UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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DEC 20 2002

R. T. Ridenoure
Division Manager - Nuclear Operations
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 550
Fort Calhoun, Nebraska 68023-0550

SUBJECT: FORT CALHOUN STATION - NRC INSPECTION REPORT 50-285/02-07

Dear Mr. Ridenoure:

On November 8, 2002, the NRC completed an inspection regarding your application for renewal of the operating license for the Fort Calhoun Station. The results of the inspection were discussed with members of your staff on November 8, 2002, in a public exit meeting at the Fort Calhoun Station Training Auditorium.

The purpose of this inspection was to examine activities that support your application for a renewed license for the Fort Calhoun Station. The inspection consisted of a selected examination of procedures and representative records and interviews with personnel regarding the process of scoping and screening plant equipment to select equipment subject to an aging management review. For a sample of plant systems, the team performed visual examinations of accessible portions of the systems to observe any effects of equipment aging.

The inspection concluded that the scoping and screening portion of your license renewal activities were conducted as described in your License Renewal Application and that documentation supporting your application is in an auditable and retrievable form. With the exception of the open items identified in this report, your scoping and screening process was successful in identifying those systems, structures, and components required to be considered for aging management.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publically Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at **http://www.nrc.gov/reading-rm/ADAMS.html** (the Public Electronic Reading Room).

Should you have any questions concerning this report, please contact Wayne Walker at (817) 276-6523.

Sincerely,

Claude E. Johnson, Chief
Project Branch C
Division of Reactor Projects

Docket: 50-285
License: DPR-40

Enclosure:
NRC Inspection Report
50-285/02-07

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	50-285
License:	DPR-40
Report:	50-285/02-07
Licensee:	Omaha Public Power District
Facility:	Fort Calhoun Station
Location:	Fort Calhoun Station FC-2-4 Adm. P.O. Box 399, Hwy. 75 - North of Fort Calhoun Fort Calhoun, Nebraska
Dates:	November 8, 2002
Inspector:	Wayne C. Walker, Senior Project Engineer, NRC Region IV
Approved By:	Claude E. Johnson, Chief, Project Branch C
Attachments:	Supplemental Information

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SUMMARY OF FINDINGS

IR 05000285-02-07; 11/08/2002; Omaha Public Power District, Fort Calhoun Nuclear Station; License Renewal Application, Scoping and Screening Inspection Report.

The inspection of license renewal activities was performed by five regional office inspectors and four staff members from the Office of Nuclear Reactor Regulation. The inspection program followed was NRC Manual Chapter 2516 and NRC Inspection Procedure 71002. This inspection did not identify any "findings" as defined in NRC Manual Chapter 0612.

Documentation from the scoping and screening process was of good quality, detailed, thorough, and understandable. The inspection concluded that the scoping and screening portion of the applicant's license renewal activities were conducted as described in the License Renewal Application and that documentation supporting the application is in an auditable and retrievable form. The inspection concluded that the scoping and screening process was successful in identifying those systems, structures, and components required to be considered for aging management with the exception of the open items listed below:

(1) The cooling medium for the safety injection leakage cooler is component cooling water. This subsystem met the criterion of 10 CFR 54.4(a)(2), nonsafety-related components that could impact safety-related components when they failed, and should be scoped in the application but was not included. The applicant is reviewing this issue. This issue will be addressed by the staff as part of its overall safety review and, if appropriate, will be identified and resolved as a Safety Evaluation Report open item. This item is discussed in Section II.A.1 of this report. (Open Item 50-285/02-07-01)

(2) The team determined that, on the basis of criterion 10 CFR 54.4(a)(1), the unqualified safety injection tank level and pressure indicators need to be considered in the scope of the license renewal. These indicators are used to ensure assumptions are met for the mitigation of a loss of coolant accident analysis. This issue will be addressed by the staff as part of its overall safety review and, if appropriate, will be identified and resolved as an SER open item. This item is discussed in Section II.A.20 of this report. (Open Item 50-285/02-07/02)

(3) "Functional realignment" for license renewal is defined as the scoping of components from one system into another system based on a common in-scope function. This normally occurs when the components from a system that otherwise would have no in-scope function share a common in-scope function with components from other systems. The containment isolation function is an example. There are many systems which contain containment isolation valves. If any of these systems have no other in scope function, applicants will sometimes functionally realign the containment isolation valves to a single system. In such a case, the components are scoped based on the common in- scope function. License Renewal Application Table 2.2-1 and the description in Licensee Renewal Application Section 2.3.2.2 are inconsistent in that the blowdown system is not identified in License Renewal Application Table 2.2-1 as having components that were functionally realigned. This issue will be addressed by the staff as part of its overall safety review and , if appropriate, will be identified and resolved as an SER open item. This item is discussed in Section II. A. 21 of this report. (Open Item 50-285/02-07/03)

(4) The team concluded that, on the basis of criterion 10 CFR 54.4(a)(2), the warm water recirculation path would need to be considered in the scope of the license renewal since this prevents the formation of icing conditions on the traveling screens that affect the raw water system. The Fort Calhoun Station Updated Safety Analysis Report, Section 9.8, notes that "Icing conditions at the river water entrance of the intake structure are prevented by routing a portion of the warm water from the circulating water discharge tunnel back upstream of the intake screen. Experience with the District's stations on the Missouri River shows that, by controlling the amount of water being recirculated, potential icing conditions can be averted." The intake structure design basis document also noted that warm water was to help prevent the formation of frazil ice. Formation of frazil ice at intake structures has occurred in the industry. This issue will be addressed by the staff as part of its overall safety review and, if appropriate, will be identified and resolved as a SER open item. This item is discussed in Sections II.A.19 and II.C.3 of this report. (Open Item 50-285/02-07- 04)

Report Details

I. Inspection Scope

The inspection was conducted by NRC regional inspectors and members of the Office of Nuclear Reactor Regulation staff to interview applicant personnel and to examine a sample of documentation which supports the license renewal application (LRA). This inspection team reviewed the results of the applicant's scoping of plant systems and screening of components within those systems to identify the list of components that need evaluation for aging management. The team selected a sample of structures, systems, and components (SSCs) from the LRA scoping results to verify the adequacy of the applicant's scoping and screening documentation and implementation activities.

The scoping process involves the evaluation of plant systems and structures against the criteria of 10 CFR 54 (a)(1) through (3) for inclusion into the scope of the LRA. Systems and structures within the scope (in scope) are those that are: (1) safety-related; (2) nonsafety related, but whose failure could prevent the satisfactory accomplishment of the function of a safety-related system; or (3) relied on in the safety analyses or plant evaluation applicable for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transient without a scram (10 CFR 50.62), or station blackout (SBO) (10 CFR 50.63). The screening process involves evaluating components of the systems and structures within the scope of the Rule to identify those that are passive and long-lived and as such subject to aging management review (AMR) in accordance with 10 CFR 54.21(a). Components and structures subject to AMR are those that: (1) perform their intended function without moving parts or without a change in configuration or properties (passive); and (2) are not subject to replacement based on a qualified life or specific time period (long-lived).

The Fort Calhoun Station LRA states that the scoping process is consistent with the intent of 10 CFR Part 54 (hereafter referred to as the Rule). The scoping process was performed in two steps, plant level scoping and system level scoping. For those systems and structures determined to be in scope, a system level scoping is performed to identify the components within the systems or structures which support the system/structure intended functions. A scoping report was prepared for each system and structure with the following information: a brief description including a list of major components, major system interfaces, and a clearly defined license renewal (LR) assessment boundary; a list of intended functions cross-referenced to the source document(s) from which they were extracted; and an annotated drawing, where applicable, indicating the boundaries of the system/structure determined to be within scope.

II. Findings

A. Evaluation of Scoping and Screening of Mechanical Systems

The team evaluated the applicant's scoping and screening process for mechanical components by reviewing a number of plant systems the applicant determined to be within the scope of LR. The team also reviewed some systems that the applicant had determined were not within the scope of LR to ascertain that the applicant had made the correct determination. The results of the review in this area are discussed below.

1. Component Cooling Water (CCW)

The CCW system is a closed loop system used to transfer heat from the components carrying radioactive or potentially radioactive fluids to the raw water (RW) system which discharges to the Missouri River. It provides a monitored intermediate barrier between these fluids and the RW system. The system also serves as a cooling medium for the containment air coolers, steam generator blowdown sampling coolers, and the control room economizer coils. The system is an engineered safety features system. In the event of a design basis accident (DBA), the system provides sufficient cooling water to the engineered safeguards system. System components are rated for the maximum duty requirements that may occur during normal, shutdown, and accident modes of operation.

The systems consists of three motor-driven circulating pumps, four heat exchangers, a surge tank, valves, piping, instrumentation, and controls. To minimize corrosion, the water in the system is demineralized, deaerated, and uses a corrosion inhibitor. Makeup is supplied to the surge tank through a level control valve from the demineralized water system.

The team reviewed the boundaries of the CCW system scope depicted in the license renewal (LR) drawings and found them appropriate with one exception. The boundary drawing indicated that the safety injection (SI) leakage coolers were excluded from LR scope. This included the four coolers, associated piping, valves, and instrumentation. Since leakage from the reactor coolant system (RCS) could be greater than 500°F, the SI leakage coolers functioned to cool any leakage past RCS check valves to prevent the leakage from flashing to steam.

CCW is supplied to the four leakage coolers via 3-inch piping at approximately 300 gpm. Component cooling water will automatically isolate on a containment isolation signal. The team asked what affect a pipe break, in this nonsafety-related subsystem, would have on the CCW system. The applicant stated that, if leakage were to occur, it would be noticed in the containment sump coupled with a change in flow that would be sensed by flow elements downstream of the coolers. However, due to the size of the containment sump, inleakage may not be immediately noticed. Additionally, neither the flow indicators nor the flow elements were included in the scope of the Rule.

The team determined that, on the basis of criterion 10 CFR 54.4(a)(2), this subsystem would need to be considered in the scope of the LR, since the subsystem is supplied by CCW and failure of its piping could adversely affect the component cooling water system. At the conclusion of this inspection, the applicant was evaluating the inclusion of the SI leakage cooler subsystem, whose failure could impact safety-related equipment. This item was identified as an open item pending completion of the applicant's determination of the extent to which the subsystem should be included in the LRA. (Open Item 50-285/02-07-01)

2. Auxiliary Feedwater (AFW)

The applicant included the safety-related portions of the AFW system within the scope of the LRA. The AFW system is designed to supply feedwater to the steam generator whenever the reactor coolant temperature is above 300°F and the main feedwater system is not in operation, e.g., during startup, cooldown, or emergency conditions resulting in a loss of main feedwater. One portion of the system is a safety-grade, Seismic Category I, redundant system with Class 1E electric components. The other portion of the system was added to increase overall system reliability and is nonsafety-grade, nonseismic, and included non-Class 1E electrical components.

The basic function of the safety-related portion is to provide an alternate source of feedwater to the steam generators in the event of a loss of main feedwater. A loss of main feedwater could result from conditions such as a loss of offsite power, failure of main feedwater pump, etc. The AFW system was designed so that a single active failure coincident with a loss of offsite power would not prevent safe shutdown.

The basic function of the nonsafety-related portion of the AFW system is to supply feedwater to the steam generator during plant startup, cooldown, and hot shutdown periods when feedwater requirements are below minimum capacity of the main feedwater pumps.

The team reviewed applicable sections of the Updated Safety Analysis Report (USAR), the LRA, applicable LR drawings, and scoping and screening documents for the AFW system. The team determined that the applicant had properly accounted for the components that were subject to AMR. The team concluded that the applicant had performed the scoping and screening for the AFW system in accordance with the methodology described in the LRA and the Rule.

3. Main Steam and Turbine Steam Extraction

The applicant included the main steam and turbine extraction system within the scope of the LRA. The main steam and turbine extraction system consisted of two steam generators which transfer RCS heat to the secondary system feedwater. The steam produced in each steam generator flows through a pipe which penetrates the containment. Main steam isolation valves are located in each pipe just outside containment. These pipes connect to a common header which leads to the four turbine stop valves. From each stop valve, steam flows through a corresponding control valve and then to the high pressure turbine. Extraction steam is taken from the second, fourth, and sixth turbine stage discharge for feedwater heating. The sixth stage also supplies the auxiliary steam system. At the exit of the high pressure turbine, the steam flows through four moisture separators to four intercept valves into the low pressure turbine. Extraction steam is taken from the eight, tenth, and twelfth stages and used in the feedwater heaters. The thirteenth stage discharge is directed to the condenser where the latent heat is removed. The condensed steam drains to the condenser hotwell, which supplies the condensate pumps.

The portion of the main steam and turbine steam extraction system within the scope of the LR rule consists of the piping from each steam generator which penetrates containment. The piping outside containment includes the main steam safety valves and the main steam isolation valves. Also included in the main steam system boundary is the piping to the steam-driven AFW pump and the associated drains and vents. The main steam check valves are the boundary valves for each of the individual lines, and the main steam isolation valve packing leakoff line isolation valve is the boundary after the leakoff piping connects into the common header.

The team reviewed the applicable sections of the USAR, the LRA, applicable LR drawings, and scoping and screening documents for the main steam and turbine steam extraction system. The team determined that the applicant had properly accounted for the components that are subject to AMR. The team concluded that the applicant had performed the scoping and screening for the main steam and turbine steam extraction system in accordance with the methodology described in the LRA and the Rule.

4. Condensate

The condensate system condenses exhaust steam from the low pressure turbines, collects the condensate, and transfers it to the suction of the main feedwater pumps. The two surface condensers are the deaerating type, sized to condense the turbine full-load steam. They are also capable of condensing steam bypassed directly to the condenser from the main steam header following a turbine trip. The CW system provides the heat sink for the main condensers. The unit is capable of operation at reduced load with one of the condensers out of service. A steam cross-tie between the condenser necks ensures equal operating pressures in the two condensers.

Condensate collects in the condenser hotwell. From the hotwells, condensate is supplied to the suction of the three condensate pumps. These pumps send the condensate through a series of heaters to the suction of the main feedwater pumps.

The applicant considered this system not to be in scope. The team reviewed scoping information, the USAR, and design basis documents (DBDs). The team agreed with the applicant's conclusion.

5. Auxiliary Building Heating, Ventilation, and Cooling (HVAC)

The applicant included the auxiliary building HVAC system within the scope of the LRA. The auxiliary building is ventilated and cooled with ambient outside air. It is divided into two zones, which are the controlled and uncontrolled access areas. Portions of the auxiliary building ventilation system are utilized by the hydrogen purge system, which is an engineered safety features system. The functions of the system are to maintain a suitable environment for equipment and personnel and to supply fresh air and limit temperature rise in a 10 CFR Part 50, Appendix R, fire scenario. The controlled access ventilation supply system consists of an air handling unit, containing filters and preheat and reheat steam coil banks, two 50 percent capacity vane axial fans, and distribution ductwork. The exhaust system consists of three 33-1/3 percent capacity vane axial fans, high efficiency particulate air filters, and return ductwork. The exhaust air is continuously monitored for radioactive contamination before discharge to the atmosphere. The uncontrolled access area system is similar to the controlled access ventilation system. The main differences are that the exhaust air is not filtered and shut-off dampers are not installed. The portions of the auxiliary building HVAC system that are within the scope of LR are the pressure retaining components.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

6. Instrument Air

The applicant included the instrument air system within the scope of the LRA. The instrument air system provides oil-free, filtered, and dried air for pneumatic controls, instrumentation, and the actuation of valves and dampers. The basic safety-related function of the instrument air system is to provide sufficient stored dry air in local accumulator tanks to permit the operation of safety-related pneumatic devices during and following an accident. It also provides containment isolation of the instrument air supply header on a containment isolation actuation signal coincident with low pressure in the instrument air supply header. Instrument air provides control air to valve accumulators to maintain reactor coolant inventory control and decay heat removal capability in the event of a SBO. Additionally, instrument air pressurizes or vents air to or from air-operated valve actuators in order to place the valves in their desired postaccident position.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

7. Emergency Diesel Generators (EDGs) and Support Systems

The applicant included the EDG system within the scope of the LRA. The EDG system provides Class 1E electrical power to the station's ac buses in the event of a loss of offsite power. Each EDG is provided with an exhaust silencer, an engine control panel, an exciter, and electrical panel and its auxiliaries. Each EDG also interfaces with a self-contained cooling system, air-start system, lubricating system, and fuel system. Both EDGs are supplied fuel oil (FO) from a common, underground FO storage tank. No external energy sources other than 125 Vdc control power is required for starting or subsequent operation of the EDGs. The LR rule recognizes that the EDGs are active and excludes them from the group that is subject to AMR. All auxiliary components supplied as part of the engine and located on the engine skid are considered part of the engine for the purpose of LR. Support systems which are the starting air system, jacket water system, FO and lubricating oil systems, and combustion and exhaust air systems are not considered active and are within the scope of LR.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

8. Spent Fuel Pool Cooling

The applicant included the spent fuel pool cooling system within the scope of the LRA. The spent fuel pool cooling system is described in LRA Section 2.3.3.2. The storage pool pumps circulate borated water through the storage pool heat exchanger and return it to the pool. Cooling water to the heat exchanger is provided by the CCW system. The purity and clarity is maintained by diverting a portion of the circulated water through the demineralizer and the filter. The fuel transfer canal drain pumps are used to provide pool make-up water from the SI and refueling water tank (SIRWT) and also to drain the fuel transfer canal and return the refueling water to the SIRWT or the radioactive waste disposal system.

The major components of the spent fuel pool cooling system consists of a stainless steel lined storage pool, two storage pool circulation pumps, a storage pool heat exchanger, a demineralizer and filter, two fuel transfer canal drain pumps, piping, manual valves, and instrumentation.

The team reviewed the applicable LRA sections, USAR, LR drawings, and engineering analysis (EA) to confirm that the applicant's implementation of its scoping and screen methodology, as applied to the spent fuel pool cooling system, was correct and to determine whether any system components were incorrectly omitted from scoping or AMR. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

9. Auxiliary Boiler Fuel Oil (FO) and Fire Protection Fuel Oil

The applicant included the auxiliary boiler FO and fire protection FO system within the scope of the LRA. The auxiliary boiler FO and fire protection FO system is described in LRA Section 2.3.3.5. The fire protection FO system supplies FO to the diesel engine fire pump. The pump is located at the north end of the intake structure and takes its suction from a chamber immediately inside the traveling screens. The fire pump's diesel engine is independent of site power. A 10-gallon FO day tank for the diesel engine is located adjacent to the engine. FO is transferred from the diesel fire pump FO tank to the day tank. The 550-gallon capacity diesel fire pump FO tank is located outside the intake structure and is contained within an enclosure.

The major components of the fire protection fuel oil system consists of a diesel fire pump FO tank, a priming tank and its hand pump, a day tank, a fuel transfer pump, a filter, valves, and all other components and piping between the diesel fire pump FO tank and the injector unit of the fire pump diesel engine.

The auxiliary boiler FO system stores and delivers diesel FO for operation of the plant auxiliary boiler. The auxiliary boiler FO storage tank also stores FO for the EDGs.

The major components of the auxiliary boiler FO system consists of the auxiliary boiler FO storage tank; below grade piping associated with the tank, filters, pumps, valves, and piping between the auxiliary boiler FO storage tanks; and the auxiliary boiler FO supply solenoid valve. In addition, all FO transfer components within the supply pipe line from the auxiliary boiler FO storage tank through the FO transfer pump discharge valve are included.

The team reviewed the applicable LRA sections, USAR, LR drawings, and EA to confirm that the applicant's implementation of its scoping and screen methodology, as applied to the auxiliary boiler FO and fire protection FO system, was correct and to determine whether any system components were incorrectly omitted from scoping or AMR. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule. During the inspection, the applicant agreed to update the existing aging management activities in Section B.2.7 of the LRA to include the auxiliary boiler FO and fire protection FO system. These systems were mistakenly left out of Section B.2.7.

10. Reactor Coolant

The applicant included the RCS within the scope of the LRA. The RCS is described in LRA Section 2.3.1.2. The RCS consists of two heat transfer loops connected in parallel to the reactor vessel. Each loop contains one steam generator, two reactor coolant pumps, connecting piping, and instrumentation. A pressurizer is connected to one of the reactor vessel outlet pipes (hot leg) by a surge line. Pressurizer relief and safety valves are provided, which discharge to a quench tank (not in LRB) to condense and cool valve discharges. All components of the RCS are located within the containment building.

The RCS is designed to remove heat from the reactor core and internals and transfer it to the secondary (steam generating) system by the controlled circulation of pressurized, borated water that serves both as a coolant and a neutron moderator. The RCS serves as a barrier to the release of radioactive material to the containment building and is equipped with controls and safety features that ensure safe conditions within the system. The design pressure is 2500 psia. The design temperature is 650°F (pressurizer 700°F).

The RCS pressure is maintained and controlled through the use of a pressurizer, where steam and water are maintained in thermal equilibrium. Steam is formed by energizing immersion heaters in the pressurizer or is condensed by a subcooled pressurizer spray as necessary to maintain operating pressure and limit pressure variations due to plant load transients. Overpressure protection for the system is provided by two power-operated relief valves and two spring loaded ASME Code safety valves. These valves discharge to the quench tank where steam is released under water to be condensed and cooled. If the steam discharge exceeds the capacity of the tank, the tank is relieved to the containment atmosphere. The quench tank and its associated piping and valves are not considered within the scope of LR boundary.

The team reviewed the applicable LRA sections, USAR, LR drawings, and EA to confirm that the applicant's implementation of its scoping and screen methodology, as applied to the RCS was correct and to determine whether any system components were incorrectly omitted from scoping or AMR. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

11. Postaccident Sampling

The applicant did not included the postaccident sampling system within the scope of the LRA. License Amendment 200, dated August 29, 2001, to Facility Operating License DPR-40 for the Fort Calhoun Station, Unit 1, eliminates the requirements to have and maintain the postaccident sampling system. This system has been removed from service and therefore is not in-scope for LR.

The team reviewed the applicable LR drawings and EA to confirm that the applicant's implementation of its scoping and screen methodology, as applied to the postaccident sampling system, was correct and to determine whether any system components were incorrectly omitted from scoping or AMR. The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

12. <u>Containment HVAC System</u>

The applicant included the containment HVAC system within the scope of the LRA. The containment HVAC system provides ventilation and cooling of the containment and provides measurement of specific containment parameters such as temperature and pressure to help determine the plant condition during and after a DBA. The containment HVAC system consist of four separate subsystems. These subsystems are:

a. containment air re-circulation and cooling
b. nuclear detector well cooling
c. containment purge
d. hydrogen purge

The containment air recirculation and cooling system is needed for both normal operation and accident conditions. The system consists of four air handling units, each with its own fan, a common plenum discharge system, and instrumentation and controls. Two of the units have filtering capability and two do not have filtering capability. The air filtering units can handle 110,000 cfm, while the nonfiltering units can handle 66,000 cfm. The air recirculation units consist of inlet face dampers, baffle type moisture separators, media type mist eliminators, high efficiency particulate adsorption (HEPA) filters, charcoal filters, and cooling coils all contained in a single housing. During normal operation, filtered air is distributed to the various areas of the containment through the ductwork. The system maintains the containment atmosphere to less than 120°F. The containment temperature is determined by four thermal detectors (TE-887, --888, -889, and -890) which are in scope. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. While the normal operation of this system was not considered to be in scope, the team felt that the system maintains an initial condition used in the DBA analysis and needed to be in scope. The team determined that all associated piping, dampers, hangers, and ducting were included to assure the pressure boundary for the system. This is a high volume recirculation system that is totally contained in the containment and minor leakage does not affect its intended function. As such, the team agreed that nonsafety instrument taps need not be included in scope as part of the pressure boundary. In addition many of the instrument taps are in wells and would not affect the pressure boundary.

The containment air recirculation system is also an engineered safety features system. However, during an emergency the ductwork is not relied upon for air distribution and the discharge can be made through self-opening hatches. This system is needed to maintain the containment structure below design pressure during a DBA and limit leakage of airborne activity from the containment in the event of a loss of coolant accident (LOCA). The system also prevents the accumulation of hydrogen pockets by maintaining a continuous flow throughout the containment. The containment air recirculation system removes heat released by the DBA to reduce the containment pressure to near atmospheric. Extended operation is required in postaccident atmosphere of air saturated with borated water at 60 psig and 288°F.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. After some discussion with the applicant, the team determined that the iodine filtration is no longer credited for (Amendment 201, dated December 5, 2001) and the team agreed that the filtration function is not required. The pressure boundary is the only in-scope function performed by the containment air recirculation system. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the containment air recirculation system are in scope.

The nuclear detector well cooling system is needed to maintain the concrete temperature in the biological shield surrounding the reactor vessel to less than 150°F. The system also cools the out-of-core neutron detectors, which are located in tubes or wells in the reactor compartment annulus between the lower portion of the reactor vessel and the biological shield. The system consists of two air handling units and vane axial fans installed in a parallel closed loop. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team inquired as to why the tubes and wells were not considered in scope. The applicant stated that the incore detector tube and wells are considered integral to the biological shield which is in scope. The pressure boundary is the in-scope function performed by the nuclear detector well cooling system. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the nuclear detector well cooling system are in scope.

The containment purge system was designed to purge the containment by passing up to 50,000 cfm of outside air through the containment. The system is used to provide a suitable environment during personnel access and relieve pressure buildup within the containment structure during normal plant operation. The purge supply system consists of two flow paths which tie into the containment recirculation ductwork. The purge exhaust system consists of four flowpaths. There are two high volume flow paths each which consist of an air handling unit with a vane axial flow fan and filter. There are two low volume flow paths each which consist of a axial flow fan, recirculation control valve, purge control valve, and flow element. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The pressure boundary is the in-scope function performed by the containment purge system. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the containment purge system are in scope.

The containment hydrogen purge system is an engineered safety system. The system was designed to provide an independent, monitored, and controlled means of purging any potential accumulation of hydrogen in the containment. This prevents the hydrogen concentration in the containment from exceeding 3 percent volume following a DBA. The system consists of two purge units each with a 250 cfm positive displacement blower, inlet/outlet ducts, isolation valves, and two hydrogen analyzers. The hydrogen purge system is manually operated and is normally isolated from the containment by locked closed valves. Radioactivity discharged by the hydrogen purge system is measured by the stack monitoring system. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the containment hydrogen purge system are in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

13. Ventilating Air

The applicant included the ventilating air system within the scope of the LRA. The ventilating air system is designed to maintain a suitable environment for equipment and personnel. This system provides ventilation and cooling for various areas and consists of several systems, including the containment, control room, and auxiliary building HVAC systems. The applicant has determined that the only other area determined to be in scope regarding the HVAC systems is the ventilation equipment within EDG rooms. The EDG rooms have a normal and emergency systems. The HVAC system used during normal operation is not in scope as it does not meet any of the LR criteria. The safety-related portion of the system includes inlet louvers, the EDG combustion exhaust ducting, and the radiator cooling discharge duct and damper for the EDG room. The EDG ventilation system provides combustion air and cooling for the EDGs and associated equipment. The EDG uses a radiator type air-cooling system which is completely integral to the EDG and requires no energy sources except the EDG itself. The louvers are normally closed and open on a diesel start. The EDG combustion exhaust duct is partially located in the radiator exhaust ducts and discharges combustion products and cooling air to the outside atmosphere. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system.

During an inspection of the EDG rooms, the team noted that additional air conditioning equipment had been added to the EDG cabinets to assist in cooling. The team noted that the air conditioning equipment was not in scope and inquired if the cooling was needed to assure the operability of the EDG system. The applicant stated that the failure of the air conditioners will not make the associated EDG inoperable. The air conditioners were added in 1990 to assist in the cooling of the EDG static exciter voltage regulators and are not part of the plant's licensing basis. The air conditioners are controlled by temperature indicating switches mounted in each cabinet which has high temperature alarms in the control room. The temperature switches and control room indicators are in scope.

The team noted that the louvers and exhaust ducting in the EDG rooms appeared to be in good material condition. There were no obvious signs of wear or deterioration. The team also inspected the exhaust duct for the EDG room. The exhaust duct is a large concrete chimney covered by a grating with the EDG combustion discharge duct located within. The team found the grates to be clean and uncluttered, allowing free flow. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the EDG ventilation system are in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

14. Control Room HVAC

The applicant included the control room HVAC system within the scope of the LRA. The control room HVAC system is designed to protect the control room operators from airborne contamination in event of a DBA. During normal operation, the system maintains a space temperature of 78°F at 50 percent maximum relative humidity. The control room HVAC consists of two HEPA and charcoal filter assemblies with separate booster fans which are installed at the outside air makeup intake to the system.

In the event of a DBA, the control room is pressurized with 1000 cfm of filtered outside air to prevent infiltration of contaminated air. The system also continuously filters 1000 cfm of recirculated control room air during a DBA. One of the DBA scenarios is an accidental release of toxic gases. The control room fresh air intake is monitored for toxic gases and upon detection will isolate the control room by closing the fresh air dampers and shutting down the control room ventilation system. The control room HVAC is also needed to maintain the safe shutdown equipment in the control room area in the event of a fire. In the event of a fire, the control room area fire dampers provide a 3-hour rated fire barrier. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that all associated piping, dampers, hangers, and ducting that assure the pressure boundary for the control room HVAC system are in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

15. Chemical Volume Control System (CVCS)

The applicant included the CVCS within the scope of the LRA. The CVCS maintains desired water level, water chemistry/purity, and boron concentration in the reactor coolant through continuous feed-and-bleed operation. The CVCS includes one regenerative heat exchanger, one letdown heat exchanger, five ion exchangers, two purification filters, one volume control tank, three positive-displacement charging pumps, one boric acid batching tank, two boric acid storage tanks, two centrifugal boric acid transfer pumps, one chemical additional tank with metering pump, piping, valves, and instrumentation and controls.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that all associated piping, heat exchangers, ion exchangers, filter housings, tanks, pumps, valves, and instrumentation for the CVCS system are in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

16. Reactor Vessel

The applicant included the reactor vessel within the scope of the LRA. The reactor vessel is a 140-inch beltline inner diameter two-loop vessel. This configuration has four coolant inlet nozzles and two coolant outlet nozzles. The vessel is comprised of a removable head with multiple penetrations (control element drive mechanisms, in-core instrumentation nozzles, and the reactor vessel vent line), upper, intermediate, and lower shell courses, and bottom head and vessel supports. The vessel includes two leakage detection lines that are located between the vessel flange o-rings. The vessel is an all welded, manganese molybdenum-nickel steel plate and forging construction. Welds were made with submerged arc welding processes using Mn-Mo-Ni steel consumable wire, a Linde welding flux, and shield metal arc repair welds. The interior surfaces of the vessel in contact with reactor coolant are clad with austenitic stainless steel. The major system interfaces with the reactor vessel are the RCS and the reactor vessel internals (RVIs).

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that reactor vessel system is in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

17. Reactor Vessel Internals (RVI)

The RVI were designed to support and align the fuel assemblies, control element assemblies, and in-core instrumentation assemblies and to guide reactor coolant through the reactor vessel. The RVIs were also designed to absorb the static and dynamic loads and transmit these loads to the reactor vessel flange. The RVI were designed to safely perform their functions in normal operating, upset, and emergency conditions and to safely withstand the forces due to deadweight, handling, system pressure, flow impingement, temperature differential, shock, and vibration. All RVI components are considered Class 1 for seismic design. The design of the RVI limits deflection where such limits are required by function. The stress values of all structural components under normal operating and expected transient conditions are not greater than those established by Section III of the ASME Boiler and Pressure Vessel Code. The effects of neutron embrittlement on materials utilized and accident loadings on the internals have been considered in the design analysis.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that the RVI was in scope and consists of all components internal to the reactor vessel, excluding the reactor vessel and head, control element drive mechanisms, and integral attachments to the reactor vessel and head.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

18. Containment Isolation

The containment penetration and system interface components for the non-critical quality elements (CQE) systems group includes the CIVs of the feedwater blowdown, compressed air, blowpipe, and demineralized water systems as well as the piping between the containment penetrations and the CIVs. The CQE heat exchangers in the demineralized water system are included to maintain the CCW system pressure boundary. The mechanical portions of all electrical penetrations that provide containment isolation are also included.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that the containment penetration and system interface components for non-CQE systems group described above was in scope.

The team found that the applicant had performed scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

19. Raw Water (RW)

The RW system is an open-cycle cooling water system which uses screened water from the Missouri River. The system includes four parallel vertical mixed-flow pumps installed in the intake structure pump house. The pumps discharge into an interconnected header which splits into two parallel supply headers. The two supply headers run underground from the intake structure to the auxiliary building, where they join in an interconnected inlet header to the four CCW heat exchangers. Downstream of the CCW heat exchangers, the RW discharge header runs through the turbine building and discharges to the river via the CW discharge tunnel. RW piping and valves are also routed to selected equipment normally cooled by CCW, to provide a means of direct cooling as a backup to CCW. The discharge from the direct cooling portion of the RW system is routed through its own separate discharge header via the turbine building into the CW discharge tunnel. In the unlikely event of a DBA, all four RW pumps are started automatically and an SI actuation signal opens the RW isolation valves on all four CCW heat exchangers.

For LR purposes, the intake structure traveling screens are evaluated as part of the RW system. There are three cells in the intake structure for the intake of river water, and each cell is served by two traveling screens.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team determined that the RW system was in scope as stated, except it questioned why the warm water recirculation path used to support RW system in winter months was not in scope.

Normally the water exiting the condenser is discharged to the Missouri River downstream of the intake structure. During the colder winter months, a portion of this discharge water is diverted upstream of the intake structure to warm the river water entering the intake structure traveling screens. According to the applicant's DBD SDBD-STRUC-503, this is required to prevent plugging of the traveling screens with frazil ice which would adversely affect the operation of the RW system.

Currently the applicant considers the SSCs supporting warm water recirculation not to be in scope. The team disagreed with the applicant since the DBD SDBD-STRUC-503 and USAR Section 9.8 discusses how warm water recirculation is used to prevent the plugging of the traveling screens with ice.

The team found that the applicant had performed scoping and screening for the RW system in accordance with the methodology described in the LRA and the rule except for the warm water recirculation path described above. The team determined that, on the basis of criterion 10 CFR 54.4(a)(2), a warm water recirculation path would need to be considered in the scope of the LR since this prevents the formation of icing conditions on the traveling screens that affects the RW system. At the conclusion of this inspection, the applicant was evaluating the inclusion of the warm water recirculation path in the LRA. This item was identified as an open item pending completion of the applicant's resolution of including the warm water recirculation path in the LRA. This item is also discussed in Section II.C.3 of this report. (Open Item 50-285/02-07- 04)

20. Safety Injection (SI) and Containment Spray (CS)

The SI system injects borated water into the RCS to provide emergency core cooling following a LOCA. This provides core cooling to ensure there is no significant alteration of core geometry, no clad melting, no fuel melting, and less than 1 percent cladding water reaction. This also limits fission product release and ensures adequate shutdown margin regardless of temperature. The SI system also provides continuous long-term postaccident cooling of the core by recirculation of borated water from the containment recirculation line inlet located in the containment sump.

The major components of the SI system are the three high pressure safety injection (HPSI) pumps, two low pressure safety injection (LPSI) pumps, four safety-injection tanks, four safety-injection leakage coolers, eight HPSI control valves, four LPSI control valves and other various valves, instrumentation, and piping.

During normal plant operation, the SI system is maintained in a standby mode with all of its components lined up for emergency injection. In standby mode, none of the major system components are operating. Following an incident that results in a safety injection actuation signal (SIAS), the HPSI and LPSI pumps automatically start and the high pressure and low pressure injection valves automatically open.

During the injection mode of operation, the HPSI and LPSI pumps take suction from the SIRWT and inject borated water into the RCS via the SI nozzles located on the RCS cold legs.

The four SI tanks constitute a passive injection system since no electrical signal, operator action, or outside power source is required for the tanks to function. The tanks are designed to inject large quantities of borated water to cover the core in the event of a rapid depressurization of the RCS due to a large break LOCA.

The function of the CS system is to limit the containment structure pressure rise by providing a means for cooling the containment atmosphere after the occurrence of a LOCA. Pressure reduction is accomplished by spraying cool, borated water into the containment atmosphere. Heat removal is accomplished by recirculating and cooling the water through the shutdown cooling heat exchangers. The CS system also reduces the leakage of airborne radioactivity by effectively removing radioactive particulates from the containment atmosphere. Removal of radioactive particulates is accomplished by spraying water into the containment atmosphere. The particulates become attached to the water droplets, which fall to the floor and are washed into the containment sump.

The CS system consists of three spray pumps, two heat exchangers (shutdown cooling heat exchangers) and all necessary piping, valves, instruments, and accessories. The pumps discharge the borated water through the two heat exchangers, during recirculation, to a dual set of spray headers and spray nozzles in the containment. These spray headers are supported from the containment roof and are arranged to give essentially complete spray coverage of the containment horizontal cross-section area.

The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the SI and CS systems. The team determined that the systems were in scope as stated except did not agree with the applicant for excluding portions of the SI tank's level and pressure instrumentation that were not in scope.

There are four SI tanks that are pressurized and filled with borated water. The borated water is injected into the RCS if a large break LOCA occurs. To prevent core damage, accident analysis requires the SI tanks to be at a certain level and pressure.

Each tank has three level detectors and three pressure detectors. Technical Specifications require that each SI tank have at least one level detector and one pressure detector in operation when the plant is above 200°F.

Two of the level detectors provide level indication while the third level detector provides level indication via only high and low level alarms. The third detector was placed in scope since it is a qualified instrument. The other two level indicators were excluded since they were not qualified instruments.

Currently the applicant considers meeting Technical Specification requirements for level if any one of the three level detectors is in operation, regardless of the instrument's qualification. With this practice, the team believes that the two unqualified level indicators need to be in scope to meet the LOCA analysis assumptions.

A similar argument applies for the pressure detectors, except there is only one unqualified instrument that provides pressure indication. The other two instruments are qualified and provide alarm indication only. One detector provides a high-pressure alarm and the other detector provides a low-pressure alarm. In this case the team believes that the unqualified pressure indication needs to be in scope to meet the LOCA analysis.

At the conclusion of this inspection, the applicant was evaluating the inclusion of the unqualified SI tank level and pressure indicators in the LRA. On the basis of criterion 10 CFR 54.4(a)(1), the team determined that the unqualified SI tank level and pressure indicators need to be considered in scope, since these indicators are used to ensure accident analysis assumptions are met for the mitigation of a LOCA. This item is an open item pending completion of the applicant's resolution to include the unqualified SI tank level and pressure indicators in the LRA. (Open Item 50-285/02-07-02)

21. <u>Miscellaneous Systems, Penetrations, and Components</u>

"Functional realignment" for LR is defined as the scoping of components from one system into another system based on a common in-scope function. This normally occurs when the components from a system that otherwise would have no in-scope function share a common in-scope function with components from other systems. The containment isolation function is an example. There are many systems which contain CIVs. If any of these systems have no other in-scope function, applicants will sometimes functionally realign the CIVs to a single system. In such a case, the components are scoped based on the common in-scope function.

The staff's review found that the LRA does not clearly describe the methodology used to functionally realign components between systems. The inspection team reviewed the applicant's on-site scoping documents to determine how functional realignment was implemented for LR. Specifically, the team reviewed EA FC-00-127, "Miscellaneous Systems, Penetrations, and Components," to determine if the EA described the functional realignment methodology. The EA did not clearly describe the functional realignment methodology. The applicant clarified that components with in-scope functions that are contained in systems which have no other in-scope functions, are functionally realigned to the "Containment Penetration and System Interface Components for Non-CQE Related System," while components with in-scope functions in systems which have other in-scope functions, are not functionally realigned.

The EA also stated that the compressed air, demineralized water, and steam generator feedwater blowdown systems contained components that were functionally realigned. The team noted that this was inconsistent with LRA Table 2.2-1 and LRA Section 2.3.2.2. LRA Table 2.2-1 states that containment isolation and/or pressure boundary components in the compressed air, demineralized water, and blowpipe systems were functionally realigned to the commodity group "Containment Penetration and System Interface Components for Non-CQE Related System." However, LRA Section 2.3.2.2, which describes this commodity group, states that the group contains CIVs from the feedwater blowdown, compressed air, blowpipe, and demineralized water systems, as well as the piping between the containment penetrations and the CIVs. It also states that the demineralized water heat exchangers are included in the commodity group to maintain the CCW system pressure boundary. LRA Table 2.2-1 and the description in LRA Section 2.3.2.2 are inconsistent in that the blowdown system is not identified in LRA Table 2.2-1 as having components that were functionally realigned. The inspection team has identified an open item to require the applicant to resolve the discrepancies between LRA Table 2.2-1 and the description in LRA Section 2.3.2.2. Resolution of this open item will be documented in the staff's SER. (Open Item 50-285/02-07/03)

The applicant went on to explain that functional transfers of components occurred in two ways. The first way was through the use of commodity groups. Once the plant level scoping was completed and the list of in scope systems was compiled, the applicant identified certain commodity groups that would be used to simplify the scoping process. These commodity groups would then be populated with the matching components from the in-scope systems. This is a common practice with previous applications for commodities. Components which fell into the commodity groups were functionally transferred from the original system to the commodity group. Because there are some systems whose only function was performed by the functionally transferred components (such as containment penetration components for service air), those systems no longer performed an intended safety function and were eliminated from scope.

Additionally, there are some components which are located at the interface between two systems. During original plant design, these components were assigned to systems based mainly on engineering judgement. During the scoping process, some of these components at the system interfaces were functionally realigned from one system to another based on materials and environments. For example, a control valve on an instrument air line to the actuator on an SI valve may be classified as a SI valve; however, for the purposes of LR it is transferred to the instrument air system because the materials and environment for that component aligns better with instrument air.

In all cases the functional transfer of components was strictly controlled. The engineers working on the system level scoping analysis were prevented from functionally transferring any components into or out of a system unless they first got agreement from the owner of the system to which the component was to be functionally transferred. The engineer then had to get agreement of the discipline lead (mechanical or electrical). The discipline lead then had to get approval from the integrated plant assessment supervisor, who would then authorize the functional transfer of the component from one system to another in the applicant's LR database. The database is set up so that only the information technology engineer has the ability to make these transfers. The information technology engineer has clear direction not to transfer components without the integrated plant assessment supervisors' approval. The criteria for component functional transfers are documented in the guidance document used for LR.

On the basis of its inspection, pending satisfactory resolution of the open item described above, the team found that the applicant has properly, functionally realigned components from systems with no other in scope functions to an in-scope commodity group.

B. Evaluation of Scoping and Screening of Electrical Systems

The team evaluated the applicant's implementation of the scoping and screening process for electrical systems by reviewing a number of plant systems and components the applicant determined to be within the scope of LR. This was accomplished by reviewing a list of CQE and limited CQEs as defined in the licensee's equipment database (RAMS). This Fort Calhoun safety classification system is the method relied on for identifying components that are in scope per Criteria 1 and 2 of the LR rule. Scoping of electrical components that meet Criterion 3 (i.e., non-CQE components) was conducted by review of documents for the five regulated events: fire protection, environmental qualification, anticipated transient without scram, SBO, and pressurized thermal shock.

Some of the electrical components (e.g., cables, electrical penetration assemblies) were scoped as commodity groups due to the components having similar materials and environments. This scoping process involved the use of the Fort Calhoun automatic cable tracking system (FACTS). FACTS is a CQE controlled database that is maintained separately from RAMS. The cables listed as CQE in the FACTS database are considered to be in scope per Criterion 1. Criterion 2 does not apply to cables because FCS design precludes non-CQE electrical failures from impacting CQE circuits, through fuse and breaker coordination, so no additional cables were scoped as within the scope of LR for this criterion. The team also reviewed some systems that the applicant had determined were not within the scope of LR. The results of the team's review are discussed below.

1. 125 Vdc Electrical System

As described in LRA Section 2.5.9, the 125 Vdc electrical systems are designed as basic sources of energy for plant control and instrumentation and operate without interruption during accident conditions and following adverse environmental conditions. The system consists of three battery chargers, two lead-acid storage batteries, two main distribution panels, six branch distribution panels, two battery discharge test circuit breakers, and manual transfer switches.

The team reviewed EA FC-00-062, "125 VDC System Scoping, Screening, and AMR for License Renewal," to confirm that the applicant's implementation of its scoping and screening methodology, as applied to the 125 Vdc electrical system, was correct, and to determine if any system components were incorrectly screened.

The applicant included the system within the scope of LR. Although the system is included within the scope, the applicant did not identify any system components which were subject to an AMR because, as described above, the applicant scoped some electrical components as commodity groups. The description of the 125 Vdc system noted that panels in the system are scoped as part of the "component support" commodity group (LRA Section 2.4.2.6) and that cables and connectors are scoped as part of the "cables and connectors" commodity group (LRA Section 2.5.1).

The team reviewed the EA and noted that junction boxes are identified in the EA as being scoped as part of the "component support" commodity group, but this was not included in the description of the 125 Vdc system. However, LRA Section 2.4.2.6 identifies junction boxes as included within the "component support" commodity group, which the inspection team finds acceptable.

The team also found that the system busses were not identified as being scoped as part of the "bus bar" commodity group (LRA Section 2.5.20), as had been done in other electrical systems. During subsequent discussions, the applicant agreed with the team to scope the busses in the 125 Vdc system as part of the "bus bar" commodity group.

With panels, junction boxes, busses, cables, and connectors scoped and screened in separate commodity groups, the team reviewed the remaining system components and determined that all remaining components were active and thus were screened out.

On the basis of its inspection, the inspection team found that the applicant has properly implemented its methodology by properly scoping and screening the components in the 125 Vdc electrical system.

2. <u>4160 Vac Electrical System</u>

As described in LRA Section 2.5.6, the 4160 Vac electrical system comprises the first level of the plant ac distribution system and distributes electrical energy to CQE and non-CQE loads through feeder circuit breakers and can be tied to emergency power supplied from the diesel generators. Switchgear Busses 1A1 and 1A3 constitute one train (the "A" train). Switchgear Busses 1A2 and 1A4 constitute the other train (the"B" train). Each switchgear bus is provided with two supply breakers. One supply breaker is connected to a unit auxiliary transformer secondary while the other supply breaker is connected to the secondary of a house transformer through a nonsegregated phase bus duct. Switchgear Busses 1A3 and 1A4 distribute electrical energy to CQE and non-CQE loads, while switchgear Busses 1A1 and 1A2 distribute electrical energy to non-CQE motors through feeder circuit breakers. Busses 1A1 and 1A2 and their associated loads are not in scope.

The scoping inspection team reviewed EA FC-00-052, "4160 VAC System Scoping, Screening, and AMR for License Renewal," to confirm that the applicant's implementation of its scoping and screening methodology, as applied to the 4160 Vac system, was correct and to determine whether any system components were incorrectly screened.

The applicant included portions of the 4160 Vac electrical system within the scope of LR. For those portions of the system included within scope, the applicant did not identify any system components which were subject to an AMR because, as described above, the applicant scoped some electrical components as commodity groups. The description of the 4160 Vac system noted that panels in the system are scoped as part of the "component support" commodity group (LRA Section 2.4.2.6), that cables and connectors are scoped as part of the "cables and connectors" commodity group (LRA Section 2.5.1), and that busses are scoped as part of the "bus bars" commodity group (LRA Section 2.5.20).

The system description in the LRA states that undervoltage (UV) Relay 27-1/1A4 was functionally transferred from the 120 Vac bus system to the 4160 Vac system. The inspection team questioned why this was done for this UV relay and not for other UV relays. The applicant clarified that this description was drawn directly from the USAR and is characterized as typical of how the 4160 Vac UV relays were handled. The inspection team found this acceptable.

The LRA system description also states that Transformer T1B-4A (a step-down transformer from 4160 Vac to 480 Vac) was functionally classified with the 480 Vac bus system "to coincide with other units." The inspection team questioned the applicant about this statement. The applicant explained that the RAMS equipment database had this component misclassified as part of the 480 Vac system, when it should have been grouped with the 4160 Vac system (the applicant's methodology group's transformers with the system associated with the primary winding, not the secondary winding). The team identified inconsistencies in scoping of Transformer T1B-4A. The applicant agreed with the team conclusion and took prompt action to clarify the scoping of Transformer T1B-4A.

With panels, busses, cables, and connectors scoped and screened in separate commodity groups, the team determined that all remaining components were active and thus screened out.

The inspection team found that the applicant has properly implemented its methodology by properly scoping and screening the components in the 4160 Vac electrical system.

3. <u>480 Vac Bus System</u>

As described in LRA Section 2.5.7, the 480 Vac bus system delivers electrical energy to both CQE and non-CQE equipment and motor control centers (MCCs). Nine 480 Vac bus sections are used to distribute the electrical energy. The system is comprised of three double-ended load centers, each with three bus sections. Each double-ended load center group is provided with two dc control power feeders, one from each dc system, and a manual transfer switch to ensure availability of control power. The six load center transformers are throat-connected and provided with surge protection on the 4160 Vac side.

The scoping inspection team reviewed EA FC-00-058, "480 VAC Bus System Scoping, Screening, and AMR for License Renewal," to confirm that the applicant's implementation of its scoping and screening methodology, as applied to the 480 Vac bus system, was correct and to determine if any system components were incorrectly screened.

The applicant included the system within the scope of LR. Although the system is included within scope, the applicant did not identify any system components which were subject to an AMR because, as described above, the applicant scoped some electrical components as commodity groups. The LRA description of the 480 Vac bus system noted that panels in the system are scoped as part of the "component support" commodity group (LRA Section 2.4.2.6); busses are scoped as part of the "bus bars" commodity group (LRA Section 2.5.20); and cables and connectors are scoped as part of the "cables and connectors" commodity group (LRA Section 2.5.1). The LRA also noted that the system contains "breaker spaces," which do not contain components and which are not included within scope. The inspection team asked the applicant how these spaces would be evaluated for their impact on LR scoping if components are installed in the spaces. The applicant stated that it would use the current scoping and screening methodology to determine whether the installed component met the scoping and screening criteria and, if appropriate, provide aging management. The staff found the applicant's response acceptable.

As discussed above, the LRA system description for the 4160 Vac system states that transformer T1B-4A (a step-down transformer from 4160 Vac to 480 Vac) was functionally classified with the 480 Vac bus system "to coincide with other units." The inspection team questioned the applicant about this statement. The applicant explained that the RAMS equipment database had this component misclassified as part of the 480 Vac system, when it should have been grouped with the 4160 Vac system (the applicant's methodology groups transformers with the system associated with the primary winding, not the secondary winding). The team identified inconsistencies in scoping of Transformer T1B-4A. The applicant agreed with the team conclusion and took prompt action to clarify the scoping of Transformer T1B-4A.

With panels, busses, cables, and connectors scoped and screened in separate commodity groups, the team determined that all remaining components were active and thus screened out.

The inspection team found that the applicant has properly implemented its methodology by properly scoping and screening the components in the 480 Vac bus system.

4. <u>480 Vac Motor Control Center (MCC) System</u>

As described in LRA Section 2.5.8, the 480 Vac MCC system delivers electrical energy to both CQE and non-CQE equipment.

The team reviewed EA FC-00-070, "480 VAC MCC System Scoping, Screening, and AMR for License Renewal," to confirm that the applicant's implementation of its scoping and screening methodology, as applied to the 480 Vac MCC system, was correct, and to determine if any system components were incorrectly screened.

The applicant included the system within the scope of LR. Although the system is included within scope, the applicant did not identify any system components which were subject to an AMR because, as described above, the applicant scoped some electrical components as commodity groups. The LRA description of the 480 Vac MCC system noted that panels in the system are scoped as part of the "component support" commodity group (LRA Section 2.4.2.6), while cables and connectors are scoped as part of the "cables and connectors" commodity group (LRA Section 2.5.1).

With panels, cables, and connectors scoped and screened in separate commodity groups, the team determined that all remaining components were active and thus screened out.

On the basis of its inspection, the inspection team found that the applicant has properly implemented its methodology by properly scoping and screening the components in the 480 Vac MCC system.

5. Communications Systems

As described in LRA Section 2.5.18, the communications and Gaitronics systems provide a means to communicate throughout the station and off site. The team reviewed EA FC-00-080, "Communications System Scoping, Screening, and AMR for License Renewal," to confirm that the applicant's implementation of its scoping and screening methodology, as applied to the communications system, was correct and to determine if any system components were incorrectly screened.

The applicant included the communications system within the scope of LR. Although the system is included within scope, the applicant did not identify any system components which were subject to an AMR because, as described above, the applicant scoped some electrical components as commodity groups. The LRA description of the communications system noted that panels in the system are scoped as part of the "component support" commodity group (LRA Section 2.4.2.6) while cables and connectors are scoped as part of the "cables and connectors" commodity group (LRA Section 2.5.1).

With panels, cables, and connectors scoped and screened in separate commodity groups, the team determined that all remaining components were active and thus screened out.

On the basis of its inspection, the inspection team found that the applicant has properly implemented its methodology by properly scoping and screening the components in the communications system.

6. Containment Electrical Penetrations

The applicant included the containment electrical penetrations within the scope of the LRA. Electrical penetrations perform the functions of a containment boundary component and provide electrical energy across the containment boundary either continuously or intermittently to power various equipment and components throughout the plant to enable them to perform their intended functions. The containment electrical penetration system consists of the electrical penetration which provides an electrical connection between two sections of the electrical/instrument and control circuit. The pigtail at each end of the penetration is connected to the field cable in various ways. The boundary for the electrical penetrations includes the pigtail cable. The team concluded that the applicant had performed scoping and screening for the containment electrical penetration system in accordance with the methodology described in the LRA and the Rule.

7. Reactor Protection System

The applicant included the reactor protection system within the scope of the LRA. The reactor protection system consists of sensors, amplifiers, power supplies, logic equipment, and other equipment necessary to monitor selected nuclear steam supply system conditions and to effect reliable and rapid reactor shutdown if any one or combination of conditions deviates from a preselected operating range to protect the reactor core. The normal logic is two-out-of-four to trip. Open circuiting or loss of power supply for the channel logic intitiates an alarm and a channel trip. The system also provides two methods to manually trip the reactor.

All safety-related electrical components within the reactor protection system have been evaluated as within the LR boundary, with the exception of chassis, panels, cables and connectors. Chassis and panels were incorporated into the component support commodity group and were evaluated separately. Cables and connectors were evaluated as a commodity group for the entire plant. The majority of components were considered active and not subject to aging management. The team concluded that the applicant had performed scoping and screening for the reactor protection system in accordance with the methodology described in the LRA and the Rule.

8. Engineered Safeguards

The engineered safeguards system provides the equipment necessary to initiate the required safeguards functions. The system also monitors the power sources acting to assure the availability of emergency power for operation of at least the minimum engineered safeguards.

The engineered safeguards system was designed and installed as two independent, functionally redundant systems called the "A" train and the "B" train. Automatic sequencers for starting safeguards pumps, fans and support auxilliaries are duplicated in each of the "A" and "B" trains. Each of the four sequencers operates with a separate control power source and distribution system. Any one sequencer operating alone automatically actuates minimum safeguards. The engineered safeguards control and instrumentation subsystem includes control devices and circuits for automatic initiation, control, supervision, and manual test of the engineered safety features systems and components and their essential auxiliary support systems. The system does not include sensing instrumentation and does not include the AFW actuation system.

All safety-related electrical components within the engineered safeguards system have been evaluated as within the LR boundary, with the exception of the temperature indication controller for the containment HVAC system, which is evaluated as part of the containment HVAC system. Chassis, junction boxes, and panels were incorporated into the component supports commodity group and are evaluated separately. Cables and connectors are evaluated as a commodity group for the entire plant.

The majority of the components were considered active and were not subject to AMR. The team concluded that the applicant had performed scoping and screening for the engineered safeguards system in accordance with the methodology described in the LRA and the Rule.

9. Radiation Monitoring

The applicant included the radiation monitoring system within the scope of the LRA. Permanently installed radiation monitors are provided for surveillance of plant effluents and critical process streams (process monitors) and personnel exposure levels in hazardous and potentially hazardous plant areas (area monitors). Monitoring and recording is required for liquid and gaseous releases. Process monitors measure RCS and balance-of-plant leakage.

Two independently adjustable setpoints are provided for each monitor. The lower setpoint alarm warns that the dose rate has reached an abnormal value. The upper setpoint alarm warns that the dose rate has reached or passed the permissible limit. The local indicator, as well as the control room indicator and recorder, indicates the actual dose rate at the detector location. Signals for containment radiation high signal (CRHS) trains are derived on a one-out-of-two basis from separate contact outputs from the containment and stack radiation monitors.

The radiation monitoring system includes circuit breakers, relays, controllers, transmitters, radiation detectors, and miscellaneous electronic components to monitor, log, and alarm radiation levels throughout the plant.

The team reviewed applicable sections of the USAR, the LRA, applicable LR drawings, and scoping and screening reports for the radiation monitoring system. The team determined that the applicant had properly accounted for the components that are subject to AMR. The team concluded that the applicant had performed the scoping and screening for the radiation monitoring system in accordance with the methodology described in the Fort Calhoun LRA and the Rule.

10. Qualified Safety Parameter Display System (QSPOS)

The QSPDS includes instrumentation to detect the approach to, existence of, and recovery from an inadequate core cooling situation. This system includes upgraded core exit thermocouples, heated junction thermocouple probes for reactor vessel level indication, associated cabling, and the QSPDS microprocessors and displays. The QSPDS also uses wide-range temperature signals and a pressurizer pressure signal to calculate subcooled margin.

The system utilizes a microprocessor-based design for the signal processing equipment in conjunction with a display having alphanumeric representation and associated keyboard for each of the two channels. Each channel accepts and processes input parameter signals and transmits its output to the plasma display unit, an alphanumeric display device. In addition, each channel transmits its output to the Emergency Response Facility computer system.

All safety-related electrical components within QSPDS have been evaluated as within the LR boundary with the exception of panels and cables and connectors. Panels are incorporated into the component support commodity group and are evaluated separately. Cables and connectors are evaluated as a commodity group for the entire plant. The majority of components were considered active and not subject to aging management. The team concluded that the applicant had performed scoping and screening for the QSPOS in accordance with the methodology described in the LRA and the Rule.

11. Main, Auxiliary, and Startup Transformers

When the LRA was initially submitted, the main, auxiliary, and startup (house) transformers were not included within the scope of LR. However, since the LRA was submitted, the staff has issued a position on the scoping of SSCs that are necessary to comply with the requirements of the SBO Rule (10 CFR 50.63). Specifically, the staff position clarified that SSCs which were required to ensure restoration of offsite power should be included within the scope of LR. In response to the staff position, the applicant developed EA-FC-00-148, "Substation - SBO Restoration," to address the scoping, screening, and aging management of additional SSCs required to assure restoration of offsite power, as required by the SBO Rule. The scoping inspection team reviewed the EA to determine whether the additional SSCs were brought in scope and whether any SSCs were omitted that should have been included within scope. In addition, the inspection team reviewed the EA to determine if any in-scope passive, long-lived structures or components were omitted from an AMR.

The inspection team reviewed the EA and found that no SSCs that are required to meet the SBO Rule were omitted from scope. The team determined that the main, auxiliary, and house transformers were brought into scope as a result of the applicant's evaluation of the SSCs required for compliance with the SBO Rule, including consideration of the restoration of offsite power. The transformers, though within the scope of LR, are active components and, therefore, were screened out as not subject to an AMR.

The team found that the applicant had appropriately identified the following structures and components as in scope and subject to an AMR: structural steel isolated phase bus used for structural support for nonsafety-related switchyard equipment, 161 kV line carrier equipment used to support the 161 kV line to and from the switchyard, 345 kV line carrier equipment used to support the 345 kV line, carbon and galvanized steel bolting, concrete pads and foundations above and below grade, and galvanized steel supports. The team also reviewed the structures and components that the applicant eliminated from AMR consideration to ensure that no structures that should have been subject to an AMR were omitted. The team found that the applicant had not omitted any passive, long-lived components from an AMR.

On the basis of its review, the inspection team concludes that the applicant has properly implemented its methodology by properly scoping and screening the main, auxiliary, and startup transformers required to comply with the SBO Rule.

12. Switchyard

When the LRA was initially submitted, switchyard cables were not included within the scope of LR. However, since the LRA was submitted, the staff has issued a position on the scoping of SSCs that are necessary to comply with the requirements of the SBO Rule (10 CFR 50.63). Specifically, the staff position clarified that SSCs which were required to ensure restoration of offsite power should be included within the scope of LR. In response to the staff position, the applicant developed EA (FC-00-148) to address the scoping, screening, and aging management of additional SSCs required to assure restoration of offsite power, as required by the SBO Rule. The scoping inspection team reviewed the EA to determine whether the additional SSCs were brought in to scope and whether any SSCs were omitted that should have been included within the scope. In addition, the inspection team reviewed the EA to determine if any in-scope passive, long-lived structures or components were omitted from an AMR.

The inspection team reviewed the EA and found that no cabling required to meet the SBO Rule were omitted from scope. The team determined that additional cabling was brought into scope as a result of the applicant's evaluation of the SSCs required for compliance with the SBO Rule, including consideration of the restoration of offsite power.

The team found that the applicant had appropriately identified underground cabling associated with restoration from SBO as in scope and subject to an AMR. This cabling was scoped with "cables and connectors" (LRA Section 2.5.1). Other switchyard equipment within the scope of LR and subject to an AMR are discussed above, under "Main, Auxiliary and Startup Transformers."

On the basis of its review, the inspection team concludes that the applicant has properly implemented its methodology by properly scoping and screening additional switchyard components required to comply with the SBO Rule.

13. <u>22 kV Electrical</u>

The 22 kV electrical system was excluded from the scope of the LRA. The function of the 22 kV electrical system is to supply power from the generator to the main transformer, which steps up the 22 kV to 345 kV for transmission offsite to the electrical grid. In addition, the 22-kV electrical system supplies power to the unit auxiliary transformers which provide the normal source of power for the 4160 v busses.

The team reviewed the relevant description of the system in the USAR. The system is not safety related, and the applicant did not include the system in the scope of the LRA. The team found the applicant's determination acceptable and concluded that the applicant had performed the scoping for this structure in accordance with the methodology described in the LRA and the Rule.

C. <u>Evaluation of Scoping and Screening of Structural Components</u>

1. <u>Structural Scoping and Screening Process</u>

The applicant's scoping methodology is presented in Section 2.1.4.2 of the Application for Renewed Operating License, April 5, 2002. The containment building, auxiliary building, and intake structure are identified as Class 1 structures in plant current licensing basis documentation and are within the scope of LR based on scoping Criterion 1. Non-Class 1 structures (turbine building and service building) required evaluation of plant documentation (e.g., DBDs, CQE List), USAR, and the FCS docket to determine their applicability to scoping Criterion 2 or 3. For example, certain plant structures or structural components are credited in OPPD responses to the requirements of 10 CFR 50.48 (e.g., fire barriers of containment of flammable liquids). Interviews with experienced plant personnel were conducted as necessary to assure complete review of FCS structures. The turbine building and service building are within the scope of LR. As a result of this review, the intended functions of the structural components were identified from the applicable source documents. The primary FCS inputs used in identifying the intended functions for structural components were the DBDs, CQE List, USAR, and FCS docket.

Also NEI 95-10, and the Calvert Cliffs and Oconee LR scoping methodologies were consulted for structural component intended functions previously identified and accepted by the NRC.

2. Structures that the License Renewal Application (LRA) Concludes are Within the Scope of License Renewal (LR)

The team reviewed documentation supporting the scoping and screening process for the following structures that were concluded by the applicant to be within the scope of LR. The team performed a walkthrough of accessible portions of the following structures to assess the material condition and to determine if there were visible signs of deterioration: containment, auxiliary building (including EDG buildings), SIRWT, diesel FO tank foundation, and the intake structure.

a. Containment

The applicant included the containment structure within the scope of the LRA. The containment is a Seismic Class I structure and is an essentially leak tight barrier to protect the public health and safety from postulated design basis events. The containment also supports and protects safety-related equipment inside it, provides shielding against radiation, and protects components within it from floods and tornados.

The containment structure is a domed cylinder with an outside radius of 58'-10 3/4" and a height of 140'-4 3/4". The containment structure is placed on a mat, which in turn is supported by steel piles driven into bedrock.

The team reviewed the description and the licensing basis of containment in the USAR, the DBDs, and the LR scoping and screening forms to determine the validity and appropriateness of the screening process. Several related drawings were also reviewed. The team found that the applicant had performed the scoping and screening for this structure in accordance with the methodology described in the LRA and the Rule.

b. Auxiliary Building

The applicant included the auxiliary building structure within the scope of the LRA. The auxiliary building is a multi-floored reinforced concrete Seismic Class I structure that is adjacent to and almost surrounds the containment building, and has safety-related and nonsafety-related equipment within it to support plant operation. The building was designed to provide suitable tornado and earthquake protection for the Class 1 equipment and components. The auxiliary building foundation mat is integral with the containment building and supported by piles that are driven into bedrock.

The auxiliary building also houses the SIWRT, the EDG buildings, the diesel FO tank (FO-1), and the spent fuel pool.

Section 9.6 of the applicant's EA for the auxiliary building listed the component groups that required an AMR, including the reinforced concrete above and below grade, flood panel seals, missile barriers, structural steel, the spent fuel pool liner, and the diesel FO tank (FO-1).

The team reviewed the boundaries of the auxiliary building system scope depicted in the applicant's renewal drawings and found them appropriate, with one exception. The drawings showed that diesel fuel oil tank (FO-1) was in scope as a Category 1 item, but FO-10, auxiliary boiler fuel oil storage tank is also used to maintain the Technical Specification required amount of fuel oil. FO-10 is credited in Technical Specification Amendment 162, dated March, 29,1994, as having 8000 gallons of fuel oil that could be transferred to FO-1; and this was necessary for the diesel generators to have the required amount of fuel oil. The amount of fuel in FO-10, combined with the amount of fuel in FO-1 provides for about 7 days of diesel operation. FO-1 and FO-10 are almost identical in their design details.

The applicant had placed FO-10 in scope, but only as a Category 3 item for SBO reasons. Therefore, Tank FO-10 would not have its foundation in scope for LR, while FO-1 would. The team determined that, since both tanks were noted in the safety evaluation associated with Technical Specification Amendment 162 (3/29/1994) as required to store the amount of fuel oil required for the diesels to perform their design basis function, tank FO-10 should have been in scope per 10 CFR 54.4(a)(2). The applicant reviewed this item and agreed with the team that the tank foundation was a Category 2 item (nonsafety-related affecting safety-related) and should be included in the scope of the LRA.

The team examined the results of the applicant's screening of the auxiliary building structure and concluded that the applicant had performed the scoping and screening for this structure according to the methodology describe in the LRA and the Rule.

c. Intake Structure

The intake structure is a seismic Class I structure that houses the safety-related RW pumps, the nonsafety-related CW pumps, and the fire protection pumps. Part of the intake structure includes the fire pump fuel oil storage tank. The intake structure is designed to take water from the Missouri river to be used to cool various components at Fort Calhoun. The water provided to the pumps in the intake structure goes through a trash rack, sluice gates, and a rotating screen. The intake structure also provides a barrier for internal/external flood events, with doors and panels used to prevent water from getting into the intake structure.

Section 9.6 of the applicant's EA for the intake structure for component groups that required an AMR included flood protection for the RW pump room, the reinforced concrete for this room, and stuffing boxes for cell cross-connect sluice Gates CW-16A and CW-16B and other components.

The team reviewed the boundaries of the intake structure and generally agreed with the applicant's scoping decisions, but had one open item. The open item concerns the warm water recirculation tunnel in the intake structure, which is used to divert warm water to the intake structure during cold weather via a normally closed sluice gate (CW-17). Section 9.8 of the USAR notes that "Icing conditions at the river water entrance of the intake structure are prevented by routing a portion of the warm water from the CW discharge tunnel back upstream of the intake screen. Experience with the District's stations on the Missouri River shows that, by controlling the amount of water being recirculated, potential icing conditions can be averted."

The intake structure DBD also noted that warm water was to help prevent the formation of frazil ice. Formation of frazil ice at intake structures has occurred in the industry. The open item is to understand the basis why the warm water recirculation is not considered in scope. See Section II.A.19 for additional discussion. (Open Item 50-285/02-07-04)

d. Turbine Building and Service Building

The turbine and service building are within the scope of LRA as discussed in Attachment 9.2 of EA-FC-00-066 "Turbine Building," Revision 1, dated July 29, 2002. The turbine and service building are multi-floored Class II structures. The lower part of the turbine building is a box type reinforced concrete structure with internal bracing provided by concrete walls, floor slabs, and structural steel. The mat foundation is supported on steel piles driven to bedrock. The upper part of the building is a braced steel frame clad with aggregate resin panels. The service building is basically a steel frame structure supported on a concrete mat foundation. Both buildings house safety-related and nonsafety-related components. The turbine generator is located on the ground floor of the turbine building and is supported on a massive concrete structure called the turbine pedestal. The pedestal is independent from the turbine building.

The scoping boundary for the turbine building includes all concretes and steel east of the auxiliary building, and the turbine pedestal is within the boundary. The CW intake and discharge tunnels are not within the turbine building system boundary and piles are evaluated as commodities. Attachment 9.7 screens out the building doors, the masonry block walls, and the expansion joint between the auxiliary and the turbine building. The team determined that the applicant's assessment was appropriate.

e. Building Piles

The building piles commodity is presented in EA-FC-00-067, "Building Piles," Revision 1, 7/22/02. Attachment 9.2 of this document describes that building piles consist of five types: Class A steel piles, Class B steel piles, concrete caissons, Raymond-step taper piles, and steel H-piles. Attachment 9.2 further describes that the Class A steel piles are 20" OD open end pipe piles driven to bedrock and filled with sand and concrete. Class A piles are capped with a 2" thick steel end plate. Class I structures (Containment structure, auxiliary building, and intake structure) are founded on Class A piles as well as the turbine pedestal. Class B piles are 12.75" OD close-end piles filled with concrete. Class B piles are capped with a 1.25" steel end plate and are used to support Class II structures (turbine and service buildings).

Concrete caissons are three foot diameter concrete cylinders that extended 10 feet into bedrock. The caissons support the diesel generator missile shield enclosures. Steel H-piles are used in the foundation of yard transformers, the condensate storage tank, the auxiliary boiler fuel oil storage tank (FO-10), and the diesel engine fuel oil storage tank (FO-1). Only piles used for the FO-1 tank are within the scope of LR. The radwaste building is supported with Raymond-step taper piles. These piles are not within the scope of LR since the radwaste building has no intended safety function(s).

The H-steel piles supporting the FO-10 tank were included within the scope of the LR application by the applicant after discussions with the team (see writeup in the auxiliary building section). The team also questioned the exclusion of the Class A piles supporting the turbine pedestal and the applicant explained that, based on Statement of Consideration (SOC) 22467 for the Rule, the Class A piles supporting the turbine pedestal should be excluded due to the cascading effect (i.e. pipe supporting the turbine pedestal was a lower level supporting system). The team concluded that the applicant had performed the scoping and screening for this structure in accordance with the methodology described in the LRA and the Rule.

Attachment 9.6 to EA-FC-00-067 lists the concrete filler in Class B piles as needing an AMR while the concrete and sand filler of the Class A piles does not need an AMR. The team requested an explanation for why the filler for the Class A piles did not require an AMR. The applicant stated that the Class A piles were designed to support the design load combinations without considering the filler. Section 5.7.2.1 of the USAR states that the Class A piles are open end steel pipe piles driven to bedrock. There was no satisfactory method to remove the interior soils without affecting the surrounding soils and to adequately install the concrete for direct positive bearing on the bedrock surface. Therefore, it was necessary to select a pipe pile size of adequate bearing capacity based on the steel cross-sectional area only without reliance on a concrete core. The team determined that the applicant's assessment was appropriate.

f. Component Supports

EA-FC-00-068, "Component Supports," Revision 1, dated October 20, 2002, describes and assesses the commodity group component supports. Attachment 9.2 of the document indicates that this commodity group consists of the structural connection between a system, or component within a system, and a plant building structural concrete or steel member. Component supports include all Seismic I and II/I supports for pipe, conduit, raceway, tubing, ventilation duct, and equipment supports. Electrical equipment enclosures for junction boxes, panels, cabinets, conduit, raceway, switchgear, and the anchor bolts associated with the supports are also included.

Attachment 9.2 also states that snubbers are considered active components and do not require an AMR. However, the structural components that attach the snubber to the piping and to the building are included. The snubber support includes the subcomponents from the snubber pin connections to the structural component, such as wall, floor, beam, etc., and from the other snubber pin connection to the pipe or component being supported.

Attachment 9.4 of EA-FC-00-068 indicates that the boundary of this commodity group includes all steel and grout for safety-related (CQE) and important to safety (limited CQE) component supports in the containment structure, auxiliary building, intake structure, and Manholes 5 and 31. The components support commodity group includes ASME piping Class 1, 2, and 3 pipe supports and equipment anchorage, CQE and limited CQE for cable trays, conduits, cable tray and conduit supports, HVAC duct supports, tube track and tubing supports. It also includes the structural portion and fasteners for racks, panels, cabinets, and enclosures for electrical equipment. Jet impingement barriers and pipe whip restraints are evaluated as part of the structure that houses these components. The team concluded that the applicant had performed the scoping and screening for this structure in accordance with the methodology described in the LRA and the Rule.

g. Duct Banks

Duct banks are described in EA-FC-01-015, "Duct Banks," Revision 2, dated July 22, 2002, as conduits that are encased in concrete and located below grade. Attachment 9.2 of the document states that duct banks are used to route electrical cables between buildings. Electrical manholes, as evaluated as part of duct banks, are reinforced concrete box-type structures which allow for inspection and routing the cables. Duct banks and electrical manholes contain both safety-related and nonsafety-related cables. Only the duct banks and electrical manholes of Class I design that contain safety-related cables are within the scope of LR.

The system boundary, as listed in Attachment 9.4 of EA-FS-01-015, includes all concrete, carbon steel, gray cast iron, polyurethane foam, and elastomer materials that form the electrical manhole and duct banks which connect the auxiliary building and the intake structure. The only components that are screened out are the manhole 31 gasket and duct bank elastomer joints. The team determined that the applicant's assessment was appropriate.

3. Structures that License Renewal Application Concludes are not Within Scope of License Renewal

a. Condensate Storage Tank Enclosure

The condensate storage tank enclosure was excluded from the scope of the LRA. The function of the condensate storage tank enclosure is to provide makeup water to the main condenser and receive excess water dumped from the condenser. The tank has a 30-foot outside diameter and is 30 feet high with a capacity of 150,000 gallons.

The team reviewed the relevant description of the system in the plant USAR. The system is nonsafety-related, and the applicant has not included the system in the scope of the LRA. The team found the applicant's determination acceptable and concluded that the applicant had performed the scoping for this structure in accordance with the methodology described in the LRA and the Rule.

b. Switchyard

The switch yard/substation was listed as not within the scope of LR in Table 2.1-1 of the LRA. During the technical review of the LRA, the staff issued Request for Additional Information 2.5-1 and requested the applicant to include any offsite power SSCs are needed to fulfill the SBO Rule requirements. The applicant agreed to put the switchyard within the scope of LR to restore the station power after an SBO.

Attachment 9.2 of EA-FC-00-148, "Substation - SBO Restoration," Revision 0, dated October 22, 2002, states that the substation (SBO restoration) includes transformers, circuit breakers, disconnect switches (manual and motor-operated) high voltage bus work and transmission cables, transmission towers, supports, actuating relays, blocking relays, indicating lights, alarm logic, and miscellaneous electronic components and switches to allow isolation, transformation, and distribution 345 kV, 161 kV, and 22 kV power to supply the plant 4.16 kV system.

There are two offsite power sources available (the 161 kV and 345 kV), either system can operate the 4.16 kV buses. The system boundary also includes all foundations for electrical equipment and transmission towers in the switchyard area. All foundations are constructed of concrete and are supported on compacted earthen fill.

All electrical components within the SBO restoration system have been considered and evaluated as within the LR boundary, except the following which are evaluated as separate commodity groups. They are: chassis, panels, power supplies, terminal blocks, fuse blocks, connectors, and medium and low voltage cables. The team inspected the switchyard and found the in-scope equipment and supports were in good condition.

The team concluded that the applicant had performed the scoping and screening for this structure in accordance with the methodology described in the LRA and the Rule.

D. Fire Protection

The applicant included virtually all of the fire protection system within the scope of the LRA. The exceptions were the use of the fire protection system as a backup water supply to the RW system in the event of a loss of all raw water pumps, and the spent fuel pool in the event of a spent fuel pool liner rupture. However, these are not intended functions of the fire protection system. The fire protection system provides means for detecting, alarming, isolating, and suppressing fires in the plant. The fire protection system consists of detectors, two 100 percent capacity fire pumps and water supply, automatic sprinklers, automatic halon systems, standpipe hose stations, outside fire hydrants, fire rated barriers (doors, dampers, and penetration seals), and the reactor coolant pump oil collection system. The team reviewed the applicable LRA sections, USAR, DBD, LR drawings, and scoping and screening documents for the system. The team found that the applicant had performed the scoping and screening for this system in accordance with the methodology described in the LRA and the Rule.

During its review of the fire protection system, the team questioned whether the turbine-generator exciter carbon dioxide system should be included within scope. The team believed that the system was required to comply with 10 CFR 50.48. The applicant stated that the system was installed for insurance purposes and not required for compliance with 10 CFR 50.48. During the inspection, the applicant provided Configuration Change Report 92-020 and Nuclear Safety Evaluation MR-FC-92-020, which confirmed that the installation of the carbon dioxide system was performed in response to an American Nuclear Insurers recommendation.

E. Visual Observation of Plant Equipment

On October 31, 2002, while at power, an inspector performed walkdown inspections of accessible portions of plant SSCs and electrical cable inside containment to observe material condition and inspect for aging conditions that might not have been recognized and accounted for in the LRA. The observations of general material conditions included: inspection of piping components for evidence of leaks or corrosion, inspection of coatings (piping, tanks, and structural components), and inspection of electrical cable for visual deterioration. In general, material condition was good and no aging management issues were identified. The following is a partial list of equipment observed:

SI piping and valves
Safety Injection Tanks and associated piping
electrical cable and cable trays
component cooling water piping
containment liner

III. Conclusions

The inspection concluded that the scoping and screening portion of the applicant's LR activities were conducted as described in the LRA and that documentation supporting the application is in an auditable and retrievable form, with the exception of the followup items identified in this report.

Exit Meeting Summary

The results of this inspection were discussed on November 8, 2002, with member of OPPD staff in an exit meeting open for public observation at the Fort Calhoun Station Training Center. The applicant acknowledged the findings presented and presented no dissenting comments. During the exit meeting, the team asked the applicant whether any of the material examined during the inspection should be considered proprietary. Applicant representatives replied that no proprietary material was reviewed during the inspection.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

K. Henry, Supervisor, Nuclear Projects
J. Gasper, Manager of Nuclear Projects
B. Van Sant, Acting Project Manager, License Renewal
R. Ridenoure, Division Manager, Nuclear Operations
R. Phelps, Division Manager, Engineering
D. Bannister, Manager, Fort Calhoun Station
T. Matthews, Supervisor, Licensing
P. Dibenedetto, Project Manager, License Renewal Electrical
T. Hoppe, Project Manager, License Renewal Structures
D. Finlay, Project Manager, License Renewal Mechanical
T. Dailey, Raw Water System Engineer

NRC

C. Johnson, Branch Chief, Project Branch C, Division of Reactor Projects

LIST OF DOCUMENTS REVIEWED

FCS LICENSING AND DESIGN BASES DOCUMENTS

Title	Revision
Fort Calhoun Station Unit 1, Revised Application for Renewing Operating License	April 5, 2002
Fort Calhoun Station, Updated Safety Analysis Report	
Design Basis Document SDBD-CA-1A-105, Instrument Air	15
Design Basis Document SDBD-FP-115, Fire Protection	16
Design Basis Document SDBD-VA-AUX-138, Auxiliary Building HVAC	15
Design Basis Document SDBD-FW-AFW-117, Auxiliary Feedwater	24
Design Basis Document SDBD-MS-125, Main Steam and Turbine Steam Extraction	16
Design Basis Document SDBD-AC-CCW-100, Component Cooling Water	27
USAR Section 9.4, Auxiliary Feedwater System	9
USAR Section 9.7, Component Cooling Water	6
USAR Section 9.8, Raw Water	9
USAR Section 10, Steam and Power Conversion System	10
Licensing Amendment No. 200 to Facility Operating License No. DPR-40 for the Fort Calhoun Station, Unit 1, dated August 29, 2001	

FCS LICENSE RENEWAL ADMINISTRATIVE DOCUMENTS

Procedures

Title	Revision
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Production Engineering Division PED-GEI-67, License Renewal Mechanical Scoping and Screening Procedure	1
Abnormal Operating Procedure AOP-11, Loss of Component Cooling Water	6
Emergency Plant Implementing Procedure, EPIP-RR-17A, Fort Calhoun Station	

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EA-FC-00-073	Electrical, Radiation Monitoring	1
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Production Engineering Division PED-GEI-67, License Renewal Mechanical Scoping and Screening Procedure	1
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License Renewal Scoping and Screening Reports

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EA-FC-00-067	Building Piles	1
EA-FC-00-068	Component Supports	1
EA-FC-01-015	Duct Banks	2
EA-FC-00-148	Substation - SBO Restoration	0
EA-FC-01-060	Engineered Safeguards	1
EA-FC-01-061	Reactor Protection System	1
EA-FC-00-032	Auxiliary Feedwater	1
EA-FC-00-072	Qualified Safety Parameter Display	1
EA-FC-00-073	Radiation Monitoring	1
EA-FC-00-093	Component Cooling Water	1
EA-FC-00-094	Main Steam	1
EA-FC-00-095	Fire Protection	1
EA-FC-00-096	Auxiliary Building Ventilation	2
EA-FC-00-096	Auxiliary Building Ventilation	2
EA-FC-00-106	Containment Electrical Penetrations	1
EA-FC-00-109	Emergency Diesel Generators	1
EA-FC-00-118	Instrument Air	1
EA-FC-00-136	Plant Level Scoping for License Renewal	0
EA-FC-00-063	Intake Structure	2
EA-FC-00-064	Containment	2
EA-FC-00-065	Auxiliary Building	2
EA-FC-00-075	Diesel Generator Lube Oil and Fuel Oil	1

Engineering Analysis	Title	Revision
EA-FC-00-131	Reactor Coolant System Scoping_Screening, and Aging Management Review for License Renewal	1
EA-FC-00-123	Spent Fuel Pool Cooling System Scoping, Screening, and Aging Management Review for License Renewal	1
EA-FC-00-136	10 CFR 54.4 System Scoping for License Renewal.	1
EA-FC-00-090	Containment Heating and Ventilation and Cooling Systems	
EA-FC-00-097	Ventilating Air	
EA-FC-00-125	Control Room HVAC	
EA-FC-00-100	Raw Water	1
EA-FC-00-127	Miscellaneous Systems, Penetrations, and Components	1
EA-FC-00-126	Safety Injection	1
EA-FC-00-128	Chemical and Volume Control	1
EA-FC-00-133	Reactor Vessel	1
EA-FC-00-134	Reactor Vessel Internals	1

Miscellaneous

- NEI 95-10 (Revision 3) Industry Guideline for Implementing The Requirements of 10 CFR Part 54 - The License Renewal Rule, March 2001
- NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, July 2001
- Configuration Change Report 92-020
- Nuclear Safety Evaluation MR-FC-92-020

ATTACHMENT 2

ACRONYMS USED IN THIS REPORT

AFW	auxiliary feedwater
AMR	Aging Management Review
CIV	containment isolation valve
DBA	design basis accident
DBD	design basis document
CCW	component cooling water
CQE	critical quality equipment
CS	containment spray
CVCS	chemical volume control system
CW	circulating water
EA	engineering analysis
EDG	emergency diesel generator
FACTS	Fort Calhoun automatic cable tracking system
FO	fuel oil
HEPA	high efficiency particulate absorption
HPSI	high pressure safety injection
HVAC	heating, ventilation, and cooling
LOCA	loss of coolant accident
LPSI	low pressure safety injection
LR	license renewal
LRA	license renewal application
MCC	motor control center
NRC	Nuclear Regulatory Commission
QSPDS	qualified safety parameter display system
RAMS	OPPD equipment database
RCS	reactor coolant system
RW	raw water
RVI	reactor vessel internals
SBO	station blackout
SSC	structures, systems and components
SI	safety injection
SIRWT	safety injection refueling water tank
UV	undervoltage
USAR	Updated Safety Analysis Report
Vac	Volts Alternating Current
Vdc	Volts Direct Current

Electronic distribution by RIV:
Regional Administrator **(EWM)**
DRP Director **(ATH)**
DRS Director **(DDC)**
Senior Resident Inspector **(JGK)**
Branch Chief, DRP/C **(CEJ1)**
Senior Project Engineer, DRP/C **(WCW)**
Staff Chief, DRP/TSS **(PHH)**
RITS Coordinator **(NBH)**
Jim Isom, Pilot Plant Program **(JAI)**
RidsNrrDipmLipb
Scott Morris **(SAM1)**
FCS Site Secretary **(NJC)**
Dale Thatcher **(DFT)**

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RIV:SPE:DRP/E	[illegible]	[illegible]DRS/EMB	RI:DRP/C	PM[illegible]
VGGaddy	AJHenry	RPMullikin	LMWilloughby	AGWang
T-WCWalker	***E-WCWalker***	***T-WCWalker***	***T-WCWalker***	***E-WCWalker***
12/10/02	12/18/02	12/12/02	12/20/02	12/12/02
RE:DRP/RLSB	[illegible]	[illegible]EMB	SPE:DRP/C	C:DRP[illegible]
HBWang	WFBurton	JFMelfi	WCWalker	CEJohnson
E-WCWalker	***E-WCWalker***	***T-WCWalker***	WC Walker	[signature]
12/12/02	12/18/02	12/16/02	12/20/02	12/20/02

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