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Regulatory Docket File

DEC 28 1976

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Karl Kniel, Chief
Light Water Reactors Branch 2

Gentlemen:

AMENDMENT 40
APPLICATION FOR LICENSES
NO. 1 AND 2 UNITS
SALEM NUCLEAR GENERATING STATION
DOCKET NOS. 50-272 AND 50-311

Amendment 40 to the Application for Licenses for Salem Nuclear Generating Station was filed with your office on July 30, 1976. Enclosed are seventy (70) printed copies of the same amendment. Please disgard the previous submittal, which consisted of facsimile reproductions. The enclosed printed copies are identical to the reproductions previously submitted.

Very truly yours,

R. L. Mittl
General Manager - Projects
Engineering and Construction

13030

The Energy People

95-2001 (400M) 6-76

AMENDMENT 40
APPLICATION FOR LICENSES
SALEM NUCLEAR GENERATING STATION
DOCKET NOS. 50-272 AND 50-311

Detailed Instruction for insertion of new and replacement pages for the Final Safety Analysis Report.

Insert the following Amendment 40 pages, and remove the corresponding existing pages as indicated below:

AMENDMENT 40 PAGES (INSERT)	EXISTING PAGES (REMOVE)
Chapter 6	
6.3-7/6.3-8	6.3-7/6.3-8
Chapter 9	
9.9-3/9.9-4	9.9-3/9.9-4
9.9-5/Table 9.9-1	9.9-5/Table 9.9-1

Amendment History

Insert these instructions at the end of the Amendment History section.

A flow switch at each fan operating both normally and post-accident, indicates whether air is circulating in accordance with the design arrangement. Indication and alarms are provided in the control room.

6.3.2.3 Flow Distribution and Flow Characteristics

The location of the distribution ductwork outlets, together with the location of the fan cooler unit inlets, ensures that the air will be directed to all areas requiring ventilation before returning to the units.

In addition to ventilating areas inside the periphery of the polar crane wall, the distribution system also includes branch ducts located at opposite extremes of the containment wall for ventilating the upper portion of the containment. These ducts extend upward along the containment wall as required to permit the throw of air from the ducts to reach the dome area and assure that the discharge air will mix with the atmosphere.

The air discharged inside the periphery of the polar crane wall will circulate and rise above the operating floor through openings around the steam generators where it will mix with air displaced from the dome area. This mixture will return to the fan coolers located on the operating floor. The temperature of this air will be essentially the design ambient for the containment vessel (120°F average maximum). 38

The steam-air mixture from the containment entering the cooling coils initially during the accident will be at approximately 271°F and have a density of 0.175 pounds per cubic foot. Most of the water vapor will condense on the cooling coil, and the air leaving the fan cooler will be saturated at a temperature slightly below 271°F.

With a flow rate of 47,000 cfm from each fan under accident conditions and a containment free volume of 2,620,000 ft^3 the recirculation rate with five fans operating is approximately 5.4 containment volumes per hour. 38

6.3.2.4 Cooling Water for the Fan Cooler Units

The cooling water requirements for all five fan cooler units during a loss of coolant accident and recovery are supplied by the service water system. The Service Water System is described in Chapter 9.

The service water, as it is discharged from the cooling coils, is monitored
for radioactivity by routing a small bypass flow from each fan cooler unit
through a radiation monitor. Upon indication of high radioactivity in this
40 effluent, the service water lines for the indicated cooler are isolated, and
operation continues with the remaining unaffected units. No contaminated
leakage into these units is expected, however, since the cooling coils and
service water lines are completely closed inside the containment.

Flow and temperature indication is provided outside containment for service water flow to and from each fan cooler unit. Abnormal flow alarms are provided in the control room.

During normal operation, a dual setpoint service water flow controller will position the flow control valve to give the required 700 gpm flow. During conditions of safety injection, a signal to the controller changes the setpoint to 2500 gpm. The control valve closes when the fan cooler unit is not in use.

Plant Condition	No. of Pumps
b. Recirculation Phase	3[1]

Emergency diesel generators are provided to power any three pumps during a failure of normal power supply. This assures sufficient water supply during any accident condition, even in the event of simultaneous pump and supply line outages coincident with a loss of all offsite power. The total system requirements during various modes of plant activity are listed on Table 9.9-1 which lists the required pumping requirements based on a maximum river temperature of 85 degrees F.

The reactor containment fan cooler (RCFC) units are supplied by individual lines from the containment area service water header. Each inlet and discharge line penetrating the containment wall is provided with a remotely-operated, automatically controlled shut-off valve. This provision allows each fan cooler to be isolated on an individual basis from outside the containment area.

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Each fan cooler discharge line monitored for radioactivity. Indication of radioactivity in a cooler effluent will automatically

1 Minimum recirculation requirements can be accomplished with 2 Service water pumps.

activate the containment isolation valves to isolate that cooler from the header.

Water leakage from the RCFC units into the containment can be detected by means of flow mismatch instrumentation.

The service water pumps are of the vertical, multistage, turbine type each rated at 10,875 gpm and 240 ft. head and are directly driven by 1000 HP induction motors powered from the plant vital buses. The pumps for each unit are mounted in two individual dewaterable cells of the intake structure with three pumps to a cell. The intake structure is physically apart from the turbine condenser circulating water pump intake. The pumps are arranged to afford adequate submergence during the lowest credible water level elevation of 76.0 ft. The motors are protected from flooding to an elevation of 121.0 ft. by the watertight pump room compartments which contain sump pumps. Automatic traveling water screens are provided at each intake cell and combine with full depth trash racks to filter debris from the incoming flow. A mobile mechanical trash rake unit is provided to maintain unobstructed passageways at the trash racks. Two-foot wide fish escape passages are located abreast of the traveling screens to minimize the entrapment of fish in the individual intake cells. Organic
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buildup in the pumps, piping and heat exchangers is prevented by means of injecting sodium hypochlorite at the suction of each pump. Each pump discharges to an automatic, self-cleaning strainer and check valve prior to entering the compartment supply header.

All system components and piping listed on Table 9.9-1, which are required to operate in the event of a loss-of-coolant accident, are designed in accordance with Seismic Class I criteria. In addition, the pump intake structure and service water equipment therein conforms to Seismic Class I criteria. The turbine generator portion of the Service

Water System within the intake structure is designed to Class I (seismic) criteria.

9.9.3 DESIGN EVALUATION

The Service Water System is designed to remain operable under each of the following conditions:

a. Any one pump failure and one pump under maintenance.
b. One main supply header failure.
c. One 4 kV vital bus failure coincident with loss of offsite power.

The minimum engineered safeguards equipment required to safely shut down the unit will not be limited by any of these failures.

9.9.4 TESTS AND INSPECTIONS

The system will be hydrostatically tested prior to station operation. All active components (valves, pumps and controls) will be functionally tested prior to startup. Since the system is in constant operation, no special tests are required after the plant is put into operation.

TABLE 9.9-1

SERVICE WATER SYSTEM FLOWS AND HEAT LOADS (PER UNIT)

	Mode of Operation						
	Start-up	Normal	Normal Shutdown	Blackout No Accident	Injection Phase	Recirculation Phase	
No. of pumps required	4	4	3	2(4)	2(4)	3	
Flow required for services, gpm							
Service Water Intake	2,736	1,486	777	768	1,720	2,280	
Turbine Services	15,857	26,613	3,754	0	0	0	40
Nuclear Services	21,924 (1)	13,798	21,570	16,885	12,450	30,600	
Total Flow (5)	40,517	41,897	26,101	21,013	14,170	32,880	
Estimated Heat Loads, Btu/hr x 10^6							
Turbine Services	71.7	117.85	17.34	14.28	0	0	
Nuclear Services	123.18	58.92	279.26 (3)	66.62	389.6	422.5	
Total Estimated Heat Load	194.88	176.77	296.60	80.90	389.6	422.5	

Notes:

(1) Remove one of two component cooling heat exchangers from service prior to feeding service water to second Turbine Auxiliaries Cooling System heat exchanger. 40

(3) First four hours following shutdown

(4) Assume only two diesel generators running

(5) At service water temperature of 85°F.