurance that the applicant adequately identified those portions of the reactor coolant system (non-Class 1 components) and the associated supporting structures and components that fall within the scope of license renewal and are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1).

### 2.3.3.33 *Recirculated Cooling Water System*

In LRA Section 2.3.3.33, "Recirculated Cooling Water System," the applicant described the components of the Catawba recirculated cooling water system that are within the scope of license renewal and subject to an AMR. Although the LRA notes that no portion of the McGuire recirculated cooling water system is within the scope of license renewal, Supplement 1 to the LRA, provided by the applicant in a letter dated June 25, 2002, stated that portions of this system had been included within the scope of license renewal for McGuire. This system is further described in Section 9.2.1 of the McGuire UFSAR.

The staff reviewed the LRA for Catawba, and LRA Supplement 1 and UFSAR for McGuire, to determine whether the applicant has adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

#### 2.3.3.33.1 Technical Information in the Application

The Catawba and McGuire Nuclear Station recirculated cooling water system is a closed cooling system that delivers clean, rust-inhibiting, cooling water of a regulated temperature to various components in the turbine building, auxiliary building, and service building.

The applicant described the process for identifying the SSCs within the scope of license renewal in LRA Section 2.1.1, "Scoping Methodology," and its process for identifying the SSCs subject to an AMR in LRA Section 2.1.2, "Screening Methodology." Using the methodology described in LRA Section 2.1.1, the applicant listed the systems and structures that are within the scope of license renewal in LRA Tables 2.2-1 and 2.2-2 for McGuire and Catawba, respectively. The Catawba recirculated cooling water system is listed on page 2.2-7 in Table 2.2-2 of the LRA. The McGuire recirculated cooling water system was added to the scope of licensed renewal as noted on page 2 of LRA Supplement 1.

The LRA notes that the only portions of the recirculated cooling water system subject to an AMR are the Duke Class F portions of the recirculated cooling water system that are in scope at Catawba. Using the methodology described in Section 2.1.2 of the LRA, the applicant listed the Catawba mechanical components that are subject to an AMR in Table 3.3-42, "Aging Management Results - Recirculated Cooling Water System." This table also lists the intended

function of each component and the materials of construction. The applicant identified the following components of the recirculated cooling water system that are subject to an AMR—pipe and valve bodies. The applicant identified maintaining pressure boundary integrity as the only intended function of the SCs subject to an AMR.

At the time of the preparation of the LRA, a plant modification was proposed to downgrade all piping within the McGuire recirculated cooling water system to a non-safety class of piping. At the time the LRA was submitted, none of this piping was included within the scope of license renewal. Subsequent to the submittal of the LRA, the proposed modification was implemented, however, some portions of the recirculated cooling water system were not downgraded, remained as Class F piping, and thus should have been identified as within the scope of license renewal. Using the methodology described in Section 2.1.2 of the LRA, the applicant listed the McGuire mechanical components that are subject to an AMR in Table 1 of LRA Supplement 1, “Recirculated Cooling Water System (KR) Component Screening and Aging Management Review Results (McGuire Nuclear Station).” This table also lists the intended function of each component and the materials of construction. The applicant identified pipe as the only component of the McGuire recirculated cooling water system that is subject to an AMR. The applicant identified maintaining pressure boundary integrity as the only intended function of the SCs subject to an AMR.

#### 2.3.3.33.2 Staff Evaluation

The staff reviewed Section 2.3.3.33 of the LRA, and Section 3 of LRA Supplement 1, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the recirculated cooling water system that are within the scope of license renewal in accordance with 10 CFR 54.4, and to verify that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information presented in Section 2.3.3.33 of the LRA, Section 3 of LRA Supplement 1, and the applicable piping and instrument drawings referenced therein, and the McGuire UFSAR, to determine if the applicant adequately identified the portions of the recirculated cooling water system that are within the scope of license renewal.

The Catawba recirculated cooling water system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). The applicant included all components within the seismically designed piping boundaries of this system within the scope of license renewal per 10 CFR 54.4(a)(2). The staff verified that those portions of the recirculated cooling water system that meet the scoping requirements of 10 CFR 54.4 were included within the scope of license renewal and were so identified by the applicant in Section 2.3.3.33 of the LRA. To verify that the applicant did include the applicable portions of the recirculated cooling water system as within the scope of license renewal, the staff focused its review on those portions of the recirculated cooling water system that were not identified as within the scope of license renewal to verify that they did not meet the scoping criteria of 10 CFR 54.4. The staff did not identify any omissions in the applicant’s scoping review.

As noted in NRC Inspection Report 50-369/02-05, 50-370/02-05, 50-413/02-05 and 50-414/02-05 for the scoping and screening inspection of McGuire and Catawba Nuclear

Stations, the inspectors observed that the applicant had relied on a proposed modification of the recirculated cooling water system at McGuire to downgrade the piping classification that was not yet implemented when the LRA was submitted. Upon completion, the modification method had changed and a portion of the piping system had remained Class F and, therefore, should have been in license renewal scope. This was the only case identified by the inspectors where the applicant had relied on a proposed modification. As discussed above, the applicant added the McGuire recirculated cooling water system to the license renewal scope in LRA Supplement 1. The McGuire recirculated cooling water system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are designated Duke Class F. The applicant included all components within the Duke Class F designated piping boundaries of this system within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The staff verified that those portions of the recirculated cooling water system that meet the scoping requirements of 10 CFR 54.4 were included within the scope of license renewal and were so identified by the applicant in Section 3 of LRA Supplement 1. To verify that the applicant did include the applicable portions of the recirculated cooling water system as within the scope of license renewal, the staff focused its review on those portions of the recirculated cooling water system that were not identified as within the scope of license renewal to verify that they did not meet the scoping criteria of 10 CFR 54.4. In addition, the staff reviewed the McGuire UFSAR to identify any additional system intended functions that were not identified in LRA Supplement 1, and verified that these additional intended functions did not meet the scoping requirements of 10 CFR 54.4. The staff did not identify any omissions in the applicant's scoping review other than those that were documented in the NRC inspection report.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR in those portions of the recirculated cooling water system that are identified as within the scope of license renewal. The applicant listed the SCs subject to an AMR for the recirculated cooling water system in Table 3.3-42 of the LRA and Table 1 of LRA Supplement 1 for Catawba and McGuire, respectively, using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER.

The applicant identified the portions of the Catawba recirculated cooling water system that are within the scope of license renewal by a highlighted Catawba drawing referenced in LRA Section 2.3.3.33. In addition, the applicant lists the pipe and valve body mechanical component commodity groups that are subject to an AMR and their intended functions in Table 3.3-42 of the LRA.

The applicant identified the portions of the McGuire recirculated cooling water system that are within the scope of license renewal by highlighted McGuire drawing MCFD-1600-01-01 referenced in LRA Supplement 1. In addition, the applicant lists pipe as a mechanical component commodity group subject to an AMR and its intended function in Table 1 of LRA Supplement 1.

The piping and instrumentation drawings were highlighted by the applicant to identify those portions of the recirculated cooling water system that meet at least one of the scoping criteria of 10 CFR 54.4. The staff performed its review by sampling the SCs that the applicant determines to be within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended functions without moving parts or without a

change in configuration or properties, and that is not subject to replacement on the basis of qualified life or specified time period, was excluded from an AMR. The staff did not identify any omissions.

### 2.3.3.33.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.33 of the LRA, Section 3 of LRA Supplement 1, the LRA, LRA Supplement 1 drawings, and the McGuire and Catawba UFSARs, the staff did not identify any omissions in the scoping of the recirculated cooling water system by the applicant beyond those identified in NRC Inspection Reports 50-369/02-05, 50-370/02-05, 50-413/02-05 and 50-414/02-05 as discussed above. The staff concludes that there is reasonable assurance that the applicant identified those portions of the recirculated cooling water system that are within the scope of license renewal, and the SCs that are subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.34 *Spent Fuel Cooling System*

In Section 2.3.3.34 “Spent Fuel Cooling System,” of the LRA, the applicant described the components of the spent fuel cooling system that are within the scope of license renewal and subject to an AMR. Section 9.1.3 of the Catawba and McGuire UFSARs provides additional information concerning their respective spent fuel cooling systems.

#### 2.3.3.34.1 Technical Information in the Application

For the purposes of license renewal, the Catawba and McGuire spent fuel cooling systems are essentially the same and perform the same functions. The Catawba spent fuel cooling system, in conjunction with the component cooling water system and nuclear service water system, is designed to remove heat from the spent fuel pool and maintain purity and optical clarity of the pool water during fuel handling operations. The purification loop provides an alternate means for removing impurities from the refueling cavity/transfer canal water during refueling, and from the refueling water storage tank water following refueling.

The McGuire spent fuel cooling system removes heat from the spent fuel pool and maintains the purity and optical clarity of the pool water for fuel handling operations. The purification loop provides an alternate means for removing impurities from the refueling canal/transfer canal water during refueling, and from the refueling water storage tank water following refueling. The fuel pool water also serves as a source of makeup water to the reactor coolant system during an event that is mitigated by the standby shutdown system.

Using the methodology described in Section 2.1.2, “Screening Methodology,” of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and their materials of construction for the spent fuel cooling system are listed in Table 3.3-43 of the LRA. In LRA Table 3.3-43, the applicant lists the following 10 component commodity groups as subject to an AMR—heat exchangers (channel head, shell, tube sheet, and tubes), orifices, pipe, pump casings, spacers, tubing, and valve bodies. LRA Table 3.3-43 also lists spacers as a component commodity group that is subject to an AMR only for the McGuire spent fuel cooling system. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs

subject to an AMR. The heat exchangers (tubes) also provide a heat transfer function (to maintain system and/or component operating temperature).

#### 2.3.3.34.2 Staff Evaluation

The staff reviewed Section 2.3.3.34 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the spent fuel cooling system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.3.34 of the LRA, and the Catawba and McGuire UFSARs, to determine if the applicant adequately identified the SSCs of the spent fuel cooling system that are in the scope of license renewal. The staff verified that those portions of the spent fuel cooling system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal and are identified by the applicant in Section 2.3.3.34 of the LRA. The staff then focused its review on those portions of the spent fuel cooling system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that no additional functions met the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the spent fuel cooling system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the spent fuel cooling system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the spent fuel cooling systems in Table 3.3-43 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines to be within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, and were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the spent fuel cooling system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which it believes perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSARs to ensure the diagrams were representative of the spent fuel cooling system. The staff sampled components in the flow diagram that were not highlighted to verify that these components did not meet any of the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.3.34.3 Conclusions

On the basis of its review of the information in Section 2.3.3.34 of the LRA, and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the

applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the spent fuel cooling system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### *2.3.3.35 Standby Shutdown Diesel*

In LRA Section 2.3.3.35, "Standby Shutdown Diesel," the applicant described the components of the standby shutdown diesel that are within the scope of the license renewal and subject to an AMR. The staff reviewed the LRA to determine if the applicant adequately demonstrated that the requirements of 10 CFR Part 54 have been met.

#### **2.3.3.35.1 Technical Information in the Application**

The standby shutdown diesel provides an alternate and independent means of achieving and maintaining a hot standby condition for one or both units following a postulated fire event. The standby shutdown diesel provides power to the standby shutdown facility required components, instrumentation, and controls for a period of up to 72 hours.

The applicant described the process for identifying the SSCs within the scope of license renewal in Section 2.1.1 of the LRA. Using that scoping methodology, the applicant determined that the standby shutdown diesel was within the scope of license renewal and listed it on page 2.2-3 in Table 2.2-1 for McGuire, and on page 2.2-8 in Table 2.2-2 for Catawba. The LRA included system drawings that were highlighted to indicate the license renewal evaluation boundary.

The applicant described the process for identifying the SCs subject to an AMR in Section 2.1.2 of the LRA. Using that screening methodology, the applicant listed the mechanical components of the standby shutdown diesel subsystems that are subject to an AMR in LRA Table 3.3-44 for both McGuire and Catawba. In LRA Table 3.3-44, the applicant grouped the components for the standby shutdown diesel in four subsystems—the cooling water and jacket water heating subsystem, the exhaust subsystem, the fuel oil subsystem, and the lubrication oil subsystem. For the cooling water and jacket water heating subsystem, the applicant identified the following component types as subject to an AMR—(1) filter, cooling water mounting head, (2) heat exchanger, engine radiator tubes, channel head, leak off connector, and cap flange, (3) tubing, (4) valves bodies, jacket water heater, and (5) water heater, jacket shell. For the exhaust subsystem, the applicant identified the following component types as subject to an AMR—(1) bellows, (2) pipes, and (3) silencer. For the fuel oil subsystem, the applicant identified the following component types as subject to an AMR—(1) filter, duplex (mounting head), (2) flame arrestor (McGuire only), (3) level glasses, (4) pipes for fuel oil, day tank vents, day tank drain (McGuire only), storage tank vents, and storage tank suctions, (5) pump casings, fuel oil transfer and engine fuel oil, (6) tanks, fuel oil storage, fuel oil storage manway, and fuel oil day, (7) tubing, fuel oil day tank, and (8) valve bodies. For the lubrication oil subsystem, the applicant identified the filters for lube oil bypass and the lube oil mounting head as subject to an AMR. The applicant stated that the intended functions of the components are to maintain mechanical pressure boundary integrity to ensure that sufficient flow and pressure are delivered, to effect containment isolation for fission product retention, to prevent physical interaction with safety-related equipment, and also provide heat transfer so that system and/or component operating temperatures are maintained.

### 2.3.3.35.2 Staff Evaluation

The staff reviewed Section 2.3.3.35 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the standby shutdown diesel that are within the scope of license renewal in accordance with 10 CFR 54.4, and that the applicant appropriately identified the mechanical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and applicable drawings submitted by the applicant in Section 2.3.3.35 of the LRA to verify that the applicant adequately identified the portions of the standby shutdown diesel that meet the scoping requirements of 10 CFR 54.4, and that these portions were included within the scope of license renewal in Section 2.3.3.35 of the LRA. The staff focused its review on those portions of the standby shutdown diesel that were not identified as within the scope of license renewal to verify that they did not meet the scoping requirements of 10 CFR 54.4.

The staff reviewed Table 3.3-44 of the LRA, which lists the mechanical components subject to an AMR for the standby shutdown diesel for McGuire and Catawba. The staff verified that the applicant properly identified the mechanical components that were subject to an AMR from among those portions of the standby shutdown diesel that were identified as within the scope of license renewal. The staff sampled the components that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no component that performs its intended functions without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from LRA Table 3.3-44.

During its review of Section 2.3.3.35, the staff determined that additional information was needed to complete its review. The standby shutdown diesel radiator is listed in LRA Table 3.3-44 as a component subject to an AMR, which implies that the radiator is within the scope of license renewal. McGuire drawing MC-1614-4 shows that the standby shutdown diesel engine radiator is air cooled by an engine-driven fan. The standby shutdown diesel and its supporting subsystems are relied on to perform a function that demonstrates compliance with the Commission's regulation for station blackout. Therefore, they meet the scoping requirement of 10 CFR 54.4(a)(3). As a subsystem of the standby shutdown diesel, the fan identified on MC-1614-4 should be within the scope of the license renewal and listed in Table 3.3-44 as subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.35-1, that the applicant provide the basis for not listing the engine-driven fan in Table 3.3-44. The staff also requested that the applicant confirm the existence of an air cooling system for the standby shutdown diesel engine radiator at Catawba and address its inclusion in the scope of license renewal. It should be noted here that, in RAI 2.3.3.35-1, the staff mistakenly referred to Table 3.3-34 instead of referring to Table 3.3-44. In its response dated April 15, 2002, the applicant stated that the engine-driven fan was not excluded from the scope of license renewal and that it was within the license renewal boundary highlighted on MC-1614-4. The applicant also stated that the air cooling system for the standby shutdown diesel radiator at McGuire was subject to an AMR and was listed in Table 3.3-46, "Turbine Building Ventilation System," rather than in Table 3.3-44, because the turbine building ventilation system performs the HVAC for the standby shutdown facility. In response to the staff's question regarding the existence of a cooling system for the standby shutdown diesel radiator at Catawba, the applicant responded that the McGuire and Catawba shutdown diesels are of the same design. The applicant indicated that the AMR

results for the Catawba standby shutdown diesel radiator were listed in Table 3.3-33 of the LRA, "Miscellaneous Structures Ventilation System," rather than in LRA Table 3.3-44, because the miscellaneous structures ventilation system performs the HVAC function for the standby shutdown facility. The applicant also stated that the only long-lived passive component associated with the standby shutdown diesel engine radiator is the plenum (the AMR results of which the staff verified are provided in Tables 3.3-33 and 3.3-46 of the LRA). Other components, such as the fans, are within the scope of license renewal, but are not subject to an AMR. Cooling fans, without sub-component exceptions, are explicitly excluded from an AMR by 10 CFR 54.21(a)(1)(i). The staff finds the applicant's response acceptable because the air cooling systems for the McGuire and Catawba standby shutdown diesel radiator were identified by the applicant as within the scope of license renewal.

Table 3.3-44 of the LRA lists the standby shutdown diesel components subject to an AMR. The list includes the pump casing for the fuel oil transfer pump. McGuire drawing MCFD-1560-01.00 and Catawba drawing CN-1560-1.0 do not show a pump by that name. By letter dated January 28, 2002, the staff asked, in RAI 2.3.3.35-2, the applicant if the fuel oil transfer pump in Table 3.3.44 is the same component as the fuel oil day tank pump on drawings MCFD-1560-01.00 and CN-1560-1.0. In its response dated April 15, 2002, the applicant confirmed that the fuel oil transfer pump listed in Table 3.3.44 refers to the component listed as standby shutdown fuel oil day tank pump at coordinates F2 on drawings MCFD-1560-01.00 and CN-1560-1.0. The applicant's clarification of this information assisted the staff in completing its review.

On drawings MCFD-1560-01.00, MCFD-1560-02-00, CN-1560-1.0, and CN-1560-2.0, the flexible hose connections on the fuel oil subsystem on either side of the engine are shown to be within the scope of license renewal. Although these components appear to have a pressure boundary intended function, they are not listed in LRA Table 3.3-44 as subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.35-3, that the applicant provide the basis for excluding these flexible hose connections from the lists of components subject to an AMR. In its response dated April 15, 2002, the applicant stated that these flexible hose connections are replaced during periodic maintenance on the diesel engine and, in accordance with 10 CFR 54.21(a)(1)(ii), are not subject to an AMR. The applicant specified that drawings MCFD-1560-02-00 and CN-1560-2.0 show no fuel oil component. Because the applicant did not provide information about the replacement of these flexible connectors (whether they are replaced on condition based on specific performance parameters or based on a qualified life), the staff is unable to evaluate the acceptability of this response. This issue was characterized as SER open item 2.3.3.35.2-1. In its response to this open item, dated October 28, 2002, the applicant stated that the flexible hoses in the standby shutdown diesel generator fuel oil subsystem are inspected for cracking and signs of wear on an 18-month frequency and replaced based on condition. The staff finds this to be an acceptable basis for excluding these hoses from an AMR. Therefore, open item 2.3.3.35.2-1 is closed.

Drawings MCFD-1560-01.00, MCFD-1560-02-00, CN-1560-1.0, and CN-1560-2.0 depict the portions of the standby shutdown diesel subsystems that are within the scope of license renewal. It is not apparent from these drawings how the standby shutdown diesel lube oil subsystem accomplishes its function of lubricating the diesel engine, and the UFSARs for McGuire and Catawba do not provide any written description of these subsystems. As a result, the staff was not able to determine, during its review of the LRA, if all the passive and long-lived subsystems components that are within the scope of license renewal, were included in LRA Table 3.3-44 to

indicate that they were subject to an AMR. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.35-4, that the applicant provide a system description and an explanation of how this subsystem performs its intended function. In its response dated April 15, 2002, the applicant stated that the standby shutdown diesel engine is a small, 16-cylinder diesel engine, and that the entire lubrication system is contained inside the diesel engine. The only external components are the lube oil filters and they are listed in LRA Table 3.3-44. The components internal to the engine, such as the pump and the lube oil cooler, are considered part of the diesel engine and are excluded from an AMR by 10 CFR 54.21(a)(1)(i). The applicant further specified that only the components associated with the filter (mounting head and bypass) are listed in Table 3.3-44 of the LRA. The filter itself is replaced during periodic maintenance and is not subject to an AMR. The staff finds the applicant's response acceptable because, even though portions of the pump and the lube oil cooler may be passive, the pump and the lube oil cooler are parts of the standby shutdown diesel generator and, therefore, are not subject to an AMR in accordance with 10 CFR 54.21(a)(1)(i). The staff's evaluation of the applicant's treatment of filters is documented in Section 2.1.3.2.1 of this SER.

LRA Table 3.3-44 lists the McGuire and Catawba components that are subject to an AMR for the cooling water and jacket water heating subsystem for the standby shutdown diesel. The table does not list piping or pump casings. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.35-5, that the applicant provide the basis for excluding the piping and pump casings from LRA Table 3.3-44 as subject to an AMR. In its response dated April 15, 2002, the applicant stated that the component called "tubing," listed in LRA Table 3.3-44 for the cooling water and jacket water heating sub system, reflects the terminology used by the vendor for piping. The applicant added that a visual inspection of the diesel confirmed that this tubing, as it is referred to in the vendor manuals, is actually carbon steel pipe. As a result, the applicant supplemented LRA Table 3.3-44 to read as follows—

Component Type	Component Function	Material	Internal Environment	Aging Effects	Aging Management Programs and Activity
			External Environment		
Pipe	PB	CS	Treated Water	Cracking (Note 3)	Chemistry Control Program
				Loss of Material	Chemistry Control Program
			Sheltered	Loss of Material	Inspection Program for Civil Engineering Structures and Components

In its response to RAI 2.3.3.35-5, the applicant stated that the pump casing for the diesel generator cooling water and jacket water heating subsystem had been inadvertently omitted from Table 3.3-44 of the LRA and provided the following supplemental information—

Component Type	Component Function	Material	Internal Environment	Aging Effects	Aging Management Programs and Activity
			External Environment		
Pump Casing (cooling water)	PB	CS	Treated Water	Cracking (Note 3)	Chemistry Control Program
				Loss of Material	Chemistry Control Program
			Sheltered	Loss of Material	Inspection Program for Civil Engineering Structures and Components

Since the applicant provided the AMR results for the pump casing and clarified that tubing was specified for the piping in question, the staff finds its response acceptable. The supplemental information for LRA Table 3.3-44 to reflect the vendor's characterization of the tubing as piping is a further clarification that is helpful because it accurately reflects the vendor's documentation. The staff's evaluation of the AMR results for the carbon steel pipe and pump casings is documented in Section 3.3.35.2 of this SER.

### 2.3.3.35.3 Conclusions

The staff reviewed the information contained in Section 2.3.3.35 of the LRA, the applicable LRA drawings, and applicant responses to RAIs and SER open items. With the resolution of open item 2.3.3.35.2-1, the staff concludes that there is reasonable assurance that the applicant has identified those portions of the standby shutdown diesel that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.36 Turbine Building Sump Pump System

In LRA Section 2.3.3.36, "Turbine Building Sump Pump System," the applicant described the components of the Catawba turbine building sump pump system that are within the scope of license renewal and subject to an AMR. McGuire has no Class F components in the turbine building sump pump system, therefore, no portion of the McGuire turbine building sump pump system is within the scope of license renewal. As a result, the following staff evaluation only applies to Catawba. The Catawba turbine building sump pump system is not described in the UFSAR.

#### 2.3.3.36.1 Technical Information in the Application

The turbine building sump pump system serves as a collection point for the contents of liquid radwaste system sumps when the sumps contain less than predetermined levels of radiation, as sensed by radiation monitors in the discharge lines. The turbine building sump pump system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). All components within the seismically designed piping boundaries of this system are within the scope of license renewal per 10 CFR 54.4(a)(2). Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant

compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR and their intended functions and materials of construction for the Catawba turbine building sump pump system are listed in LRA Table 3.3-45. In LRA Table 3.3-45, the applicant lists the following mechanical component as subject to an AMR—pipe. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

#### 2.3.3.36.2 Staff Evaluation

The staff reviewed Section 2.3.3.36 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the turbine building sump pump system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.3.36 of the LRA to determine if the applicant adequately identified the SSCs of the turbine building sump pump system that are in the scope of license renewal. The staff verified that those portions of the turbine building sump pump system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.3.36 of the LRA. The staff then focused its review on those portions of the turbine building sump pump system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the turbine building sump pump system that should be included within the scope of license renewal in accordance with 10 CFR Part 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the turbine building sump pump system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the turbine building sump pump systems in Table 3.3-45 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the turbine building sump pump system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4.

### 2.3.3.36.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.36 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the turbine building sump pump system that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.3.37 Turbine Building Ventilation System

In LRA Section 2.3.3.37, "Turbine Building Ventilation System," the applicant identified components of the turbine building ventilation system that are within the scope of license renewal and subject to an AMR. This specific system is only applicable to McGuire. The McGuire turbine building ventilation (VO) system includes the standby shutdown facility (SSF) heating, ventilation, and air-conditioning subsystems. The standby shutdown facility heating, ventilation, and air-conditioning portion of the VO system provide the environmental control requirements for the standby shutdown facility.

The applicant evaluated component supports for the VO system ductwork within Table 3.5-3 of the LRA. The applicant evaluated electrical components that support the operation of the system in Section 2.1.2.3 of the LRA. The staff's scoping evaluation of structures and component supports is provided in Section 2.4 of this SER. The staff's evaluation of electrical components and instrumentation and controls in the VO system is documented in Section 2.5 of this SER.

#### 2.3.3.37.1 Technical Information in the Application

The SSF heating ventilation, and air-conditioning subsystems are part of the McGuire VO system. The SSF control room is air-conditioned while the standby shutdown facility electrical equipment room and SSF diesel room are provided with ventilation, fans, and electric heaters.

In Section 2.3.3.37 of the LRA, the applicant identified the following McGuire VO system intended function based on 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2)—

Section 2.3.3.37 of the LRA—

- to provide the environmental conditioning requirements for the standby shutdown facility

Section 9.4.4 of the McGuire UFSAR—

- to provide a suitable environment for the operation of equipment and personnel access as required for inspection, testing, and maintenance
- to maintain the ambient temperature limit within the turbine building
- to provide air-conditioning for the SSF control room and battery rooms
- to provide ventilation and heat for the SSF electrical equipment room and SSF diesel rooms

On the basis of the intended functions identified above for the McGuire SSF heating ventilation and air-conditioning subsystems, the portions of this system that were identified by the applicant as within the scope of license renewal included components highlighted on the referenced flow

diagram in Section 2.3.3.37 of the LRA. The applicant described their methodology for identifying the mechanical components subject to an AMR in Section 2.1 of the LRA. On the basis of this methodology, the applicant identified the portions of the SSF heating ventilation and air-conditioning subsystems that are within the scope of license renewal. Using the methodology described in Section 2.2.1 of the LRA, the applicant compiled a list of the mechanical components and component types subject to an AMR that are within the evaluation boundaries highlighted on the flow diagrams, and identified their intended functions. The applicant provided this list in Table 3.3-46 of the LRA.

The following component types are identified as within the scope of license renewal and subject to an AMR within Table 3.3-46 of the LRA—air handling unit, ductwork, flexible connectors, and plenum section. The applicant indicated in Table 3.3-46 of the LRA for the McGuire SSF heating, ventilation, and air-conditioning portion of the VO system that the pressure boundary function is the only applicable intended function.

#### 2.3.3.37.2 Staff Evaluation

To verify that the applicant identified the components of the VO system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), the staff reviewed the flow diagram listed in Section 2.3.3.37 showing the evaluation boundaries for the highlighted portion of the VO system that are within the scope of license renewal. The staff also reviewed Table 3.3-46 of the LRA, which lists the mechanical components and the applicable intended functions that are subject to an AMR. The staff also reviewed Section 9.4.4 of the McGuire UFSAR to determine if there were any portions of the VO system that met the scoping criteria in 10 CFR 54.4(a) that were not identified as within the scope of license renewal. The staff also reviewed the McGuire and Catawba UFSARs to determine if any safety-related system functions were not identified as intended functions in the LRA, and to determine if any structures or components that have intended functions were omitted from the scope of structures or components that require an AMR. The staff compared the functions described in the UFSARs to those identified in the LRA.

The applicant identified the structures and components subject to an AMR for the VO system using the screening methodology described in Section 2.1 of the LRA and listed them in Table 3.3-46 of the LRA. The staff sampled the structures and components from Table 3.3-46 of the LRA to verify that the applicant did identify the structures and components subject to an AMR. The staff also sampled the structures and components that were within the scope of license renewal, but not subject to an AMR, to verify that the structures and components perform their intended functions without moving parts or without a change in configuration or properties, and are not subject to replacement on the basis of a qualified life or specified time period.

To ensure that those portions of the VO system excluded from scope do not perform any intended functions, the staff requested additional information based on a review of the McGuire UFSAR and LRA descriptions. The staff noted that Section 2.3.3.37 of the LRA provides a summary description of the system functions and a listed flow diagram. The flow diagram highlights the evaluation boundaries, and Table 3.3-46 of the LRA tabulates the components within the scope and subject to an AMR for the VO system. The corresponding drawings and UFSAR, however, show additional components that were not listed in Table 3.3-46 of the LRA.

The staff noted that the applicant did not identify housings for active components that require an AMR. The determination should consider whether failure of the housing would result in a failure of the associated active component to perform its intended function, and whether the housing meets the long-lived and passive criteria as defined in the rule.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-1, specific information concerning the exclusion of fan housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that cooling fans are not included in the AMR results tables in the LRA. The applicant also stated that cooling fans, without sub-component exceptions, are explicitly excluded from an AMR by 10 CFR 54.21. The staff reviewed this response and determined that the applicant's basis for excluding fan housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the fan housings are passive long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-1.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-2, specific information concerning the exclusion of damper housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that dampers are not included in the AMR result tables in the LRA. The applicant goes on to state that ventilation dampers, without sub-component exceptions, are explicitly excluded from an AMR by 10 CFR 54.21. The staff reviewed this response and has determined that the applicant's basis for excluding damper housings is not consistent with the license renewal rule because the housings are relied upon to maintain pressure boundary integrity (as are valve bodies and pump casings) and are within scope. Furthermore, because the damper housings are passive long-lived components, they are subject to an AMR. The staff found this response unacceptable and characterized this issue as SER open item 2.3-2.

In its response to open items 2.3-1 and 2.3-2, dated October 28, 2002, the applicant provided AMR results tables for the turbine building ventilation system fan and damper housings that are in scope at McGuire and Catawba. On the basis of the information provided, the staff finds the applicant's response sufficient to resolve open items 2.3-1 and 2.3-2. The applicant indicated that the aging effects will be adequately managed such that the intended functions of the fans and dampers will be maintained consistent with the current licensing basis for the period of extended operation. The staff's evaluation of the AMR results is documented in Section 3.3.37.2 of this SER. Because these open items apply to a number of ventilation systems, their resolution is documented in multiple sub-sections of Sections 2.2 and 2.3 of this SER.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-7(6), specific information concerning the exclusion of McGuire duct heater housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that duct heater housings should have been highlighted on flow diagrams to indicate they are within the scope of license renewal. The applicant further states the duct heaters consist of electric heating elements that are mounted inside the ductwork and do not have a pressure boundary function or any other component intended function for license renewal and are not subject to an AMR. Because the duct heater housings do not perform any intended function as described in 10 CFR 54.5, the staff finds the applicant's responses acceptable.

By letter dated January 23, 2002, the staff requested, in RAI 2.3-7(7), specific information concerning the exclusion of pre-filter housings from the scope of license renewal and/or an AMR. In its response dated April 15, 2002, the applicant stated that the pre-filter housings are removable components within the air handling units. The applicant further explained that the filters are removable components within the air handling units (AHUs), and that the AHUs are listed in Table 3.3-46 of the LRA. The staff verified that the AHUs are listed in Table 3.3-46. Since the housings (AHUs) for these filters (which are removable) are in scope, and since the applicant performed an AMR on the AHUs, the staff finds the applicant's response acceptable.

Some components that are common to many systems, including the VO system, have been evaluated separately by the applicant in Section 2.1.2.1.2 of the LRA as "replace on condition" commodities. The staff's evaluation of applicant's treatment of these consumables is documented in Section 2.1.3.2.1 of this SER.

SER Section 2.4.3 documents the staff's evaluation of component supports for piping, cables, and equipment, that support the design and operation of the VO system. SER Section 2.5, "Scoping and Screening Results - Electrical and Instrumentation and Controls," documents the staff's evaluation of electrical and instrument components that support the VO system.

The staff reviewed the LRA, supporting information in the UFSARs, and the applicant's responses to RAIs. In addition, the staff sampled several components from the VO system flow diagram, as identified in Section 2.3.3.37 of the LRA, to determine whether the applicant properly identified the components within scope and subject to an AMR. No omissions were identified, except as identified in the RAIs.

#### 2.3.3.37.3 Conclusions

On the basis of its review, and with the open items identified in this SER section resolved, the staff has reasonable assurance that the applicant has adequately identified the VO system structures and components that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively.

#### 2.3.3.38 Waste Gas System

In LRA Section 2.3.3.38, "Waste Gas System," the applicant described the components of the waste gas system that are within the scope of license renewal and subject to an AMR. The system is described in Section 11.3 of the McGuire and Catawba UFSARs.

##### 2.3.3.38.1 Technical Information in the Application

The waste gas system removes fission product gases from radioactive fluids and contains these gases for a time sufficient to allow ample decay of the nuclides prior to release in accordance with applicable NRC regulations. The system is designed to control and minimize releases of radioactive effluent to the environment by reducing the fission product gas concentration in the reactor coolant which may escape during maintenance operations or from equipment leaks.

The applicant described the process for identifying the mechanical components that are within the scope of license renewal in LRA Section 2.1.1, "Scoping Methodology." As described in the scoping methodology, the applicant identified the portions of the waste gas system that are

within the scope of license renewal on the P&IDs that are listed in LRA Section 2.3.3.38. Consistent with the method described in LRA Section 2.1.2, "Screening Methodology," the applicant listed the waste gas system mechanical components that are subject to an AMR in LRA Table 3.3-47. This table also lists the component functions. Specifically, the applicant identified the following component types as subject to an AMR—valve bodies, pipe, flow meters, hydrogen recombiners, hydrogen recombiner heat exchangers (tubes and shell), hydrogen recombiner heaters, hydrogen recombiner phase separators, hydrogen recombiner safety disc, orifices, strainers (for Catawba only), tubing, waste gas compressor heat exchangers (tubes, tube sheet, shell, and channel head) - for Catawba only, and waste gas decay tanks. All these components have the intended component function of PB, which is defined by the applicant as maintaining pressure boundary integrity so that sufficient flow and/or sufficient pressure are delivered, effecting containment isolation, or preventing interaction with safety-related equipment. In addition to the PB function, hydrogen recombiner heat exchangers have HT (heat transfer) function, hydrogen recombiner phase separators have WR (water removal) function in maintaining moisture levels, and orifices have TH (throttling) function.

#### 2.3.3.38.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.38 to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the waste gas system that are within the scope of license renewal in accordance with 10 CFR 54.4(a) and that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information provided in LRA Section 2.3.3.38, the applicable P&IDs referenced therein, and the McGuire and Catawba UFSARs, to determine if the applicant adequately identified the portions of the waste gas system that are within the scope of license renewal. The staff verified that those portions of the waste gas system that meet the scoping requirements of 10 CFR 54.4(a) were included within the scope of license renewal and were identified as such by the applicant in Section 2.3.3.38 of the LRA.

In LRA Section 2.3.3.38, the applicant listed applicable P&IDs for the waste gas system. The detailed diagrams are highlighted to identify those portions of the system that are within the scope of license renewal. The staff compared the LRA diagrams to the system drawings and descriptions in the UFSARs to ensure that they were representative of the waste gas system. To verify that the applicant included the applicable portions of the waste gas system within the scope of license renewal, the staff focused its review on those portions of the waste gas system that were not identified as within the scope of license renewal and verified that they did not meet the scoping criteria of 10 CFR 54.4(a). In addition, the staff reviewed the UFSARs for each facility to identify any additional system functions that were not identified in the LRA, and verified that the additional functions did not meet the scoping requirements of 10 CFR 54.4(a).

During a September 12, 2001, conference call (summarized by memorandum dated October 10, 2001), the staff asked the applicant to clarify whether the hydrogen recombining function for the combustible gas control is one of the intended system functions for the waste gas system. The hydrogen recombiner is listed in LRA Table 3.3-47 for an AMR, but the recombining function is not discussed in the system description of LRA Section 2.3.3.38 for waste gas system. The applicant responded that the system description in the LRA discussed the general function of the waste gas system, and not all of the intended system functions that

met license renewal scoping criteria. The applicant indicated that the safety-related hydrogen recombiners are part of the containment air return exchange and hydrogen skimmer (VX) system at Catawba and McGuire, and that they can be located on piping and instrumentation drawings associated with the VX systems. The applicant further indicated that the WG hydrogen recombiners are within the scope of license renewal because they provide a pressure boundary function to retain radioactive gases. The applicant indicated that the safety-related hydrogen recombiners in the VX system are within the scope of license renewal, but the electrical portions are not subject to an AMR because they are heaters, which are classified as active components. The electrical components are located in enclosures that are considered component supports. The enclosures are seismically qualified and are included in LRA Table 3.5-3, page 3.5-19, Electrical & Instrument Panels & Enclosures. No aging effects or AMPs were identified for the VX hydrogen recombiner enclosures. The staff finds this clarification reasonable and provides its evaluation of the applicant's scoping and screening review for the VX system in Section 2.3.2.3.2 of this SER.

By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.38-2, the applicant to identify the intended system functions of the waste gas system that the applicant used for the scoping determination. In its response dated April 15, 2002, the applicant stated that the system intended functions were not used to determine whether the waste gas system is within the scope of license renewal. Instead, the applicant determined the portions of the waste gas system within the scope of license renewal according to the following scoping criteria—(1) portions of the systems that are safety-related (Duke Class A, B, or C), (2) portions of the systems that are designated as non-safety-related Class F piping, and (3) portions of the systems that are required to remain functional for fire protection. The staff finds the applicant's scoping criteria acceptable for the same reason provided in the staff's evaluation of radioactive waste management systems, which is documented in SER Section 2.3.3.24.2 pertaining to the liquid waste system.

LRA Table 3.3-47 identifies all the components subject to an AMR, but the following components are identified as for Catawba only—orifices for compressor seal and compressor make-up, waste gas compressor heat exchangers, valve bodies and strainers. Both Catawba and McGuire have the waste gas compressor. The staff reviewed Catawba drawing CN-1567-1.0 and found that the waste gas compressor and associated components (such as orifices, heat exchangers, piping, valves, and strainers) are designed to either Duke Class C or Class F components, therefore, those Catawba components are within the scope of license renewal. On the other hand, McGuire Drawing No. MCFD-1567-01.00 indicates that the waste gas compressor and associated components are designated as Duke Class E, therefore, those McGuire components are out of the scope according to LRA Section 2.1. The staff's evaluation of different Duke Classes is in SER Section 2.1. The staff noted that the differences in scoping the above components resulted from the differences in the current design basis, and both are acceptable according to 10 CFR 54.4(a).

On the basis of the above review, the staff did not identify any omissions by the applicant in the scoping of mechanical components according to 10 CFR 54.4(a).

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the waste gas system that were identified as within the scope of license renewal. The applicant used the screening methodology described in LRA Section 2.1.2 to identify the SCs subject to an AMR. The staff evaluation of the scoping and

screening methodology is documented in Section 2.1 of this SER. In the LRA, the applicant identified the portions of the waste gas system that are within the scope of license renewal in the P&IDs and listed the mechanical components that are subject to an AMR and their intended component functions in LRA Table 3.3-47. The staff performed its review by sampling the SCs that the applicant determined to be within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended function without moving parts or without a change in configuration or properties, and that is not subject to replacement based on qualified life or specified time period, was excluded from an AMR.

During the staff's review of Table 3.3-47, the staff noted that the waste gas separators were not listed. By letter dated January 28, 2002, the staff requested, in RAI 2.3.3.38-1, the applicant to explain why the waste gas separators, which appeared to be passive, long-lived components, were highlighted in Catawba drawing CN-1567-1.0, but not listed in LRA Table 3.3-47. In its response dated April 15, 2002, the applicant stated that the waste gas separators are within the scope of license renewal and subject to an AMR. The applicant provided the AMR results for the waste gas separators as a supplement to Table 3.3-47. Since the applicant provided the AMR results for the waste gas separators, the staff finds this response acceptable. The staff's evaluation of the AMR results is documented in Section 3.3.38.2 of this SER. The staff did not identify any other omissions by the applicant in screening the components that are subject to an AMR in accordance with the requirement of 10 CFR 54.21(a)(1).

#### **2.3.3.38.3 Conclusions**

On the basis of its review of the information contained in LRA Section 2.3.3.38, the supporting information in the P&IDs, and the McGuire and Catawba UFSARs, as described above, the staff did not identify any other omissions by the applicant. Therefore, the staff finds that there is reasonable assurance that the applicant adequately identified those portions of the waste gas system that are within the scope of license renewal and the associated SCs that are subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

### **2.3.4 System Scoping and Screening Results: Steam and Power Conversion Systems**

#### ***2.3.4.1 Auxiliary Feedwater System***

In LRA Section 2.3.4.1, "Auxiliary Feedwater System," the applicant described the components of the auxiliary feedwater system that are within the scope of license renewal and subject to an AMR. These systems are identical for purposes of license renewal for both facilities without any notable differences in system design. Sections 10.4.9 and 10.4.10 of the Catawba and McGuire UFSARs, respectively, "Auxiliary Feedwater System," provide additional information concerning their respective auxiliary feedwater systems.

##### **2.3.4.1.1 Technical Information in the Application**

For both Catawba and McGuire, the auxiliary feedwater system is a nuclear safety-related system which serves as a backup to the feedwater system to ensure the safety of the plant and protection of equipment. The auxiliary feedwater system is essential to prevent an unacceptable decrease in the SG water levels, to reverse the rise in reactor coolant temperature, to prevent the pressurizer from filling to a water solid condition, and to establish stable hot standby

conditions. The auxiliary feedwater system can be used during an emergency as well as during normal startup and shutdown operations. Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical components within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire auxiliary feedwater systems are listed in Table 3.4-1 of the LRA. In LRA Table 3.4-1, the applicant lists the following 10 component commodity groups as subject to an AMR—motor-driven auxiliary feedwater pump casings, orifices, pipe, tubing, turbine-driven auxiliary feedwater pump casings, turbine-driven auxiliary feedwater pump bearing oil cooler (tubes), turbine-driven auxiliary feedwater pump bearing oil cooler (tube sheet), turbine-driven auxiliary feedwater pump bearing oil cooler (channel heads), turbine-driven auxiliary feedwater pump bearing oil cooler (shell), and valve bodies. LRA Table 3.4-1 also lists eductors as a component commodity group that is subject to an AMR for the Catawba auxiliary feedwater system. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR. In addition, the orifices perform a throttling function and the turbine-driven auxiliary feedwater pump bearing oil cooler (tubes) perform a heat transfer function.

#### 2.3.4.1.2 Staff Evaluation

The staff reviewed Section 2.3.4.1 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the auxiliary feedwater system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.1 of the LRA and the Catawba and McGuire UFSARs to determine if the applicant adequately identified the SSCs of the auxiliary feedwater system that are in the scope of license renewal. The staff verified that those portions of the auxiliary feedwater system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.1 of the LRA. The staff then focused its review on those portions of the auxiliary feedwater system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the auxiliary feedwater system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the auxiliary feedwater system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the auxiliary feedwater systems in Table 3.4-1 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed its intended functions with moving

parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the auxiliary feedwater system that are within the scope of license renewal in the drawings referenced in the LRA. The license renewal drawings were highlighted by the applicant to identify those portions of the auxiliary feedwater systems that meet at least one of the scoping criteria of 10 CFR 54.4. The staff compared the LRA drawings to the system drawings and the descriptions in the Catawba and McGuire UFSARs to ensure they were representative of the auxiliary feedwater systems. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that no structure or component that performs its intended functions without moving parts or without a change in configuration or properties and that are not subject to replacement based on qualified life or specified time period, was excluded from an AMR. The staff did not identify any omissions.

#### 2.3.4.1.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.1 of the LRA, and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the Catawba and McGuire auxiliary feedwater systems that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.2 Auxiliary Steam System

In the Catawba and McGuire LRA's, Section 2.3.4.2, "Auxiliary Steam System," the applicant described the components of the auxiliary steam system that are within the scope of license renewal and subject to an AMR. These systems are identical for purposes of license renewal for both facilities without any notable differences in system design.

##### 2.3.4.2.1 Technical Information in the Application

The auxiliary steam system provides steam to various plant equipment, as required during all modes of plant operation, including condensate cleanup, startup, normal operation, and shutdown. The auxiliary steam system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). All components within the seismically designed piping boundaries of this system are within the scope of license renewal per 10 CFR 54.4(a)(2). Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire auxiliary steam systems, are listed in LRA Table 3.4-2. In LRA Table 3.4-2, the applicant lists the following three component commodity groups as subject to an AMR—pipe, tubing, and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

#### 2.3.4.2.2 Staff Evaluation

The staff reviewed Section 2.3.4.2 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the auxiliary steam system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.2 of the LRA to determine if the applicant adequately identified the SSCs of the auxiliary steam system that are in the scope of license renewal. The staff verified that those portions of the auxiliary steam system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.2 of the LRA. The staff then focused its review on those portions of the auxiliary steam system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the auxiliary steam system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the auxiliary steam system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the auxiliary steam systems in Table 3.4-2 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the auxiliary steam system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.2.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.2 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the Catawba and McGuire auxiliary steam systems that are within the scope of license renewal, and subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### **2.3.4.3 Condensate System**

In LRA Section 2.3.4.3, "Condensate System," the applicant described the components of the condensate system that are within the scope of license renewal and subject to an AMR. The Catawba UFSAR Section 10.4.7, Condensate and Feedwater System, provides additional information concerning the Catawba condensate system. McGuire has no Class F components in the Condensate System, therefore, no portion of the McGuire Condensate System is within the scope of license renewal. As a result, the following staff evaluation applies to Catawba only.

#### **2.3.4.3.1 Technical Information in the Application**

The condensate system provides water to various plant equipment, as required, during all modes of plant operation, including condensate cleanup, startup, normal operation, and shutdown. The condensate system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). All components within the seismically designed piping boundaries of this system are within the scope of license renewal per 10 CFR 54.4(a)(2). Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba condensate system are listed in Table 3.4-3. In LRA Table 3.4-3, the applicant lists the following two component commodity groups as subject to an AMR—pipe and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

#### **2.3.4.3.2 Staff Evaluation**

The staff reviewed Section 2.3.4.3 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the condensate system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.3 of the LRA and the Catawba UFSAR to determine if the applicant adequately identified the SSCs of the condensate system that are in the scope of license renewal. The staff verified that those portions of the condensate system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.3 of the LRA. The staff then focused its review on those portions of the condensate system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the condensate system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the condensate system that are identified as within the

scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the condensate systems in Table 3.4-3 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the condensate system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSAR to ensure they were representative of the condensate system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.3.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.3 of the LRA, and the supporting information in the Catawba UFSAR, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the condensate system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.4 Condensate Storage System

In LRA Section 2.3.4.4, "Condensate Storage System," the applicant described the components of the condensate storage system that are within the scope of license renewal and subject to an AMR. McGuire has no Class F components in the condensate storage system, therefore, no portion of the McGuire condensate storage system is within the scope of license renewal. As a result, the following staff evaluation only applies to Catawba.

##### 2.3.4.4.1 Technical Information in the Application

The condensate storage system provides a source of water for various plant equipment as required during all modes of plant operation, including condensate cleanup, startup, normal operation, and shutdown. The condensate storage system is a non-safety system whose postulated failure could prevent satisfactory accomplishment of certain safety-related functions. To preclude these postulated failures, portions of this system are seismically designed (i.e., Duke Class F). All components within the seismically designed piping boundaries of this system are within the scope of license renewal per 10 CFR 54.4(a)(2). Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba condensate

storage system are listed in LRA Table 3.4-4. In LRA Table 3.4-4, the applicant lists the following two component commodity groups as subject to an AMR—pipe and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

#### 2.3.4.4.2 Staff Evaluation

The staff reviewed Section 2.3.4.4 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the condensate storage system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.4 of the LRA to determine if the applicant adequately identified the SSCs of the condensate storage system that are in the scope of license renewal. The staff verified that those portions of the condensate storage system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.4 of the LRA. The staff then focused its review on those portions of the condensate storage system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the condensate storage system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the condensate storage system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the condensate storage systems in Table 3.4-4 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the condensate storage system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.4.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.4 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is

reasonable assurance that the applicant adequately identified those portions of the condensate storage system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### **2.3.4.5 Feedwater System**

In LRA Section 2.3.4.5, "Feedwater System," the applicant described the components of the feedwater system that are within the scope of license renewal and subject to an AMR. Section 10.4.7, "Condensate and Feedwater System," of the Catawba and McGuire UFSARs, provides additional information concerning their respective feedwater systems. These systems are identical for purposes of license renewal for both facilities without any notable differences in system design.

##### **2.3.4.5.1 Technical Information in the Application**

The feedwater system takes treated condensate system water, heats it further to improve the plant's thermal cycle efficiency, and delivers it at the required flow rate, pressure and temperature to the SGs. The feedwater system is designed to maintain proper vessel water levels with respect to reactor power output and turbine steam requirements. Using the methodology described in Section 2.1.2, "Screening Methodology," of the Catawba and McGuire LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire feedwater systems, are listed in LRA Table 3.4-5. In LRA Table 3.4-5, the applicant lists the following five component commodity groups as subject to an AMR—orifices, pipe, reservoirs, tubing, and valve bodies. Table 3.4-5 also lists cavitating venturies as a component commodity group that is subject to an AMR for the Catawba feedwater system. Table 3.4-5 lists flow nozzles as a component commodity group that is subject to an AMR for the McGuire feedwater system. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

##### **2.3.4.5.2 Staff Evaluation**

The staff reviewed Section 2.3.4.5 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the feedwater system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.5 of the LRA and the Catawba and McGuire UFSARs, to determine if the applicant adequately identified the SSCs of the feedwater systems that are in the scope of license renewal. The staff verified that those portions of the feedwater system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.5 of the LRA. The staff then focused its review on those portions of the feedwater system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the

applicant adequately identified all portions of the feedwater system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the feedwater system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the feedwater systems in Table 3.4-5 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the feedwater system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSAR to ensure they were representative of the feedwater system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any of the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.5.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.5 of the LRA, and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the feedwater system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.6 Feedwater Pump Turbine Exhaust System

In Section 2.3.4.6, "Feedwater Pump Turbine Exhaust System," of the LRA, the applicant described the components of the feedwater pump turbine exhaust system that are within the scope of license renewal and subject to an AMR. Catawba UFSAR Section 10.3, Main Steam System, provides additional information concerning the design and operation of the Catawba feedwater pump turbine exhaust system. The McGuire feedwater pump turbine exhaust system is not described in the McGuire UFSAR.

##### 2.3.4.6.1 Technical Information in the Application

The feedwater pump turbine exhaust system is essentially the same, and performs the same function, at Catawba and McGuire. The system provides a flow path for the exhaust steam from the turbine-driven auxiliary feedwater pump turbine. The steam to the turbine-driven auxiliary feedwater pump turbine is provided by the main steam system. Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of

mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire feedwater pump turbine exhaust systems are listed in LRA Table 3.4-6. In LRA Table 3.4-6, the applicant lists the following two component commodity groups as subject to an AMR—pipe and tubing. LRA Table 3.4-6 also lists expansion joint, expansion joint (bellows), orifices, and valve bodies as component commodity groups for Catawba that are subject to an AMR. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR. The orifices also provide a throttling function.

#### 2.3.4.6.2 Staff Evaluation

The staff reviewed Section 2.3.4.6 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the feedwater pump turbine exhaust system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.6 of the LRA, and the Catawba UFSAR, to determine if the applicant adequately identified the SSCs of the feedwater pump turbine exhaust system that are in the scope of license renewal. The staff verified that those portions of the feedwater pump turbine exhaust system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.6 of the LRA. The staff then focused its review on those portions of the feedwater pump turbine exhaust system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the Catawba UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the feedwater pump turbine exhaust system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the feedwater pump turbine exhaust system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the feedwater pump turbine exhaust systems in Table 3.4-6 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the feedwater pump turbine exhaust system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the Catawba and McGuire LRA flow diagrams to the system drawings and, for Catawba, the descriptions in the

Catawba UFSAR to ensure they were representative of the feedwater pump turbine exhaust system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any of the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.6.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.6 of the LRA, and the supporting information in the Catawba UFSAR, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the Catawba and McGuire feedwater pump turbine exhaust systems that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### *2.3.4.7 Feedwater Pump Turbine Hydraulic Oil System*

In Section 2.3.4.7, "Feedwater Pump Turbine Hydraulic Oil System," of the LRA, the applicant described the components of the feedwater pump turbine hydraulic oil systems that are within the scope of license renewal and subject to an AMR.

##### 2.3.4.7.1 Technical Information in the Application

The feedwater pump turbine hydraulic oil system is essentially the same, and performs the same function, at Catawba and McGuire. The system provides emergency trip to the feedwater pump turbine steam valves and overspeed exercisers for ATWS mitigation. The turbine trip signal causes pressure to be bled off the hydraulic system causing the stop and governor valves to close. The components required to meet these functions are either active components or are passive components whose failure will not prevent the desired action from occurring. Failure of the pressure boundary of the valve bodies or piping will create a loss of hydraulic pressure causing the stop and governor valves to close, which is the safety function. Therefore, the components are in scope, but no AMR is required.

##### 2.3.4.7.2 Staff Evaluation

The staff reviewed Section 2.3.4.7 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the feedwater pump turbine hydraulic oil system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.7 of the LRA to determine if the applicant adequately identified the SSCs of the feedwater pump turbine hydraulic oil system that are in the scope of license renewal. The staff verified that those portions of the feedwater pump turbine hydraulic oil system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.7 of the LRA. The staff then focused its review on those portions of the feedwater pump turbine hydraulic oil system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the

applicant adequately identified all portions of the feedwater pump turbine hydraulic oil system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the feedwater pump hydraulic oil system that are identified as within the scope of license renewal. The applicant identified that no AMR is required using the screening methodology described in Section 2.1 of the LRA. This is due to the components required to meet the ATWS mitigation functions are either active components or are passive components whose failure will not prevent the desired action from occurring. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the feedwater pump turbine hydraulic oil system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.7.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.7 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the Catawba and McGuire feedwater pump turbine hydraulic oil systems that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.8 Main Steam System

In Section 2.3.4.8, "Main Steam System," of the LRA, the applicant described the components of the main steam system that are within the scope of license renewal and subject to an AMR. In both the Catawba and McGuire UFSARs, Section 10.3, Main Steam Supply System, provides additional information concerning the main steam system.

##### 2.3.4.8.1 Technical Information in the Application

The main steam system is essentially the same and performs the same function at Catawba and McGuire. The main steam system dissipates heat from the reactor coolant system, provides main steam overpressure protection, minimizes positive reactivity effects associated with a main steam line rupture, minimizes the containment temperature increase associated with a main steam line rupture within containment, and provides steam to the turbine driven auxiliary feedwater pump, as needed. Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their

intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the main steam system are listed in Table 3.4-7. In the LRA, Table 3.4-7, the applicant lists the following four component commodity groups as subject to an AMR—orifices, pipe, tubing, and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR. The orifices also perform a throttling function.

#### 2.3.4.8.2 Staff Evaluation

The staff reviewed Section 2.3.4.8 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the main steam system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.8 of the LRA, and the Catawba and McGuire UFSARs, to determine if the applicant adequately identified the SSCs of the main steam system that are in the scope of license renewal. The staff verified that those portions of the main steam system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.8 of the LRA. The staff then focused its review on those portions of the main steam system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the main steam system that should be included within the scope of license renewal in accordance with 10 CFR Part 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the main steam system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the main steam systems in Table 3.4-7 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the main steam system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the system drawings and the descriptions in the UFSAR to ensure they were representative of the main steam system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

### 2.3.4.8.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.8 of the LRA and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the main steam system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

### 2.3.4.9 Main Steam Supply to Auxiliary Equipment

In LRA Section 2.3.4.9, “Main Steam Supply to Auxiliary Equipment System,” the applicant described the components of the main steam supply to auxiliary equipment system that are within the scope of license renewal and subject to an AMR. Section 10.3, Main Steam Supply System, of the Catawba and McGuire UFSARs, provides additional information concerning the main steam supply to auxiliary equipment system.

#### 2.3.4.9.1 Technical Information in the Application

The main steam supply to auxiliary equipment system is essentially the same, and performs the same function, at Catawba and McGuire. The system transfers steam to the turbine driven auxiliary feedwater pump turbine, so that the design bases of the Auxiliary Feedwater System can be met. Using the methodology described in Section 2.1.2, “Screening Methodology,” of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire main steam auxiliary equipment systems are listed in LRA Table 3.4-8. In the LRA, Table 3.4-8, the applicant lists the following five component commodity groups as subject to an AMR—auxiliary feedwater pump turbine casing, orifices, pipe, tubing, and valve bodies. Table 3.4-8 also lists strainers as a component type that is subject to an AMR only for McGuire. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR. In addition, the orifices perform a throttling function and the strainers perform a filtration function.

#### 2.3.4.9.2 Staff Evaluation

The staff reviewed Section 2.3.4.9 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the main steam supply to auxiliary equipment system structures and components (SSCs) that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.9 of the LRA, and the Catawba and McGuire UFSARs, to determine if the applicant adequately identified the SSCs of the main steam supply to auxiliary equipment system that are in the scope of license renewal. The staff verified that those portions of the main steam supply to auxiliary equipment system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.9 of the LRA. The staff then focused its review on those portions of the main steam supply to auxiliary

equipment system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional main steam supply to auxiliary equipment functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the main steam auxiliary equipment system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the main steam auxiliary equipment system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the main steam supply to auxiliary equipment systems in Table 3.4-8 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the main steam supply to auxiliary equipment system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the main steam supply to auxiliary equipment that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the main steam supply to auxiliary equipment drawings, and the descriptions in the UFSAR, to ensure they were representative of the main steam auxiliary equipment system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.9.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.9 of the LRA, and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the main steam supply to auxiliary equipment system that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.10 Main Steam Vent to Atmosphere System

In Section 2.3.4.10, "Main Steam Vent to Atmosphere System," of the LRA, the applicant described the components of the main steam vent to atmosphere system that are within the scope of license renewal and subject to an AMR. Section 10.3, Main Steam Supply System, of the Catawba and McGuire UFSARs, provides additional information concerning the main steam vent to atmosphere system.

#### 2.3.4.10.1 Technical Information in the Application

The main steam vent to atmosphere system is essentially the same, and performs the same function, at Catawba and McGuire. The system dissipates heat from the reactor coolant system, provides main steam overpressure protection, minimizes positive reactivity effects associated with a main steam line rupture, and minimizes the containment temperature increase associated with a main steam line rupture within containment. Using the methodology described in Section 2.1.2, "Screening Methodology," of the LRA, the applicant compiled a list of mechanical component commodity groupings within the license renewal boundaries that are subject to an AMR and identified their intended functions. The mechanical components subject to an AMR, their intended functions, and materials of construction for the Catawba and McGuire main steam vent to atmosphere systems are listed in LRA Table 3.4-9. In LRA Table 3.4-9, the applicant lists the following three component commodity groups as subject to an AMR—pipe, tubing, and valve bodies. The applicant states that maintaining pressure boundary integrity is the intended function of the SCs subject to an AMR.

#### 2.3.4.10.2 Staff Evaluation

The staff reviewed Section 2.3.4.10 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the main steam vent to atmosphere system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.10 of the LRA, and the Catawba and McGuire UFSARs, to determine if the applicant adequately identified the SSCs of the main steam vent to atmosphere system that are in the scope of license renewal. The staff verified that those portions of the main steam vent to atmosphere system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.10 of the LRA. The staff then focused its review on those portions of the main steam vent to atmosphere system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the main steam vent to atmosphere system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the main steam vent to atmosphere system that are identified as within the scope of license renewal. The applicant identifies and lists the SCs subject to an AMR for the main steam vent to atmosphere systems in Table 3.4-9 of the LRA using the screening methodology described in Section 2.1 of the LRA. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the main steam vent to atmosphere system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that is within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff compared the LRA flow diagrams to the main steam vent to atmosphere system equipment drawings and the descriptions in the UFSAR to ensure they were representative of the main steam vent to atmosphere system. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any of the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.10.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.10 of the LRA, and the supporting information in the Catawba and McGuire UFSARs, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the main steam vent to atmosphere system that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### *2.3.4.11 Main Turbine Hydraulic Oil System*

In Section 2.3.4.11, "Main Turbine Hydraulic Oil System," of the LRA, the applicant described the components of the main turbine hydraulic oil system that are within the scope of license renewal and subject to an AMR. The Catawba and the McGuire main turbine hydraulic oil systems are not described in their respective UFSARs.

##### 2.3.4.11.1 Technical Information in the Application

The main turbine hydraulic oil system is essentially the same, and performs the same function, at Catawba and McGuire. The system provides a means to trip the main turbine to mitigate the plant response to an ATWS event. The components in the main turbine hydraulic oil system are required to maintain pressure boundary integrity for normal system operation. However, an operational loss of pressure in the hydraulic oil system, or a failure of the pressure boundary of within scope components, will produce a turbine trip signal. Because a turbine trip signal is the system intended function, there are no component intended functions applicable to the components highlighted on the mechanical system flow diagrams. Therefore, no AMR is required.

##### 2.3.4.11.2 Staff Evaluation

The staff reviewed Section 2.3.4.11 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the main turbine hydraulic oil system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.11 of the LRA to determine if the applicant adequately identified the SSCs of the main turbine hydraulic oil system that are in the scope of license renewal. The staff verified that those portions of the main turbine hydraulic oil system that meet the scoping requirements of 10 CFR 54.4 are included

within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.11 of the LRA. The staff then focused its review on those portions of the main turbine hydraulic oil system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the main turbine hydraulic oil system that should be included within the scope of license renewal in accordance with 10 CFR Part 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the main turbine pump hydraulic oil system that are identified as within the scope of license renewal. The applicant identified that no AMR is required using the screening methodology described in Section 2.1 of the LRA. This is a result of system design where an operational loss of pressure in the hydraulic oil system or a failure of the pressure boundary of within scope components will produce a turbine trip signal which is the intended function of the system. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed their intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the main turbine hydraulic oil system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.11.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.11 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the main turbine hydraulic oil system that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.3.4.12 *Main Turbine Lube Oil and Purification System*

In Section 2.3.4.12, "Main Turbine Lube Oil and Purification System," of the LRA, the applicant described the components of the main turbine lube oil and purification system that are within the scope of license renewal and subject to an AMR. The Catawba and the McGuire main turbine lube oil and purification systems are not described in their respective UFSARs.

#### 2.3.4.12.1 Technical Information in the Application

The main turbine lube oil and purification system is essentially the same, and performs the same function, at Catawba and McGuire. The system provides a means to trip the main turbine to mitigate the plant response to an ATWS event. The components in the main turbine lube oil and purification system are required to maintain pressure boundary integrity for normal system operation. However, an operational loss of pressure in the hydraulic oil system, or a failure of the pressure boundary within scope components, will produce a turbine trip signal. Because a turbine trip signal is the system intended function, there are no component intended functions applicable to the components highlighted on the mechanical system flow diagrams. Therefore, no AMR is required.

#### 2.3.4.12.2 Staff Evaluation

The staff reviewed Section 2.3.4.12 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the main turbine lube oil and purification system SCs that are within the scope of license renewal in accordance with 10 CFR 54.4 and subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the text and diagrams submitted by the applicant in Section 2.3.4.12 of the LRA to determine if the applicant adequately identified the SSCs of the main turbine lube oil and purification system that are in the scope of license renewal. The staff verified that those portions of the main turbine lube oil and purification system that meet the scoping requirements of 10 CFR 54.4 are included within the scope of license renewal, and are identified as such by the applicant in Section 2.3.4.12 of the LRA. The staff then focused its review on those portions of the main turbine lube oil and purification system that were not identified as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed the UFSAR to determine if there were any additional system functions that were not identified in the LRA, and verified that those additional functions did not meet the scoping requirements of 10 CFR 54.4. The staff found no omissions by the applicant, therefore, there is reasonable assurance that the applicant adequately identified all portions of the main turbine lube oil and purification system that should be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the SCs that are subject to an AMR from among those portions of the main turbine lube oil and purification system that are identified as within the scope of license renewal. The applicant identified that no AMR is required using the screening methodology described in Section 2.1 of the LRA. This is a result of system design where an operational loss of pressure in the hydraulic oil system, or a failure of the pressure boundary of within scope components, will produce a turbine trip signal which is the intended function of the system. The staff evaluated the scoping and screening methodology and documented its findings in Section 2.1 of this SER. The staff performed its review by sampling the SCs that the applicant determines as within the scope of license renewal, but not subject to an AMR, to verify that these SCs performed its intended functions with moving parts or with a change in configuration or properties, or were subject to replacement based on qualified life or specified time period.

The applicant identified the portions of the main turbine lube oil and purification system that are within the scope of license renewal in the drawings referenced in the LRA. The detailed flow

diagrams were highlighted to identify those portions of the system that are within the scope of license renewal. The applicant highlighted those components which they believe perform at least one of the scoping requirements of 10 CFR 54.4. The staff sampled portions of the flow diagram that were not highlighted to verify that these components did not meet any the scoping criteria in 10 CFR 54.4. The staff did not identify any omissions.

#### 2.3.4.12.3 Conclusions

On the basis of its review of the information contained in Section 2.3.4.12 of the LRA, as described above, no omissions by the applicant were identified. The staff concludes that there is reasonable assurance that the applicant adequately identified those portions of the main turbine lube oil and purification system that are within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

## **2.4 Scoping and Screening Results: Structures**

### **2.4.1 Reactor Buildings**

The reactor buildings include the concrete shield building, steel containment, and reactor building internal structures. The descriptions provided in the LRA are generically applicable to both McGuire and Catawba, except where differences are stated.

#### *2.4.1.1 Concrete Shield Building*

In the LRA, the applicant described the components of the concrete shield building for Catawba and McGuire that are within the scope of license renewal and subject to an AMR. The concrete shield building is further described in Section 3.8.1 of both the Catawba and McGuire UFSARs. The staff reviewed sections of the LRA and UFSARs pertaining to the concrete shield building to determine whether there is reasonable assurance that the applicant has identified and listed the structures and components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

##### 2.4.1.1.1 Technical Information in the Application

The applicant described its methodology for identifying structures and components that are within the scope of license renewal in Section 2.0 of the LRA and the applicant states that the methodology is generically applicable to both McGuire and Catawba. LRA Section 2.1.1.1.2, "Safety-Related Structures," specifically describes the applicant's methods for identifying structures within the scope of license renewal that satisfy criteria in 10 CFR 54.4(a)(1). The applicant listed the structures within the scope of license renewal for McGuire in LRA Table 2.2-1, and for Catawba in LRA Table 2.2-2. Structures identified as not within the scope of license renewal are listed in Tables 2.2-3 and Table 2.2-4 of the LRA, for McGuire and Catawba, respectively. Based on the scoping methodology, the applicant, in Table 3.5-1 of the LRA, includes the reactor buildings within the scope of license renewal and describes the results of its scoping methodology in Section 2.4.1 in the LRA.

The concrete shield building ("shield building") at McGuire and Catawba is a reinforced concrete structure composed of a right cylinder with a shallow dome and flat circular foundation. The

shield building is part of the containment system that ensures that an acceptable upper limit of leakage of radioactive material is not exceeded under design basis events. In addition, it is designed to provide biological shielding as well as missile protection for the steel containment vessel. The annulus space between the shield building and the steel containment vessel provides control of containment external temperatures and pressures.

The applicant identified shield building structural components that require AMRs in Table 3.5-1 in the LRA. This table lists the types of structural components with their passive function(s) identified, including the AMR results with a link to the aging management programs and activities, if applicable. The applicant identified the following structural components for the shield building that are subject to an AMR—dome, foundation dowels (McGuire only), foundation mat, and shell wall.

In Table 3.5-1, the applicant lists the structural components of the McGuire and Catawba shield building that are within the scope of license renewal because they fulfill one or more of the following intended functions— (1) provides structural and/or functional support to safety-related equipment, (2) provides shelter/protection to safety-related equipment, (3) provides rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant, (4) serves as missile (internal or external) barrier, (5) provides structural and/or functional support to non-safety related equipment where failure of this component could directly prevent satisfactory accomplishment of any of the required safety-related functions, and (6) provides structural support and/or shelter to components relied on during certain postulated fire, anticipated transients without scram, and/or station blackout events.

As stated by the applicant, structural components of the shield building are subject to an AMR because they support equipment meeting the scoping criteria from the license renewal rule, 10 CFR Part 54.4(a)(1), (a)(2), and (a)(3), in a passive manner. As a result, they perform their intended function(s) without moving parts or without change in configuration or properties, and are not subject to periodic replacement based on a qualified life or specified time limit.

#### 2.4.1.1.2 Staff Evaluation

The NRC staff reviewed Section 2.4.1.1 of the LRA, and the supporting information in Section 3.8.1 of the McGuire and Catawba UFSARs, to determine whether there is reasonable assurance that the structural components of the shield building were adequately identified within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), respectively.

The staff reviewed the structural components in LRA Table 3.5-1 for McGuire and Catawba to determine whether any other structures associated with the shield building meet the scoping criteria of 10 CFR 54.4(a), but were not included within the scope of license renewal. The staff then reviewed portions of the UFSAR descriptions to ensure that all structural components of the shield buildings had been adequately identified and that they were passive, long-lived and performed their intended functions without moving parts or with a change in configuration or change in properties and were subject to replacement based on qualified life or specified time period. The staff reviewed figures 3-11, 3-12, and 3-13 of Section 3.8.1 of the Catawba UFSAR, which depicts hot, cold, and feedwater penetrations. These penetrations were not identified in Table 3.5-1 of the LRA as within the scope of license renewal.

By letter dated January 28, 2002, the staff requested, in RAIs 2.4.1-1 and 2.4.1-4, additional information relating to the shield building penetrations for Catawba and McGuire. In its response dated March 11, 2002, the applicant provided a supplement to LRA Table 3.5-1 to add penetrations to the scope of license renewal for the shield building. The penetrations that are being added under the shield building in LRA Table 3.5-1 include subcomponents such as anchor rings, penetrations sleeves, pipe, caps, and restraint rings. These penetrations perform the following intended functions—

- to provide pressure boundary and/or fission product barrier
- to provide structural and/or functional support to safety-related equipment
- to provide structural and/or functional support to non-safety related equipment where failure of this component could directly prevent satisfactory accomplishment of any of the safety-related functions

The staff finds the addition of the shield building penetrations to be acceptable because these components are passive, long-lived, and perform their intended functions without moving parts or without a change in configuration or change in properties and are not subject to replacement based on qualified life or specified time period. The staff's evaluation of the AMR results is documented in Section 3.5.1.2.1 of this SER.

During its review of the UFSAR the staff noted that the shield building included a 3-foot thick removable concrete cover mounted on a track that covers the equipment hatch during operations. By letter dated January 28, 2002, the staff requested, in RAI 2.4.1-3, the applicant to explain why the concrete covers were not included within the scope of license renewal and subject to an AMR. In its response dated March 11, 2002, the applicant stated that the concrete cover described in the UFSAR is equipment hatch missile shield, and that it is within the scope of license renewal and subject to an AMR. The applicant stated that the tracks and other supporting structures also were within scope and subjected to an AMR. The missile shield is listed in LRA Table 3.5-1 under the Reactor Building Interior Structural Components; the tracks and other supporting structures are included with structural steel beams, plates, etc., in LRA Table 3.5-1 under the Reactor Building Interior Structural Components. The staff noted that, since LRA Section 2.4.1.1, Concrete Shield Building, did not provide a reference to LRA Section 2.4.1.3, Reactor Building Interior Structural Components, it was not clear that these exterior components were covered within the LRA. However, the staff reviewed this portion of LRA Table 3.5-1 and verified that the components of concern were included within the scope as indicated within the applicant's RAI response. Since the applicant indicated that the structures of concern were within scope and listed in the AMR results tables, the staff finds the applicant's clarification concerning the concrete cover, rails, and associated supports to be acceptable.

The NRC staff reviewed the LRA, supporting information in the UFSARs, and the applicant's response to the staff's RAI. In addition, the staff sampled several structures from LRA Tables 2.2-3 and 2.2-4, and several components from LRA Table 3.5-1, to determine whether the applicant properly identified the structures and components that are within the scope of license renewal and subject to an AMR. No omissions were identified.

### 2.4.1.1.3 Conclusions

On the basis of this review, the staff finds that there is reasonable assurance that the applicant has adequately identified SCs of the concrete shield building that are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

### 2.4.1.2 Steel Containment

In LRA Section 2.4.1.2, "Steel Containment," the applicant described the structures and components of the steel containment that serve as the primary containment and surround the reactor coolant system. The steel containment is further described in Section 3.8.2, "Steel Containment," within both the Catawba and McGuire UFSARs. The staff reviewed sections of the LRA and UFSARs pertaining to the steel containment to determine whether there is reasonable assurance that the applicant has identified and listed the structures and components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

#### 2.4.1.2.1 Technical Information in the Application

The applicant described its methodology for identifying structures and components that are within the scope of license renewal in Section 2.0 of the LRA and the applicant states that the methodology is generically applicable to both McGuire and Catawba. Section 2.1.1.1.2, "Safety Related Structures," specifically describes the applicant's methods for identifying structures within the scope of license renewal that satisfy criteria in 10 CFR 54.4(a)(1). The applicant lists the structures within the scope of license renewal for McGuire in LRA Table 2.2-1 and for Catawba in LRA Table 2.2-2. Structures identified as not within the scope of license renewal are listed in LRA Tables 2.2-3 and 2.2-4, for McGuire and Catawba, respectively. Based on the scoping methodology, the applicant, in Table 3.5-1 of the LRA, identifies the steel containment as within the scope of license renewal and lists the results of its scoping methodology in Table 3.5-1 of the LRA.

The steel containment at Catawba and McGuire is a freestanding welded seismic Category I structure with a vertical cylinder, hemispherical dome, and flat base. The primary containment is anchored to the shield building foundation by means of anchor bolts around the circumference of the cylinder base. The base of the steel containment is a liner plate encased in and anchored to the shield building foundation. The base liner plate functions as a leak-tight membrane and does not provide structural support to the steel containment. The applicant lists the structures and components of the steel containment in LRA Table 3.5-1 that are within the scope of license renewal because they provide pressure boundary and/or fission product barrier.

In Table 3.5-1 of the LRA, the applicant identifies the component types for the steel containment that require an AMR. This table lists the structural components with their passive function identified and its AMR results. The applicant has identified the following structural components for the steel containment that are subject to an AMR—bellows (penetrations), electrical penetrations, equipment hatch, fuel transfer tube penetration, mechanical penetrations, personnel air locks, and the steel containment vessel.

On the basis of the above-described methodology, the applicant identified the structures and components that are part of the steel containment and identified the intended functions of the SCs that are subject to an AMR in Table 3.5-1 of the LRA. As stated by the applicant, SCs of

the steel containment are subject to an AMR because the steel containment is a Seismic Category I structure. All Category I structures are within the scope of license renewal because they ensure the health and safety of the public and support or protect safety-related equipment in a passive manner. As a result, they perform their intended function without moving parts or without change in configuration or properties, and are not subject to periodic replacement based on a qualified life or specified time limit.

#### 2.4.1.2.2 Staff Evaluation

The NRC staff reviewed Section 2.4.1.2 of the LRA, and the supporting documentation in Section 3.8.2 of the McGuire and Catawba UFSARs, to determine whether there is reasonable assurance that the SCs of the steel containment were adequately identified within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21(a)(1), respectively.

The staff reviewed the structural components in LRA Table 3.5-1 for McGuire and Catawba to determine whether any other structures associated with the steel containment meet the scoping criteria of 10 CFR 54.4(a), but were not included within the scope of license renewal. The staff then reviewed portions of the UFSAR descriptions to ensure that all SCs of the steel containment had been adequately identified, and that they were passive, long-lived, and performed their intended functions without moving parts or with a change in configuration or change in properties, and were not subject to replacement based on qualified life or specified time period. The staff reviewed Section 3.8.2.1 of the McGuire and Catawba UFSARs, which lists the containment penetrations. The staff found that SCs, such as seals on personnel locks, penetration sleeves, the purge penetration, double compressible seals, and bolted flanges, were not included in Section 2.4.1.2 nor Table 3.5-1 of the LRA as within the scope of license renewal. By letter dated January 28, 2002, the staff requested, in RAI2.4.1-5, additional information relating to the above-mentioned steel containment SCs for Catawba and McGuire. In its response dated March 11, 2002, the applicant indicated that the SCs in question were subcomponents of other structures and components, or included within the component type listed in LRA Table 3.5-1. The SCs were part of items, such as personnel air locks, steel containment penetrations, equipment hatch, fuel transfer penetration, and the purge penetration, and were included within the component type of mechanical penetrations listed in LRA Table 3.5-1. The applicant indicated that these SCs, being subcomponents of SCs within the scope of license renewal, and their aging effects were managed in accordance with the Containment Leak Rate Testing Program identified in Appendix B of the LRA. The staff finds the applicant's response to be acceptable, since the subcomponents are within the scope and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

The NRC reviewed the LRA, supporting information in the UFSARs, and the applicant's response to the staff's RAI. The staff examined the structures and components in Table 3.5-1 of the LRA to determine whether they are the only SCs that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). On the basis of the above review, the staff did not find omissions by the applicant.

#### 2.4.1.2.3 Conclusion

On the basis of its review of the information submitted by the applicant in the LRA, and supporting information in the Catawba and McGuire UFSAR as described above, the staff did not

identify any omissions by the applicant. Therefore, the staff finds that there is reasonable assurance that the applicant has adequately identified the SCs of the steel containment that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### *2.4.1.3 Reactor Building Internal Structures*

In LRA Section 2.4.1.3, "Reactor Building Internal Structures," the applicant described the structures and components within the steel containment that surround the reactor coolant system. The internal structures are further described in Sections 3.8.3, "Concrete and Structural Steel Internal Structures of the Steel Containment," and 6.2.2, "Ice Condenser System," within the McGuire UFSAR, and Sections 3.8.3 and 6.7, "Ice Condenser System," of the Catawba UFSAR. The staff reviewed sections of the LRA and UFSARs pertaining to these internal structures to determine whether there is reasonable assurance that the applicant has identified and listed the structures and components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

##### **2.4.1.3.1 Technical Information in the Application**

The applicant described its methodology for identifying the reactor building internal structures that are within the scope of license renewal in Section 2.0 of the LRA and the applicant states that the methodology is generically applicable to both McGuire and Catawba. Section 2.1.1.1.2, "Safety-Related Structures," further describes the applicant's methods for identifying structures within the scope of license renewal that satisfy criteria in 10 CFR 54.4(a)(1). The applicant lists the structures within the scope of license renewal for McGuire in LRA Table 2.2-1, and for Catawba in LRA Table 2.2-2. Structures identified as not within the scope of license renewal are listed in LRA Tables 2.2-3 and 2.2-4, for McGuire and Catawba, respectively. Based on the scoping methodology, the applicant, in Table 3.5-1 of the LRA, identifies the reactor building internal structures that are within the scope of license renewal and lists the results of its scoping methodology in the table.

The internal structures are comprised of a variety of reinforced concrete and structural steel structures. The internal structures enclose the reactor coolant system and provide biological shielding and acts as the pressure boundary for the lower, intermediate, and upper volumes of the steel containment interior. These structures also provide support for all major equipment, components, and systems located within the steel containment. The internal structures are supported by the shield building foundation. The applicant lists the internal structures within LRA Table 3.5-1 under ice condenser components and reactor building interior structural components that are within the scope of license renewal because they fulfill one or more of the following intended functions—

- to provide pressure boundary and/or fission product barrier
- to provide structural and/or functional support to safety-related equipment
- to provide shelter/protection to safety-related equipment
- to provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
- to serve as missile (internal or external) barrier

- to provide structural and/or functional support to non-safety related equipment where failure of this component could directly prevent satisfactory accomplishment of any of the safety-related functions
- to provide a protective barrier for internal/external flood event
- to provide heat sink during SBO or design basis accidents
- to provide structural support and/or shelter to components relied on during certain postulated fire, anticipated transients without scram, and/or station blackout events

In the LRA, Table 3.5-1, the applicant identifies the component types for the internal structures that require an AMR. This table lists the SCs with their passive function identified and their AMR results. The applicant has identified SCs of the internal structures that are subject to an AMR, such as ice baskets, lower support structure, wear slab, anchorage, flood curbs, equipment pads, embedments, hatches, missile shields, pressure seals and gaskets, reinforced concrete beams, structural steel beams, sumps, and trusses.

On the basis of the above-described methodology, the applicant identified the structures and components that are part of the reactor building interior structural components and identified the intended functions of the SCs that are subject to an AMR in Table 3.5-1 of the LRA. As indicated by the applicant in LRA Table 3.5-1, SCs of the internal structures are subject to an AMR because they provide structural or functional support to safety-related equipment or equipment meeting 10 CFR 54.4(a)(2) or (3) in a passive manner. As a result, they perform their intended function without moving parts or without change in configuration or properties, and are not subject to periodic replacement based on a qualified life or specified time limit.

#### 2.4.1.3.2 Staff Evaluation

The NRC staff reviewed Section 2.4.1.3 in the LRA, and the supporting information in Sections 3.8.3 of the Catawba and McGuire UFSAR, Section 6.2.2 and Section 6.7 of the McGuire and Catawba UFSARs, respectively, to determine whether there is reasonable assurance that the SCs of the reactor building internal structures were adequately identified within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

The staff reviewed the component types in LRA Table 3.5-1 (e.g., sump liner, sump screens, embedment, checkered plate, anchorage, flood curbs, speciality doors, ice baskets, lower support structure, pressure seals and gaskets, fuel transfer canal liner plate, reinforced concrete beams, slabs, walls, and steel beams) to determine whether there were any other components associated with the reactor building internal structures and ice condenser that meet the scoping criteria of 10 CFR 54.4(a), but were not included within the scope of license renewal. The staff reviewed Section 2.4.1.3 of the LRA and the relevant portions of the Catawba and McGuire UFSARs. The staff also examined the component types listed in Table 3.5-1 of the LRA to determine whether they are the only SCs that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). On the basis of the above review, the staff did not find any omissions by the applicant.

In its response to SER open item 3.5-3, dated October 2, 2002, the applicant stated the following—

With respect to the ice condenser wear slab, Duke has performed an additional review of the design of McGuire and Catawba and determined that the ice condenser wear slab is not within the scope of license renewal because it does not perform a license renewal function. The ice condenser slab is described in each station's UFSAR (Section 6.2.2 for McGuire and Section 6.7.1 for Catawba) as follows—

The wear slab is a concrete structure whose function is to provide a cooled surface as well as to provide personnel access support for maintenance and/or inspection. The wear slab also serves to contain the floor cooling piping.

Therefore, no further aging management review of the ice condenser wear slab is required for license renewal.

The staff had discussed this determination by the applicant during a meeting on September 18, 2002. The applicant had noted that, for open item 3.5-3, it had re-evaluated the ice condenser wear slab and determined that the scoping criteria were not met for this component and that it should have been excluded from scope. The applicant explained its basis for this determination, and the staff did not identify any concerns with the decision. A summary of this meeting was issued in a memorandum dated November 18, 2002. Since the ice condenser wear slab does not perform an function that meets the license renewal scoping criteria, the staff concurs with the applicant's finding that the wear slab should not have been included within the scope of license renewal.

#### 2.4.1.3.3 Conclusion

On the basis of its review of the information submitted by the applicant in the LRA, supporting information in the Catawba and McGuire UFSARs, and correspondence from the applicant as described above, the staff did not identify any omissions. Therefore, the staff finds that there is reasonable assurance that the applicant has adequately identified the SCs of the reactor building internal structures, which include the ice condensers, that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### 2.4.2 Other Structures

Other structures are a collection of buildings and structures that house equipment necessary for the safe operation of the plant. In Section 2.4.2, "Other Structures," of the LRA, the applicant identified the following structures as within the scope of license renewal—

- auxiliary building
- condenser cooling water intake structure
- nuclear service water structures
- standby nuclear service water pond dam
- standby shutdown facility
- turbine building (including service building)
- unit vent stack
- yard structures

At both McGuire and Catawba, each of the above buildings and structures is similar in design and essentially performs the same function unless noted otherwise.

#### *2.4.2.1 Auxiliary Buildings*

In Section 2.4.2.1, "Auxiliary Buildings," of the LRA, the applicant described the structures in the boundary of auxiliary building and identified the structures and components that are within the scope of license renewal and subject to an AMR for both McGuire and Catawba. These structures are further described in Section 3.8.4.1 of the McGuire UFSAR and Section 3.8.4 of the Catawba UFSAR.

##### **2.4.2.1.1 Technical Information in the Application**

As described in Section 2.4.2.1 of the LRA, each plant has one auxiliary building, which is a seismic Category I reinforced concrete structure. The auxiliary building is shared by both reactor units. It houses the nuclear steam supply system equipment, electrical equipment, control building, fuel pools, and diesel generator related piping and cabling. The auxiliary building is integrally connected with the spent fuel building and main steam doghouse, and is linked with the diesel generator building by cable tunnels. In the LRA, the control building, diesel generator building, fuel building, ground water drainage system, main steam doghouse, and the UHI tank building are within the boundary of the auxiliary building for license renewal because they are either contained within, or attached to, the auxiliary building.

At both McGuire and Catawba, the control building is a part of the auxiliary building that houses the control room, battery room, and cable room. The control building is a seismic Category I reinforced concrete frame structure that is supported by a reinforced concrete mat foundation on rock and/or fill concrete. A frame structure is the structure that is connected by continuous rigid reinforced concrete beams, columns, walls, floor slabs, and roof slab.

The diesel generator buildings are the free-standing seismic Category I reinforced concrete structures. Each plant has two diesel generator buildings, each one houses two diesel generators which are separated by a reinforced concrete partition wall. The diesel generator building is supported by a reinforced concrete mat foundation on rock and/or fill concrete. Major portions of the diesel generator buildings are below grade. There are various equipment trenches, pits, and sumps at the base of the diesel generator buildings.

The fuel buildings are the seismic Category I reinforced concrete structures that provide storage for the new fuel and spent fuel. The spent fuel building houses the spent fuel pool and the cask handling area. A bridge crane is provided for the fuel cask handling. Each spent fuel pool has reinforced concrete walls lined with stainless steel liner plates. The upending canal can be dewatered independent of the main pool. The roof of the spent fuel pool is designed for missile protection. At McGuire, the reinforced concrete structure encloses the spent fuel pool with the north end open to the cask handling area and new fuel storage vault. At Catawba, the spent fuel building encloses the pool with the east end open to the new fuel building which is a seismic Category I reinforced concrete structure.

The groundwater drainage system maintains normal groundwater level near the base of the auxiliary building and diesel generator buildings. The groundwater drainage system is an integral part of the building foundation that consists of a grid of collecting trenches below the

foundation surround on all sides by concrete, fill concrete, or rock. These groundwater under-drain systems are further described in Section 2.4.13 of both the McGuire UFSAR and the Catawba UFSAR. Three groundwater sumps are provided along the perimeter of the auxiliary building for collecting groundwater.

The main steam doghouses are seismic Category I reinforced concrete structures that house the high-pressure main steam and feedwater piping. Each reactor unit has one inside doghouse, one outside doghouse, and an UHI tank building. At Catawba, the inside doghouse and outside doghouse are located on the opposite sides of their respective reactor buildings. The inside doghouse is cast integrally with the auxiliary building and is free standing above a certain elevation. The outside doghouse is cast integrally with the UHI tank building, which houses the UPI tank and its components. The outside doghouse and the UHI tank building are separated by a reinforced concrete wall and are supported by a single mat foundation on rock and/or fill concrete. The Catawba UHI tank was originally designed to store the water to be used for removing decay heat from reactor core after a design basis event. This system has been functionally disabled. However, other systems contained within the UHI tank building, such as portions of the hydrogen bulk storage, are within the scope of license renewal. Therefore, the UHI tank building at Catawba is within the scope of license renewal. The LRA does not address the UHI tank building for McGuire.

The applicant identified the buildings and structures within the scope of license renewal in Table 2.2-1 of the LRA for McGuire and in Table 2.2-2 of the LRA for Catawba. The applicant listed structural component types, component intended functions, and their construction materials in Table 3.5-2 of the LRA as the results of AMR for these buildings. These structural components listed in the table meet the intent of 10 CFR 54.4(a) for license renewal because they perform one or more of the intended functions specified in the table. They also meet the criteria of 10 CFR 54.21(a)(1) because they are passive and long-lived components.

#### 2.4.2.1.2 Staff Evaluation

The staff reviewed Section 2.4.2.1 of the LRA and each plant's UFSAR to determine if the applicant adequately implemented its methodologies as described in Section 2.1 of the LRA, such that there is reasonable assurance that the structural components and commodities within the boundary of the auxiliary building have been properly identified as within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively. After completing its initial review, the staff determined that additional information was needed to complete its review.

By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-1, general and detailed structural drawings that would depict the structures addressed in Section 2.4.2 of the LRA. The applicant provided general arrangement plot plans to the staff, and the staff found these drawings to be sufficient to support the staff's review. In a February 21, 2002, conference call, (summarized by memorandum dated March 6, 2002) the staff recast RAI 2.4.1-1 to refer to general drawings only, since detailed drawings were requested in RAI 2.4.1-12. In its response

to RAI 2.4.1-1, dated March 11, 2002, the applicant referenced the drawings it had provided to the staff, as follows—

CN-1003-10, Catawba Nuclear Station, Plot Plan, General Arrangement  
MC-1003-1, McGuire Nuclear Station, Plot Plan, General Arrangement  
Figure 1 from CNS-1139.00-00-0004, "Auxiliary Building Structures Plan of Component Structures"  
Figure 1 from MCS-1154.00-00-0004, "Auxiliary Building Structures Plan of Component Structures"

Because the applicant identified these drawings as classified commercial information related to the physical protection of McGuire and Catawba nuclear stations, the drawings were not attached to the applicant's response and are not accessible by the public. Since the applicant's drawings were sufficient to support the staff's review, the staff found the applicant's response to RAI 2.4.1-1 acceptable.

Section 2.4.2.1 of the LRA states that the groundwater drainage system is provided for the auxiliary building and diesel generator building to maintain normal groundwater level near the base of these structures. However, the applicant did not address whether the foundation mat and the lower portion of the walls have expansion joints, water-stops, or waterproofing membranes (or elastomer components, if any), that can prevent groundwater in-leakage into the concrete construction joints. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-3, the applicant to provide additional information on structural sealant or elastomer components for the below-grade construction joints. The staff asked whether the water-stops and the components of the under-drain groundwater system should be included in Table 3.5-2 of the LRA for an AMR.

In its response dated March 11, 2002, the applicant stated that water-stops are provided in the below-grade sections of the structures. Water-stops are addressed in Section 2.1.2.2 of the LRA. However, water-stops are not uniquely identified in the LRA. They are the sub-components of foundation or wall and are addressed with the foundation or wall within which the water-stops are located. The foundations and walls are within the scope and subject to an AMR for license renewal, as are the subcomponents. The staff finds the applicant's response acceptable because the components in concern were included in the scope and subject to an AMR for license renewal.

Section 2.4.2.1 of the LRA states that the main steam doghouses and UHI tank building are within the scope of license renewal. However, the applicant did not describe these structures, and Table 3.5-2 of the LRA does not define which of the components in the table are applicable to these structures. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-4, that the applicant provide additional information for the main steam doghouse and UHI tank building.

In its response, the applicant stated that the components listed in Tables 3.5-2 and 3.5-3 of the LRA are applicable to the main steam doghouse and UHI tank building unless noted otherwise. For example, equipment pads identified in the table are the components for all the structures, including the main steam doghouse and UHI tank building. For completeness, the applicant identified the following components and commodities for the main steam doghouse and UHI tank building—equipment pads, fire walls, foundations, hatches, reinforced concrete beams, columns, floor slabs and walls, roof slabs, anchorage, checkered plate, embedment, expansion anchors, fire doors, structural steel beams, columns, steel plates and trusses, fire barrier penetration seals, cable tray and conduit supports, electrical and instrument panels and enclosures,

equipment component supports, HVAC duct supports, instrument line supports, instrument racks and frames, pipe supports, stair, platform, and grating supports. The staff finds the applicant's response acceptable because the applicant identified the components within the structures (main steam doghouse and UHI tank building), and the staff verified that these components are included in the LRA tables.

Table 2.2-1 of the LRA does not identify a UHI tank building for McGuire. The staff asked the NRC's scoping and screening inspection team to verify why the McGuire UHI tank building was not in scope. As is documented in NRC Inspection Reports 50-369/02-05, 50-370/02-05, 50-413/02-05 and 50-414/02-05, issued May 6, 2002 (ADAMS Accession No. ML021280003), the applicant provided McGuire design drawings MC-1204-2-A and MC-1204-3-A (general arrangement plan for the auxiliary building) to the inspector for review. These drawings indicated that the UHI tanks are located in the McGuire auxiliary building, not in a separate building. The drawings depicted the UHI tanks as an "accumulator water tank" and an "accumulator gas tank." To demonstrate that these tanks were associated with the UHI system, the applicant furnished an excerpt from the fire hazards analysis pertaining to fire area 21, which linked the accumulator water and gas tanks to the UHI system. Based on the scoping and screening inspection, the staff confirmed that the UHI tank building is in scope only for Catawba because this building does not exist at the McGuire plant site.

The staff has completed its review of the information presented in Section 2.4.2.1 of the LRA, the supporting information in each plant's UFSAR, the applicant's response to RAIs, and the drawings referenced in the SER section. As a result of its review, the staff did not identify any omissions by the applicant related to scoping the structures for license renewal as defined under 10 CFR 54.4(a). The staff also found that all the components and commodities in scope were subject to an AMR because the applicable intended functions are performed without moving parts or without a change of configuration or properties, and they are not replaced based on a qualified life or specified time period.

#### 2.4.2.1.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified those structures in the boundary of the auxiliary building that are within the scope of license renewal and their associated components and commodities that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.4.2.2 Condenser Cooling Water Intake Structure

In Section 2.4.2.2, "Condenser Cooling Water Intake Structure," of the LRA, the applicant described the condenser cooling water intake structure and identified the structural components and commodities that are within the scope of license renewal and subject to an AMR.

##### 2.4.2.2.1 Technical Information in the Application

At McGuire, the condenser cooling water intake structure houses three main fire pumps, which are relied on during certain postulated fire event in compliance with 10 CFR 50.48 for fire protection. The condenser cooling water intake structure is a seismic Category III structure that is constructed of carbon steel and reinforced concrete. Seismic Category III structure is not

designed to withstand design basis seismic loadings. The applicant determined that the fire pump rooms at east and west sides of the condenser cooling water intake structure are the only portions of the intake structure that are within the scope of license renewal, because they have the safety function for fire protection.

At Catawba, the low pressure service water intake structure houses the components of the conventional low pressure service water system and fire pumps. The applicant determined that only the portion of the structure that supports the fire pumps is within the scope of license renewal. The low pressure service water intake structure is included in the yard structures for license renewal.

The structural components, component intended functions, and material of construction listed in Table 3.5-2 of the LRA are applicable to the condenser cooling water intake structure.

#### 2.4.2.2.2 Staff Evaluation

The staff reviewed Section 2.4.2.2 of the LRA and each plant's UFSAR to determine if there is reasonable assurance that the applicant has properly identified the structures and listed the components of the condenser cooling water intake structure for each plant to meet the requirements of 10 CFR 54.21(a)(1). After completing its initial review, the staff determined that additional information was needed to complete its review.

Section 2.4.2.2 of the LRA states that the McGuire condenser cooling water intake structure is a Category III structure, and the fire pump rooms are the only parts of the intake structure that are within the scope of license renewal. However, there is insufficient information in the LRA regarding the structural components that house and support the fire pumps. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-5, the applicant to provide additional information on the components listed in Table 3.5-2 of the LRA that are applicable to the fire pump rooms.

In its response dated March 11, 2002, the applicant stated that the condenser cooling water intake structure provides structural support to the three main fire pumps, which perform a function that is required by the fire protection rule, 10 CFR 50.48. The fire pump rooms are located on the outermost east and west sides of the condenser cooling water intake structure. For completeness, the applicant identified the following components of the fire pump rooms subject to an AMR—foundation, foundation dowels, equipment pads, reinforced concrete beams, columns, floor slabs and walls, roof, anchorage, cable tray and conduit and their supports, electrical and instrument panels and their enclosures, embedment, expansion anchors, and pipe supports. The staff reviewed Tables 3.5-2 and 3.5-3 of the LRA and found that these components were listed therein.

Section 2.4.2.2 of the LRA states that the fire pumps at Catawba are supported by the low-pressure service water intake structure, which is included in the yard structures. Section 2.4.2.8, "Yard Structures," of the LRA states that the Catawba fire pumps and their support structure are within the scope of license renewal. However, neither LRA section describes the low-pressure service water intake structure. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-6, the applicant to describe the structure and identify the components that are subject to an AMR.

In its response dated March 11, 2002, the applicant stated that the low-pressure service water intake structure provides structural support for the components of the conventional low-pressure service water system and the fire pumps. The conventional low-pressure service water system is not within the scope of license renewal. The fire pumps are required for fire protection and are within the scope of license renewal. The applicant listed the following components which protect and support the fire pumps—foundation, equipment pads, reinforced concrete beams, columns, floor slabs and walls, anchorage, cable tray and conduit and their supports, electric and instrument panels and their enclosures, embedment, expansion anchors, and pipe supports. The staff's review found that these components were listed in Tables 3.5-2 and 3.5-3 of the LRA.

The staff has completed its review of the applicant's submittals and did not find any omissions by the applicant related to scoping the structures of the condenser cooling water intake structure that were included in the scope of license renewal as defined in 10 CFR 54.4(a). The staff also found that all the components and commodities of the condenser cooling water intake structure in scope are subject to an AMR because they perform applicable intended function(s) without moving parts or without a change in configuration or properties, and they are not replaced on a qualified life or specified time period.

#### 2.4.2.2.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified those portions of the structures in the boundary of the condenser cooling water intake structures for both McGuire and Catawba that are within the scope of license renewal, and their associated components and commodities that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.4.2.3 Nuclear Service Water Structures

In Section 2.4.2.3, "Nuclear Service Water Structures," of the LRA, the applicant described the nuclear service water structures and identified the structures and components that are in scope and subject to an AMR for license renewal.

##### 2.4.2.3.1 Technical Information in the Application

At McGuire, the nuclear service water structures include both the standby nuclear service water pond intake structure and the standby nuclear service water pond discharge structure. The nuclear service water pond intake structure is a completely submerged, reinforced concrete structure located at the bottom of the water pond east of the standby nuclear service water pond dam. The intake structure is designed to act as the head-wall of the nuclear service water intake pipes that provides missile protection for the pipes. The service water pond discharge structure is located at the northern portion of the water pond near the water surface. The discharge structure has a concrete head-wall that prevents erosion around the discharge pipes and has soil backfill over the stepped concrete slab that provides missile protection for the discharge pipes.

At Catawba, the nuclear service water structures include the following—

- nuclear service water and standby nuclear service water pump structure
- nuclear service water conduit manholes

- nuclear service water intake structure
- standby nuclear service water discharge structure
- standby nuclear service water intake structure
- standby nuclear service water pond outlet

The Catawba nuclear service water and standby nuclear service water pump structure is a reinforced concrete enclosure founded on solid rock. The exterior and interior walls and reinforced concrete roof are designed for missile protection. The reinforced concrete roof has hatches which are designed with fire barrier and missile barrier. There are pressure doors in the service water pump enclosure that are designed to withstand tornado suction pressure. The interior wall, and some of the exterior walls of the pump enclosure, are also designed as fire barriers.

The Catawba nuclear service water conduit manholes and the nuclear service water intake structure are the seismic Category I reinforced concrete structures. The nuclear service water intake structure is designed to house the nuclear service water intake pipes and is submerged in the plant intake channel. The conduit manholes are the small reinforced concrete structures that are located underground with access opening at grade level for cable installation and removal. The nuclear service water intake structure acts as an earth/silt retaining wall that provides missile protection for the intake pipe. An intake chamber and screens are provided at the pipe-end to stop fish impingement.

The Catawba standby nuclear service water discharge structures are the seismic Category I reinforced concrete head-walls. Two discharge structures are provided within the pond that provide missile protection for the discharge piping. Each discharge structure houses two standby nuclear service water discharge pipes and acts as an earth retaining wall.

The Catawba standby nuclear service water intake structures are the seismic Category I reinforced concrete box-shaped structures. The intake structure acts as an earth/silt retaining wall that holds the nuclear service water intake pipe and protects the intake pipe from missile strikes. The intake structure has an intake chamber and screens at the pipe-end to stop fish impingement.

The Catawba standby nuclear service water pond outlet is a seismic Category I structure that consists of a steel pipe located at the south abutment of the standby nuclear service water pond dam with a reinforced concrete head-wall on the pond side and a reinforced concrete end-wall on the Lake Wylie side. The head-wall is designed to contain and protect the pipe and support the missile shield. The pond outlet supports the weir and its missile shield, and contains the trash rack.

The applicant identified all the structures within the scope of license renewal in Table 2.2-1 of the LRA for McGuire, and in Table 2.2-2 of the LRA for Catawba. The structural components and commodities listed in Tables 3.5-2 and 3.5-3 of the LRA are applicable to the nuclear service water structures.

#### 2.4.2.3.2 Staff Evaluation

The staff reviewed Section 2.4.2.3 of the LRA and each plant's UFSAR to determine if the applicant adequately identified the structures of the nuclear service water structures for both

plants that are within the scope of license renewal in accordance with 10 CFR 54.4(a), and their components and commodities that require an AMR in accordance with the requirements of 10 CFR 54.21(a)(1). After completing its initial review, the staff determined that additional information was needed to complete its review.

Section 2.4.2.3 of the LRA states that the nuclear service water structures at Catawba include several structures. It is not clear that the structures described in this section cover all the nuclear service water structures in scope. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-7, the applicant to identify all the structures that are within the scope of license renewal and the components in Table 3.5-2 of the LRA that are applicable to the nuclear service water structures.

In its response dated March 11, 2002, the applicant stated that Table 2.2-2 of the LRA lists all of the Catawba structures that are within the scope of license renewal. Table 2.2-4 of the LRA lists all of the Catawba structures that are not within the scope of license renewal. The combination of the two tables contains all the structures of Catawba. The components listed in Tables 3.5-2 and 3.5-3 of the LRA are applicable to the nuclear service water structures, unless noted otherwise. For completeness, the applicant listed the following components of the nuclear service water structures subject to an AMR—anchorage; checkered plate; embedments; flood curbs; equipment pads; fire walls; foundations; hatches; manholes and covers; missile shields; reinforced concrete beams, columns, floor slabs, and walls; roof slabs; cable tray and conduit; cable tray and conduit supports; expansion anchors; fire doors; flood, pressure and specialty doors; electrical and instrument panels and enclosures; equipment component supports; stairs, platforms, and grating supports; HVAC duct supports (Catawba only); instrument line supports; pipe supports; instrument racks and frames; structural steel beams, columns, plates and trusses; trash rack and screens; fire barrier penetration seals (Catawba only); flood seals; and roofing.

The staff reviewed Tables 2.2-2 and 2.2-4 of the LRA for Catawba, and Tables 2.2-1 and 2.2-3 for McGuire, and found that the structures within the nuclear service water structures are all identified in Section 2.4.2.3 of the LRA. Some of the components provided by the applicant are listed in Table 3.5-3 of the LRA as the component supports that will be further reviewed in Section 2.4.3 of this report. As a result of this review, the staff did not find any omissions by the applicant related to scoping the structures. The staff's review also found that all the structural components in scope were identified as being subject to an AMR because they are all passive and long-lived components.

#### 2.4.2.3.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the structures and components associated with the nuclear service water structures that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.4.2.4 Standby Nuclear Service Water Pond Dam

In Section 2.4.2.4, "Standby Nuclear Service Water Pond Dam," of the LRA, the applicant described the standby nuclear service water pond dam at each plant site and identified its structures and components that are within the scope of license renewal and subject to an AMR.

#### 2.4.2.4.1 Technical Information in the Application

At both Catawba and McGuire, the standby nuclear service water pond dam performs the same function that provides ultimate heat sink following a postulated LOCA or loss of Lake Norman or Lake Wylie. The standby nuclear service water pond dam is an earthen embankment that is designed as a seismic Category I structure. At each plant, the dam impounds water within the standby nuclear service water pond to provide an alternate source of water for the standby nuclear service water system.

#### 2.4.2.4.2 Staff Evaluation

The staff reviewed Section 2.4.2.4 of the LRA to determine if there is reasonable assurance that the components comprising the standby nuclear service water pond dam have been properly identified as within the scope of license renewal and subject to an AMR. After completing its initial review, the staff determined that additional information was needed to complete its review.

In Table 3.5-2 of the LRA, the applicant lists "earthen embankment" as the component subject to an AMR. No other components are listed in the table. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-8, the applicant to indicate if other components of the nuclear service water pond dam that may perform an intended function should be listed in the table, such as drain pipes, observation wells, and piezometers, if any.

In its response dated March 11, 2002, the applicant stated that the earthen embankment is the component of the standby nuclear service water pond dam that performs the intended function to provide ultimate heat sink following a LOCA or loss of Lake Norman or Lake Wylie. Other components, such as drain pipes, observation wells, and piezometers, are not relied upon for the standby nuclear service water pond dam to perform their intended function, but are used as part of the aging management program to verify that the dam is performing the function as designed. Consequently, these components are not included in the scope of license renewal and are not subject to an AMR. However, they are included as an integral part of the standby nuclear service water pond dam inspection program as described in Appendix B, Section B.3.30 of the LRA.

The staff reviewed the information presented in Section 2.4.2.4 of the LRA and the additional information provided by the applicant in response to the staff's question. As a result of this review, the staff finds that the applicant's methodology for scoping the standby nuclear service water pond dam is acceptable because the associated components not listed in the table monitor the dam performance but do not support the intended function of the standby nuclear service water pond dam. Therefore, the staff found no omissions of structural components by the applicant that are required to be in scope and subject to an AMR for license renewal.

#### 2.4.2.4.3 Conclusions

On the basis of this review, the staff concludes that inclusion of the structure of the standby nuclear service water pond dam in the scope of license renewal meets the criteria of 10 CFR 54.4(a), and inclusion of the earthen embankment as the component subject to an AMR meets the criteria of 10 CFR 54.21(a)(1). Therefore, the staff concludes that the applicant's scoping and screening of the standby nuclear service water pond dam is acceptable.

### *2.4.2.5 Standby Shutdown Facility*

In Section 2.4.2.5, "Standby Shutdown Facility," of the LRA, the applicant described the structure that houses the standby shutdown equipment and identifies the structures and components that are within the scope of license renewal and subject to an AMR.

#### *2.4.2.5.1 Technical Information in Application*

At both McGuire and Catawba, the standby shutdown facility structure houses a dedicated diesel generator, and its supporting equipment, and the batteries relied on during certain postulated events. The standby shutdown system in the enclosure is used to maintain safe shutdown conditions from outside of the control room in the event of a postulated fire, sabotage, or flooding events. The standby shutdown facility structure is a steel-frame and masonry building that consists of a diesel generator room, electrical equipment room, battery room, and the shared equipment for both units. The building is a seismic Category III structure that is not designed to withstand design basis seismic loadings.

The structural components, component intended functions, and material of construction listed in Table 3.5-2 of the LRA are applicable to the standby shutdown facility structure.

#### *2.4.2.5.2 Staff Evaluation*

The staff reviewed Section 2.4.2.5 of the LRA and each plant's UFSAR to determine if the applicant adequately identified the structures of the standby shutdown facility that are within the scope of license renewal in accordance with 10 CFR 54.4(a), and the structural components that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). After completing its initial review, the staff determined that additional information was needed to complete its review.

The standby shutdown facility structure is within the scope of license renewal because it provides structural support and/or shelter to components relied on during certain postulated events (e.g., postulated fire, ATWS, and/or SBO). Section 2.4.2.5 of the LRA states that the standby shutdown facility structure is a steel-frame and masonry structure. However, LRA Table 3.5-2 of the LRA only specifies "the block walls" as the components of the standby shutdown facility structure. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-9, the applicant to identify other components in the table that are applicable to the standby shutdown facility structure.

In its response dated March 11, 2002, the applicant stated that the components listed in Tables 3.5-2 and 3.5-3 of the LRA are applicable to the standby shutdown facility structure unless noted otherwise. The components of the standby shutdown facility structure subject to an AMR—anchorage; battery racks; cable tray and conduit and their supports; control boards; electrical and instrument panels and enclosures; embedments; equipment component supports; equipment pads; expansion anchors; foundations; hatches; checkered plate; fire walls; flood curbs; flood seals; roofing HVAC duct supports; instrument line supports; instrument racks and frames; masonry block walls; pipe supports; reinforced concrete beams, columns, floor slabs, and walls; roof slabs; stairs, platforms, and grating supports; and structural steel beams, columns, plates, and trusses.

The staff reviewed Tables 3.5-2 and 3.5-3 of the LRA and the additional information submitted by the applicant in response to the staff's question. The staff examined the components and commodities of the standby shutdown facility structure provided by the applicant and found that all portions of the structure were identified in the LRA tables as within the scope of license renewal and subject to an AMR by the applicant. Some of the components are within the category of component supports that will be further reviewed in Section 2.4.3 of this report.

As a result of the above review, the staff did not find any omissions by the applicant related to scoping of the standby shutdown facility structure. The staff's review also found that these long-lived and passive structures and components identified as within the scope of license renewal were subject to an AMR.

#### 2.4.2.5.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the standby shutdown facility structures for both McGuire and Catawba that are within the scope of license renewal, and their associated components and commodities that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### 2.4.2.6 Turbine Buildings (including Service Building)

In Section 2.4.2.6, "Turbine Buildings (including Service Building)," of the LRA, the applicant described the structures of the turbine building, and service building and identified the structures and components that are within the scope of license renewal and subject to an AMR.

##### 2.4.2.6.1 Technical Information in the Application

At both McGuire and Catawba, the turbine buildings and service building are seismic Category III structures that are not designed to withstand design basis seismic loadings. There are two turbine buildings at each plant site (one for each unit) that house the turbine generators, condensers, feedwater heaters, pumps, and associated components and equipment. The turbine building itself is constructed of a steel frame superstructure and a reinforced concrete substructure that is supported by a mat foundation bearing on dense soil, partially weathered rock, and rock. The service building is a two-story relatively light steel frame structure that is located between the two turbine buildings. At McGuire, the southern portion of the service building and the southwest portion of the McGuire-1 turbine building are underlaid by compacted soil and are supported on the end bearing caissons. The intended function of the turbine building (including service building) is to provide structural support and/or shelter to the components relied on during certain postulated fire, anticipated transients without scram, and/or station blackout events. The applicant determined that the turbine buildings (including service building) at each plant site are within the scope of license renewal.

The applicant listed the structural components in Table 3.5-2 of the LRA for other structures that are applicable to the turbine building and service building. The applicant specified in the table that the foundation caissons are for McGuire turbine building only and the flood, pressure, and specialty doors are applicable to both the turbine building and auxiliary building.

#### 2.4.2.6.2 Staff Evaluation

The staff reviewed Section 2.4.2.6 of the LRA and each plant's UFSAR to determine if the applicant adequately identified the structures of the turbine building and service building that are within the scope of license renewal in accordance with 10 CFR 54.4(a), and their structural components, that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). After completing its initial review, the staff determined that additional information was needed to complete its review.

Section 2.4.2.6 of the LRA states that the turbine building (including service building) are Category III structures. However, the relationship between the turbine building and the service building is not clearly defined in the LRA. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-10, the applicant to describe these buildings and identify the components in Table 3.5-2 of the LRA that are applicable to the turbine building and service building (other than the components specified for turbine building only).

In its response dated March 11, 2002, the applicant described these structures and referred the staff to drawing MC-1003-1, which had been provided to the staff previously. Drawing MC-1003-1 shows the general arrangement of these buildings. The applicant indicated that the following components of the turbine buildings and service building are subject to an AMR—anchorage; cable tray and conduit and their supports; checkered plate; electrical and instrument panels and their enclosures; embedments; equipment component supports; equipment pads; expansion anchors; flood, pressure and specialty doors; flood curbs; foundations; foundation caissons (McGuire only); hatches; instrument line supports, instrument racks and frames; masonry block walls; pipe supports; reinforced concrete beams, columns, floor slabs, and walls; fire walls; flood seals; roofing; stair, platform, and grating supports; structural steel beams, columns, plates, and trusses. The staff reviewed these structural components and commodities and found that they were listed in Table 3.5-2 and 3.5-3 of the LRA. Some of these components listed in Table 3.5-3 of the LRA are in the category of component supports that will be further reviewed in Section 2.4.3 of this report.

The staff has completed its review of the applicant's submittals and did not find any omissions by the applicant related to scoping the structures. The staff's review also found that all the structural components and commodities in scope were identified as being subject to an AMR because they are passive and perform the applicable intended functions without moving parts or without a change of configuration or properties, and they are not replaced on a qualified life or specified time period.

#### 2.4.2.6.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the structures and components associated with the turbine building and service building that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

#### **2.4.2.7 Unit Vent Stack**

In Section 2.4.2.7, "Unit Vent Stack," of the LRA, the applicant described the unit vent stack and identified the structure and components that are within the scope of license renewal and subject to an AMR.

##### **2.4.2.7.1 Technical Information in the Application**

At both McGuire and Catawba, the unit vent stack is a stiffened steel cylindrical shell that is designed as a seismic Category I structure. The cylindrical shell is vertically supported by the roof of the auxiliary building and is laterally attached to the outside cylindrical wall of the reactor building. The unit vent stack at each reactor unit is the primary release point of gases effluent from the plant.

##### **2.4.2.7.2 Staff Evaluation**

The staff reviewed Section 2.4.2.7 of the LRA to determine if there is reasonable assurance that the applicant has properly identified the structure and components of the unit vent stack that are in scope and subject to an AMR for license renewal. The unit vent stack performs the intended function to release the filtered and unfiltered gaseous discharges. The inclusion of the structure in the scope of license renewal meets the criteria of 10 CFR54.4(a). The applicant listed "unit vent stack" in Table 3.5-2 of the LRA to represent the components subject to an AMR. The components of the unit vent stack, such as the steel cylindrical shell, vertical and lateral supports, restraints, anchorage, and embedment, are not individually listed in the table. The staff's review found that the unit vent stack is unique and its components and attachments are the integral parts of the unit vent stack. Therefore, the structure, as a whole, is in scope and subject to an AMR for license renewal. Based on this review, the staff found no omissions by the applicant related to identify the structural components subject to an AMR.

##### **2.4.2.7.3 Conclusions**

On the basis of this review, the staff concludes that the applicant has properly identified the structure and components of the unit vent stack that were included within the scope of license renewal and subject to an AMR.

#### **2.4.2.8 Yard Structures**

In Section 2.4.2.8, "Yard Structures," of the LRA, the applicant described the yard structures and identified the structures and components that are within the scope of license renewal and subject to an AMR.

##### **2.4.2.8.1 Technical Information in the Application**

As described in the LRA, the following yard structures at McGuire are within the scope of license renewal—

- reactor makeup water storage tank foundation
- refueling water storage tank foundation
- refueling water storage tank missile wall

- refueling water storage tank pipe trenches
- standby shutdown facility cable trenches
- condenser cooling water intake structure cable trenches

At McGuire, the refueling water storage tank foundation is a poured-in-place reinforced concrete composite structure. The foundation mat is enclosed by a free-standing reinforced concrete wall which is designed to protect the tank from missile strike. The foundation and missile wall are seismic Category I structures. Trenches are provided throughout the plant yard to allow underground routing of cables and piping. The trenches within the scope of license renewal are constructed of reinforced concrete. The covers for the trenches are either made of reinforced concrete or steel checkered plates.

At Catawba, the following yard structures are within the scope of license renewal—

- low pressure service water intake structure
- refueling water storage tank foundation
- refueling water storage tank missile shield
- refueling water storage tank pipe trenches
- standby shutdown facility cable trenches

The Catawba low pressure service water intake structure is a reinforced concrete structure that provides structural support for the components of the conventional low pressure service water system and the fire pumps. As stated in Section 2.4.2.2 of the LRA, the portion of the low pressure service water intake structure that supports the fire pumps are within the scope of license renewal. The refueling water storage tank foundation and missile wall are seismic Category I structures. The tank foundation is a poured-in-place reinforced concrete mat. The tank is enclosed by a free-standing reinforced concrete wall with a height that is capable of containing an assured source of water.

Trenches are provided throughout the Catawba plant site to allow underground routing of cables and piping. The cable and pipe trenches are constructed of reinforced concrete and are covered with either reinforced concrete or checkered plate covers. The yard drainage system is designed to protect all safety-related structures from flooding during a local probable maximum precipitation event. The drainage system consists of catch basin inlets that are connected by corrugated metal pipes to form several networks. The catch basin inlets are constructed of angle iron and grating. The yard drainage system is within the scope of license renewal.

The structural components, component intended functions, and materials of construction listed in Table 3.5-2 of the LRA are applicable to the yard structures.

#### 2.4.2.8.2 Staff Evaluation

The staff reviewed Section 2.4.2.8 of the LRA and each plant's UFSAR to determine if the applicant adequately implemented its methodologies such that there is reasonable assurance that the structures and components comprising the yard structures at each plant site have been properly identified as within the scope of license renewal and subject to an AMR. After completing its initial review, the staff determined that additional information was needed to complete its review.

Table 2.2-1 of the LRA lists the structures for McGuire, and Table 2.2-2 of the LRA lists the structures for Catawba that are within the scope of license renewal. Tables 2.2-3 and 2.2-4 of the LRA list the structures not in scope for the respective plants. The staff reviewed these tables and found that the yard structures, trenches, and drainage systems described in Section 2.4.2.8 of the LRA are included in the scope of license renewal. In Table 3.5-2 of the LRA, the applicant specified that “trenches,” and “yard drainage system,” and “metal siding” are the components only applicable to the yard structures. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-11, the applicant to identify other components in the table that are also applicable to the yard structures.

In its response dated March 11, 2002, the applicant stated that components listed in Tables 3.5-2 and 3.5-3 of the LRA are applicable to the yard structures unless noted otherwise. For example, equipment pads identified in LRA Table 3.5-2 are the components for all structures, including the yard structures. The foundations for the reactor makeup water storage tank and the refueling water storage tank are listed in the table under the component type “foundations.” The refueling water storage tank missile wall is listed in the table under the component type “missile shield.” The components of the low pressure service water intake structure at Catawba are all listed in the table as foundations, concrete walls, floor slabs, and anchorage. The corresponding structure at McGuire for these components is the condenser cooling water intake structure. The applicant further clarified that the components for the yard structures identified in Table 3.5-3 of the LRA include cable tray and conduit and their supports, electrical and instrument supports, equipment component supports, pipe supports, stair, platform, and grating supports. Some of these components are noted in the table that they are exposed to the external (yard only) environment.

The staff reviewed the information presented in Section 2.4.2.8 of the LRA and additional information submitted by the applicant in response to the staff’s questions. The staff compared the LRA descriptions, and Tables 3.5-2 and 3.5-3 of the LRA, with LRA Tables 2.2-1 through 2.2-4 and available drawings, to verify that the applicant included all the yard structures that meet the scoping criteria of 10 CFR54.4(a), as within the scope of license renewal. As a result of this review, the staff found no omissions by the applicant in scoping the yard structures. The staff also found no omissions for the components and commodities in Tables 3.5-2 and 3.5-3 of the LRA that are applicable to the yard structures for an AMR.

#### **2.4.2.8.3 Conclusions**

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has properly identified the structures and components of the yard structures for both plants that were within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

#### **2.4.3 Component Supports**

In Section 2.4.3, “Component Supports,” of the LRA, the applicant described the component supports and identified the structures and components that are within the scope of license renewal and subject to an AMR.

#### *2.4.3.1 Technical Information in the Application*

At both McGuire and Catawba, the component supports are those components that provide support or enclosure for the mechanical and electrical equipment. As stated in Section 2.4.3 of the LRA, the component supports within the scope of license renewal include battery racks, cable tray and conduit, cable tray and conduit supports, control boards, crane rails, enclosures, equipment component supports, HVAC duct supports, instrument line supports, instrument racks and frames, lead shielding supports, new fuel storage racks, pipe supports, stairs, platform and grating supports, and spent fuel storage racks. These support structures are constructed of steel or stainless steel that are located in all of the buildings and structures within the scope of license renewal.

The component supports within the scope of license renewal also include Class I NSSS supports. The Class I NSSS supports include reactor coolant system piping supports, pressurizer upper and lower lateral supports, reactor vessel support, control rod drive seismic structure supports, SG vertical, lower lateral, and upper supports, and reactor coolant pump lateral and vertical support assemblies. These Class I component supports are further described in Section 5.5.14 of the McGuire UFSAR and Section 5.4.14 of the Catawba UFSAR.

The component types, component intended functions, and material of construction for these component supports are listed in Table 3.5-3 of the LRA. The components listed in the table meet the criteria of 10 CFR 54.21(a)(1) for an AMR, because applicable intended functions are performed without moving parts or without a change of configuration or properties, and they are not replaced based on a qualified life or specified time period.

#### *2.4.3.2 Staff Evaluation*

The staff reviewed Section 2.4.3 of the LRA and each plant's UFSAR to determine if the applicant adequately implemented its methodologies as described in Section 2.1 of the LRA, such that there is reasonable assurance that the component supports have been properly identified as within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4 and 10 CFR 54.21, respectively. After completing its initial review, the staff determined that additional information was needed to complete its review.

During the scoping process for the structures within the scope of license renewal, the applicant identified the passive steel structural components in all buildings and structures that are within the scope of license renewal. Since many of the component supports and enclosures are made from similar materials and are located in the environment common to two or more buildings, the applicant decided to group these general structural components together for an AMR instead of addressing each of them separately in the individual structural evaluation. The applicant classified these general structural components that support or protect most plant mechanical or electrical equipment in the group of "component supports" subject to a specified AMR program. These steel structural components provide support for the safety-related and non-safety related systems, components, and equipment. The applicant lists 21 component types with their intended functions in Table 3.5-3 of the LRA that are subject to an AMR. In addition to the components described in Section 2.4.3 of the LRA, the table lists the equipment component supports in the yard and in the nuclear service water structures, electrical instrument panels, and enclosures. The table also includes the component supports and enclosures that are unique, such as spent fuel and new fuel storage racks, battery racks, control room ceiling, control

boards, crane rails and girders, and NSSS supports. These components are subject to the specified AMR program.

Section 2.4.3 of the LRA states that the component supports also include Class 1 NSSS supports. Table 3.5-3 of the LRA lists "Class 1 (NSSS) supports" as the components for the Class 1 NSSS supports subject to an AMR. However, the applicant neither describes the components nor defines the boundaries of the supports that are subject to an AMR. The staff is unable to verify their components for which an AMR is required because these NSSS support assemblies are the Class 1 structures and are different in design. By letter dated January 28, 2002, the staff requested, in RAI 2.4.2-12, the applicant to describe the components of the NSSS support assemblies as well as their boundaries that are within the specified AMR program.

In its response dated March 11, 2002, the applicant stated that the component types for the pressurizer supports, reactor vessel supports, SG supports, and reactor coolant pump supports are identified in Table 3.5-3 of the LRA as the Class 1 (NSSS) supports. Typically, the boundary of a NSSS component support extends from the attachment to the component through the attachment to the support structure. Lugs that are integrally attached to the component are included with the component, not the component support. The concrete floors and walls to which the component supports are anchored are addressed in Table 3.5-1 of the LRA under the reactor building interior structural components. The applicant provided additional detail on the NSSS component supports. The staff reviewed this information and each plant's UFSAR and available design drawings. The following paragraphs summarize the staff's evaluation.

RCS pipe supports are generally constructed of a standard support or a structural frame, or combination of the two. A standard support is an assembly generally mass-produced and referred to as a catalogue item. The RCS pipe support frames are constructed of structural steel or tube shapes. The staff verified that these pipe supports are within the scope of license renewal and subject to an AMR.

The pressurizer supports consist of an upper lateral support ring and a lower lateral support frame. The upper lateral support ring is a large frame that encircles the pressurizer and is attached to the embedment anchored to the crane wall and the pressurizer enclosure wall. The lower lateral support is a frame attached to the vertical hangers. The lower lateral support frame attaches to the embedded plates that are anchored to the crane wall and the operating floor slab. The support skirt of the pressurizer is attached to a circular steel frame that is connected to the lateral support frame. The staff verified that all these support components are within the scope of license renewal and subject to an AMR.

The reactor vessel supports are the individual rectangular steel box structures. They are located beneath the two opposing cold leg nozzles and two opposing hot leg nozzles. These supports are constructed from steel plate sections and are anchored to the primary shield wall (lower reactor cavity wall). The staff verified that all the components of the reactor vessel supports are in scope and subject to an AMR for license renewal.

The CRDM seismic support is anchored in place by the seismic supports, including turnbuckles, tie rods, and other components. The tie rods arrangement provides radial and rotational restraints. The seismic support platform employs numerous spacer plates, most of which fit

around individual CRDM shafts. The staff verified that the CRDM seismic supports and components are in scope and subject to an AMR for license renewal.

The SG is supported by four vertical pinned-end columns, each attached to two SG support lugs, i.e., a lower lateral support (including compression bumpers) and an upper lateral restraint (including a ring band with compression snubbers). The SG support columns provide vertical support for the SGs. The support columns are attached with simple supports to the embedment, which project into the foundation mat through both the base slab and the steel containment vessel liner plate. The SG lower lateral support is a large frame structure consisting of flanged sections constructed from structural steel plates that encircles the SG. The frame structure is attached to the embedment anchored to either the crane wall or the reactor cavity wall. The SG upper lateral restraint consists of a restraint ring, two snubbers, and two A-frame structures. The snubbers are anchored to the SG enclosure wall. The two A-frames, that limit movement of the restraint ring, are attached to the embedment located in either the crane wall or the SG compartment wall. The staff verified that all the components of the SG support are in scope and subject to an AMR for license renewal, except the snubbers. The staff noted that the snubbers are not in scope because they are active components, but the brackets that attach the snubbers to the ring and to the building are in scope and subject to an AMR for license renewal.

Each of the reactor coolant pump supports consists of three vertical steel columns and a lateral steel frame. The steel columns provide vertical support for the RCP that are attached to the embedment in the foundation mat. The RCP lateral support frame is a steel rigid frame structure anchored to the crane wall. The staff verified that all the components of the RCP supports are within the scope of license renewal and subject to an AMR.

The staff has reviewed the LRA and the applicant's response to RAI 2.4.2-12, related to the component supports, including the Class 1 NSSS supports. The staff previously reviewed the other structures including—auxiliary building, turbine building, condenser cooling water intake structure, standby shutdown facility—which address the component supports and enclosures. The staff determined that the component supports listed in Table 3.5-3 of the LRA are part of the safety-related or non-safety-related systems and components, or are part of the structures in scope that are common to most nuclear power plants. The staff verified that they are all in scope and subject to an AMR for license renewal because they are passive and long-lived and perform intended functions. The staff also determined that the NSSS support boundaries that are in scope include all structural support items between the NSSS components and the containment concrete structure, up to and including integral attachments on the components. All the NSSS support components are subject to an AMR with the exception of snubbers, because they are active and subject to replacement on a qualified life.

Based on its review, the staff did not identify any omissions by the applicant related to scoping and screening of the structures for the component supports (including the Class 1 NSSS supports). The staff also verified that all the structural components within the component supports were identified subject to an AMR with the exception of snubbers, which are active components that are not subject to the AMR in accordance with 10 CFR 54.21(a)(1).

#### *2.4.3.3 Conclusions*

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has adequately identified those portions of the structures and components associated

with the component supports (including the Class 1 NSSS supports) for both McGuire and Catawba that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

## **2.5 Scoping and Screening Results: Electrical and Instrumentation and Control**

The applicant identified electrical and instrumentation and control (I&C) component commodity groups subject to an AMR in Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Control," of the LRA. The staff reviewed this section of the LRA to determine that all electrical component commodity groups [which are subject to an AMR, as required by 10 CFR 54.21(a)(3)] have been identified as required by 10 CFR 54.4(a) and 10 CFR 54.21(a)(i).

### **2.5.1 Technical Information in the Application**

The applicant performed screening for electrical/I&C components in accordance with NEI 95-10, Appendix B, which identifies the following passive electrical and I&C component commodity groupings (i.e., groups of components that perform similar intended functions without moving parts or without a change in configuration).

- electrical portions of electrical and I&C penetration assemblies
- high-voltage insulators
- insulated cables and connections for power, instrumentation, and control applications (including plug-in connectors, splices, and terminal blocks)
- phase bus (e.g., isolated-phase bus, nonsegregated-phase bus, bus duct)
- switchyard bus
- transmission conductors
- uninsulated ground conductors

Other electrical and I&C component commodity groups are active.

Based on its review, the applicant determined that the electrical and I&C component commodity groups that are subject to an AMR are non-EQ insulated cables and connections for power, instrumentation, and control applications (including plug-in connectors, splices, and terminal blocks).

### **2.5.2 Staff Evaluation**

Section 2.1.1 of the LRA, "Scoping Methodology," discussed the scoping methodology as it related to the safety-related criteria in accordance with 10 CFR 54.4(a)(1), non-safety-related criteria in accordance with 10 CFR 54.4(a)(2), and the scoping criteria in accordance with 10 CFR 54.4(a)(3). Following the determination of the SSCs within the scope of license renewal, the applicant implemented a process for determining which SCs, among those SSCs that were determined to be within scope of renewal, would be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

For scoping and screening of electrical and I&C systems, the applicant used the plant spaces approach, which provides efficiencies in AMR of electrical equipment located within the same

plant space environment. Under this approach, the applicant identified all passive long-lived electrical equipment within a specified plant space as subject to an AMR, regardless of whether these components perform any intended functions. In the subsequent AMR, the applicant would evaluate the environment of the space to determine the appropriate aging management activities for the components.

#### *2.5.2.1 Identification of Passive Components*

From the group of components consisting of all electrical components, the applicant identified the following electrical and I&C component commodity groups as passive—

- electrical portion of electrical, instrumentation, and control penetration assemblies
- high-voltage insulators
- insulated cables and connections for power, instrumentation, and control applications (including plug-in connectors, splices, and terminal blocks)
- phase bus (e.g., isolated-phase bus, nonsegregated-phase bus, bus duct)
- switchyard bus
- transmission conductors
- uninsulated ground conductors

Passive components (for which aging degradation is not readily monitored) are those that perform an intended function without moving parts or without a change in configuration or properties. As examples of passive components, 10 CFR 54.21(a)(1)(i) conveys that electrical components meeting this passive definition as including, but not limited to, electrical penetrations, cables, and connections; and as excluding, but not limited to, motors, diesel generators, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies.

The staff reviewed the above identified component commodity groups to verify that the applicant did not omit any passive component commodity groups and that they meet the above-defined passive screening criteria and/or examples conveyed by 10 CFR 54.21(a)(1)(i). The staff concluded that the above identified component commodity groups are consistent with the examples of passive components conveyed by 10 CFR 54.21(a)(1)(i), and are therefore considered acceptable. In addition, these component commodity groups were found to be the same as the passive determinations described in NEI-95-10 (Revision 3), Appendix B, for component commodity groups in the electrical category. The staff has reviewed these NEI determinations and concluded (1) that each component identified performs its intended function without moving parts or without a change in configuration or properties, and its aging degradation is not readily monitored and (2) that these components acceptably identify passive components pursuant to 10 CFR 54.21(a)(1)(i). Therefore, the staff agrees that the above-identified subgroup of electrical components represents the passive electrical components (i.e., component commodity groups) that would be required to be included in an AMR if they also meet scoping and long-lived screening criteria.

### 2.5.2.2 Identification of Components Not Within the Scope of License Renewal

From the above-identified subgroup of passive electrical and I&C component commodity groups, the applicant in the LRA identified the following component commodity groups as being outside the scope of license renewal.

- high-voltage insulators
- phase bus (e.g., isolated-phase bus, nonsegregated-phase bus, bus duct)
- switchyard bus
- transmission conductors
- uninsulated ground conductors

Switchyard systems were found not to meet any of the scoping criteria of 10 CFR 54.4(a). Consequently, the passive electrical component commodity groups of switchyard bus, transmission conductors, and high-voltage insulators (included in switchyard systems) are not within the scope of license renewal.

The unit main power system and nonsegregated-phase bus in the 6.9kV normal auxiliary power system were found not to meet any of the scoping criteria of 10 CFR 54.4(a). Consequently, the passive electrical component commodity groups of phase bus are not within the scope of license renewal.

**Uninsulated Ground Conductors:** Section 2.5 of the LRA indicates that the passive electrical component commodity groups of uninsulated ground conductors were found not to meet any of the scoping criteria of 10 CFR 54.4(a). Consequently, uninsulated ground conductors were considered outside the scope of license renewal. By letter dated January 17, 2002, the staff requested, in RAI 2.5-3, the applicant to clarify why uninsulated ground conductors that provide safety-related electrical systems with the capability to withstand transient conditions (e.g., electrical faults) do not meet the scoping criteria of 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2). In its response dated March 8, 2002, the applicant stated the following—

The non-safety-related scoping criterion of 10 CFR 54.4(a)(2) is not a function-based criterion but a failure-based criterion. To further understand this scoping criterion and how a non-safety-related system or component could be within scope, the language of this criterion is expanded in Chapter 6 of the License Renewal Electrical Handbook, EPRI 1003057, (page 6-6) as follows:

License Renewal Electrical Handbook

“A non-safety-related system or component is not in scope (per §54.4(a)(2)) unless its failure would—

- cause a loss of the integrity of the reactor coolant pressure boundary,
- cause a loss of the capability to shut down the reactor or the capability to maintain it in a safe shutdown condition, or cause a loss of the capability to prevent or mitigate the consequences of accidents that could result in the potential offsite exposure specified in §54.(a)(1)(iii).”

This non-safety-related failure is a single failure as discussed in licensing and station design documents. Single failures are considered as part of the current licensing basis for both McGuire and Catawba. McGuire and Catawba are in conformance with licensing commitments concerning single failure as contained in Section 3.1, “Conformance with General Design Criteria” of their respective UFSARs. Criterion 17 - Electrical Power Systems is excerpted below:

**UFSAR Section 3.1, Conformance with General Design Criteria Criterion 17 - Electrical Power Systems**

**"...The onsite electrical power supplies...and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure...."**

Based on conformance with single failure criteria as outlined in both the McGuire and Catawba UFSARs, no uninsulated ground conductor failure would prevent satisfactory accomplishment of any of the safety-related functions identified in 10 CFR 54.4(a)(1)(i), (ii), or (iii). Uninsulated ground conductors do not meet the non-safety-related scoping criterion of 10 CFR 54.4(a)(2).

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).

Offsite System Scoping: Section 2.5 of the LRA indicates that the passive electrical component commodity groups of switchyard bus, transmission conductors, and high-voltage insulators are not within the scope of license renewal because offsite systems (to which these component commodity groups are a part) were found not to meet any of the scoping criteria of 10 CFR 54.4(a). Consequently, offsite systems (and consequently these component commodity groups) were considered outside the scope of license renewal. The staff disagreed with this conclusion.

10 CFR 54.4(a)(3) requires that all systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63) be included within the scope of license renewal. 10 CFR 50.63 requires that each light-water-cooled power plant licensed to operate be able to withstand and recover from a station blackout of a specified duration. The establishment of this specified duration (or coping) can be based on plant evaluations that follow the guidance in NRC Regulatory Guide 1.155 and NUMARC 87-00. This guidance requires that the plant evaluation consider offsite system characteristics, such as the expected frequency of loss of offsite power, and the probable time needed to recover offsite power. Offsite systems can be relied on in plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63). Thus, pursuant to 10 CFR 54.4(a)(3), offsite systems should be included within the scope of license renewal to the extent practical.

The staff pursued offsite system scoping generically and held several public meetings on the subject. By letter dated April 1, 2002, the staff issued its position on the license renewal rule (10 CFR 54.4) as it relates to the station blackout rule (10 CFR 50.63). By letter dated January 17, 2002, the staff requested the applicant to clarify why offsite systems (which include switchyard systems, parts of the unit main power system, and nonsegregated-phase bus in the 6.9 kV normal auxiliary power system) are not relied on in safety analyses or plant evaluations to perform a function in the recovery from a station blackout. In addition, the staff requested the applicant to clarify why these offsite system components do not meet the scoping criteria of 10 CFR 54.4(a)(3).

In its response dated March 8, 2002, the applicant indicated that it had re-reviewed plant documents with emphasis on equipment related to the recovery of offsite power. Based on the results of this review, the applicant decided that components that are part of the power path for offsite power from the switchyard are within the scope of license renewal in accordance with the station blackout scoping criterion required by 10 CFR 54.4(a)(3). This power path includes portions of the power path from the unit power circuit breakers (PCBs) in the respective switchyards to the safety-related buses in each plant. The power path includes portions of the switchyard systems, the unit main power system, and the nonsegregated-phase bus in the 6.9 kV normal auxiliary power system of each station.

By letter dated June 26, 2002, the applicant submitted to the staff the results of the AMR it had performed for the passive, long-lived offsite system components that perform a function in the recovery from a station blackout and were identified by the applicant as within the scope of license renewal. Pending completion of the staff's review of this information, this issue was characterized as SER open item 2.5-1.

In its June 26, 2002, letter, the applicant indicated that the following passive component commodity groups (that were originally identified as out of scope) have been identified as being within the scope of license renewal and subject to an AMR—high-voltage insulators, phase bus (e.g., isolated-phase bus, nonsegregated-phase bus, bus duct), switchyard bus, and transmission conductors. In a letter dated October 2, 2002, the applicant clarified its response to SER open item 2.5-1 as follows—

All insulated cables and connections (power, control and instrumentation applications) installed in the additional areas identified in the SBO open item response were, and still are, in scope as part of a bounding scope. The maximum cable voltage at either station is 13.8kV. The cables in these additional areas are included in the aging management review for insulated cables and connections submitted in the June 2001 License Renewal Application. This June 2001 cable aging management review is a bounding review that included all cables installed in these additional areas and structures (the areas and structures now identified as being within scope).

The applicant also provided, in a letter dated October 28, 2002, a simplified one line diagram of the SBO power recovery path, and further clarified that insulated cables and connections, included as part of the SBO power recovery path, are considered to be part of the larger component commodity group which includes all insulated cables and connections. Cables and connections in the SBO power recovery path were considered by the applicant to be within the scope of license renewal and subject to an AMR.

Based on its review of the information provided in the applicant's letters dated March 8, 2002, and June 26, 2002; information provided during a September 17, 2002, meeting with the applicant (summarized by memorandum dated September 17, 2002); and subsequent correspondence from the applicant dated October 2, 2002, and October 28, 2002, the staff concludes that passive offsite system component commodity groups (i.e., components included as part of switchyard, unit main power, and 6.9kV normal auxiliary power systems) have been identified by the applicant to be within the scope of license renewal. Therefore, open item 2.5-1 is closed. The staff's evaluation of the AMR results, provided by the applicant in its June 26, 2002, letter, is documented in Section 3.6.4 of this SER.

Treatment of Fuse Holders: In a letter dated May 16, 2002, the staff forwarded to the Nuclear Energy Institute (NEI) and Union of Concerned Scientists a proposed interim staff guidance

(ISG) document on screening of electrical fuse holders. The ISG stated that fuse holders should be scoped, screened, and subject to an AMR in the same manner as terminal blocks and other types of electrical connections that also meet the criteria specified in 10 CFR 54.4 and 54.21. This position applies only to fuse holders that are not part of a larger assembly such as switchgear, power supplies, power inverters, battery chargers, circuit boards, etc. Fuse holders in these types of active components would be considered piece-parts of the larger assembly and not subject to an AMR.

The intended functions of a fuse holder are to provide mechanical support for the fuse and to maintain electrical contact with the fuse blades or metal end caps to prevent the disruption of the current path during normal operating conditions when the circuit current is at or below the current rating of the fuse. Like electrical connections, fuse holders perform a primary function of providing electrical connections to specified sections of an electrical circuit to deliver rated voltage, current, or signals. These intended functions of fuse holders meet the criteria of 10 CFR 54.4(a). In addition, these intended functions are performed without moving parts and without a change in configuration or properties as described in 10 CFR 54.21(a)(1)(i). The fuse holders into which fuses are placed are typically constructed of blocks of rigid insulating material, such as phenolic resins. Metallic clamps are attached to the blocks to hold each end of the fuse. The clamps can be spring-loaded clips that allow the fuse ferrules or blades to slip in, or they can be bolt lugs to which the fuse ends are bolted. The clamps are typically made of copper.

Operating experience as documented in NUREG-1760, "Aging Assessment of Safety-Related Fuses Used in Low- and Medium-Voltage Applications in Nuclear Power Plants," indicates that aging stressors such as vibration, thermal cycling, electrical transients, mechanical stress, fatigue, corrosion, chemical contamination, or oxidation of the connection surfaces can result in fuse holder failure. The final staff position on this issue is under development. In a letter dated November 13, 2002, the staff requested the applicant to commit to implement, at McGuire and Catawba, the final resolution of the ISG.

In its response to the staff's request, dated November 18, 2002, the applicant provided the following commitment:

For McGuire, Duke commits to implement the final version of the fuse holder interim staff guidance (initially provided to NEI by letter dated May 16, 2002 and when finalized by the staff) by June 12, 2021 (the end of the initial license of McGuire Unit 1).

For Catawba, Duke commits to implement the final version of the fuse holder interim staff guidance (initially provided to NEI by letter dated May 16, 2002 and when finalized by the staff) by December 6, 2024 (the end of the initial license of Catawba Unit 1).

This commitment was included in a table of commitments submitted by the applicant in a letter dated December 16, 2002. The table of commitments is provided in Appendix D of this SER. The staff found the applicant's response acceptable because it commits to implement the final resolution of the ISG before the period of extended operation begins at McGuire and Catawba.

### **2.5.2.3 Identification of Components that are Passive but Not Long-Lived**

From the above-identified subgroup of passive electrical and I&C component commodity groups, the applicant identified the following component commodity groups as not meeting the long-lived screening criteria—

- electrical portion of electrical, instrumentation, and control penetration assemblies
- insulated cables and connections (power, instrumentation, and control applications; connections include plug-in connectors, splices and terminal blocks) that are included in the McGuire and Catawba 10 CFR 50.49 EQ program

A component that is not replaced either (1) on a specified interval based on the qualified life of the component or (2) periodically in accordance with a specified time period, is deemed to be “long-lived,” and therefore subject to an AMR.

Components subject to EQ aging requirements pursuant to 10 CFR 50.49(e)(5) are required to be replaced or refurbished at the end of their designated life. These components, pursuant to 10 CFR 50.49(e)(5), are subject to replacement based on a qualified life or specified time period. The applicant in the LRA conveyed that the above identified components are included in their 10 CFR 50.49 EQ program and subject to aging requirements of 10 CFR 50.49(e)(5). The staff, therefore, agrees that the above-identified components do not meet long-lived screening criteria and are thus not subject to an AMR.

### **2.5.3 Conclusion**

Based on its review and satisfactory resolution of SER open item 2.5-1, the staff did not find any omissions and, therefore, concludes that the applicant has identified component commodity groups of the electrical and I&C systems that are within the scope of license renewal pursuant to 10 CFR 54.21(a), and subject to an AMR pursuant to passive screening criterion 10 CFR 54.21(a)(1)(i) and the long-lived screening criterion 10 CFR 54.21(a)(1)(ii).