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June 28, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Section 9.5.1 of the Catawba Safety Evaluation report discusses Open Item 14, Fire Protection Program. The attached information regarding cold shutdown analysis and the adequacy of the standby makeup pump is provided to assist the staff in the completion of this review.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

ROS/rhs

cc: Mr. James P. O'Reilly, Regional Administrator
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CATAWBA NUCLEAR STATION

Additional Information Regarding The Cold Shutdown Analysis

I. PURPOSE

This document summarizes the evaluation which assured means of achieving and maintaining cold shutdown were not encumbered as a result of a fire or assured the fire damage was limited so that the necessary systems could be made operable and cold shutdown achieved.

II. APPROACH

The minimum equipment required for cold shutdown, in addition to the equipment required for hot standby, was identified. Credit was taken for manual operation of the motor operated valves, via handwheels, and the replacement of transmitters with direct reading pressure gauges. Therefore, the additional cold shutdown components requiring electrical power are the following.

Residual Heat Removal Pumps
Component Cooling Water Pumps
Nuclear Service Water Pumps
Centrifugal Charging Pumps
Pressurizer PORVs

A. Pumps and Valves

Only one pump of each group is required to operate and only one of the Pressurizer PORVs is required to operate, thus the fire areas were examined to determine the extent of possible fire damage to these functions. Our analysis identified the redundant functions that were located within the same fire area and were not protected by fire detection and automatic fire suppression systems. Only the power cables for the pumps were examined, since the pumps could be manually controlled at the respective switchgear.

B. Instrumentation

In addition to the instrumentation required for hot standby, the following parameters need to be monitored for cold shutdown.

Main Steamline Pressure
Refueling Water Storage Tank Level
Containment Pressure

If these loops are inoperable, due to a fire, pressure gauges could be temporarily installed as part of damage control measures.

III. RESULTS

A. Pumps and Valves

1. Pressurizer PORVs

Both trains of the Pressurizer PORVs are located within Inner Containment; however, with a fire within Inner Containment depressurization can be achieved using four wt. % boric acid or refueling water via a flow path from the Centrifugal Charging pumps using the Auxiliary Spray valve to the pressurizer. Therefore damage control procedures are not required.

Outside Containment, the cables for the redundant Pressurizer PORVs are either separated by fire areas; or, have fire detection and automatic fire suppression systems. Thus, damage control measures are not required.

2. Residual Heat Removal Pumps

The power cables for both Residual Heat Removal pumps are routed thru the same fire area and they are not protected by an automatic fire suppression system. Thus damage control procedures will be available to replace one of these power cables.

3. Component Cooling Water Pumps

All four of the Component Cooling Water pumps have their power cables routed thru the same fire area and these cables are not protected by an automatic fire suppression system. Therefore, damage control procedures will be available to replace one of the Train A power cables.

4. Nuclear Service Water and Centrifugal Charging Pumps

The power cables associated with the redundant trains for each pump are separated by fire areas; thus, damage control measures are not required.

B. Power

The 4KV cables from the Train A & B Diesel Generators to their respective switchgear are routed in separate fire areas. Likewise, the power cables to the power panelboards, feeding the Pressurizer PORVs, are separated by fire areas; therefore, damage control procedures are not required.

IV. SUMMARY

An adequate length of cable will be tagged and stored on site for the potential replacement of cables as part of damage control measures. Suitable pressure gauges will also be tagged and stored on site for possible installation as part of damage control measures.

Catawba Nuclear Station

Adequacy of the 26 GPM Standby Makeup Pump

The Standby Shutdown System (SSS) is designed to provide an alternate method of bringing the plant from normal operating conditions to hot standby conditions. Since decay heat removal is accomplished via the steam generators and their associated safety valves, the Reactor Coolant System (RCS) temperature remains high and significant contraction of the RCS inventory does not occur. The RCS pressure boundary is isolated with the exception of the reactor coolant pump (RCP) seal leakoff lines. Thus they are the only paths which could cause a decrease of RCS inventory.

The standby makeup pump will provide at least 26 GPM of borated water to the RCP seals. During normal operation, the flow past the number 1 seal is 3.5 GPM per pump (i.e., 14 GPM total for the four pumps). The Technical Specification 3.4.6.2 limits unidentified leakage to 1.0 GPM, identified leakage to 10 GPM and pressure boundary leakage to 0 GPM. (During normal operation, both identified and unidentified leakage are normally essentially zero.) However, conservatively assuming these leakages are at their maximum Technical Specification limits, the maximum makeup requirement is 25 GPM. Thus the pump is capable of maintaining RCS inventory (with a 1 GPM margin) under these conservative assumptions.

We plan to modify the standby makeup pump to increase the flowrate so that, after consideration of possible measurement errors, test results will demonstrate that the pump is capable of delivering at least 26 GPM. The modification will be completed and the flowrate verified prior to declaring the SSS operable.

In order to provide assurance that normal operational leakage is within the capacity of the standby makeup pump, it is requested that Technical Specification 3.4.6.2 and 4.7.14.2 be revised as marked on the attached pages.

DRAFT

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 gpm UNIDENTIFIED LEAKAGE,

c. 1 gpm total reactor-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,

d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System,

e. 40 gpm CONTROLLED LEAKAGE at a Reactor Coolant System pressure of 2235 ± 20 psig, and

f. 1 gpm leakage at a Reactor Coolant System pressure of 2235 ± 20 psig from any Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1.

g. 26 gpm ~~total~~ UNIDENTIFIED LEAKAGE, IDENTIFIED LEAKAGE, and reactor coolant pump seal leakage.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE ~~and~~, leakage from Reactor Coolant System Pressure Isolation Valves, and ~~total~~ UNIDENTIFIED LEAKAGE, IDENTIFIED LEAKAGE and Reactor coolant pump seal leakage, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, isolate the high pressure portion of the affected system from the low pressure portion within 4 hours by use of at least two closed manual or deactivated automatic valves, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With ~~the total~~ UNIDENTIFIED LEAKAGE, IDENTIFIED LEAKAGE and reactor coolant pump seal leakage greater than the above limit, reduce the total leakage to less than the above limit within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

a. Monitoring the containment atmosphere gaseous radioactivity monitor at least once per 12 hours;

b. Monitoring the containment floor and equipment sumps inventory and discharge at least once per 12 hours;

c. Measurement of the CONTROLLED LEAKAGE to and leakage from the reactor coolant pump seals when the Reactor Coolant System pressure is 2235 ± 20 psig at least once per 31 days. The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4;

d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours; and

e. Monitoring the reactor head flange leakoff at least once per 24 hours.

4.4.6.2.2 Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit:

a. At least once per 18 months,

b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months,

c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve, and

d. Within 24 hours following valve actuation due to automatic or manual action or flow through the valve.

The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

2. Verifying the battery-to-battery and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.

4.7.14.2 The Standby Makeup Pump water supply shall be demonstrated OPERABLE by:

a. Verifying at least once per 7 days:

1. That the requirements of Specification 3.9.10 are met, or

2. That a contained water volume of at least 112,320 gallons is available and capable of being aligned to the Standby Makeup Pump.

b. Verifying on a quarterly basis that the Standby Makeup Pump develops a flow of greater than or equal to ~~24.5~~ 26 gpm at a pressure greater than or equal to 2488 psig.

3/4.4.6.2 OPERATIONAL LEAKAGE

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

Industry experience has shown that while a limited amount of leakage is expected from the Reactor Coolant System, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 gpm. This threshold value is sufficiently low to ensure early detection of additional leakage.

The total steam generator tube leakage limit of 1 gpm for all steam generators not isolated from the Reactor Coolant System ensures that the dosage contribution from the tube leakage will be limited to a small fraction of 10 CFR Part 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The 1 gpm limit is consistent with the assumptions used in the analysis of these accidents. The 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

The 10 gpm IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the Leakage Detection Systems.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 40 gpm with the modulating valve in the supply line fully open at a nominal Reactor Coolant System pressure of 2235 psig. This limitation ensures that in the event of a LOCA, the safety injection flow will not be less than assumed in the safety analyses.

The 1 gpm leakage from any Reactor Coolant System pressure isolation valve is sufficiently low to ensure early detection of possible in-series check valve failure. It is apparent that when pressure isolation is provided by two in-series check valves and when failure of one valve in the pair can go undetected for a substantial length of time, verification of valve integrity is required. Since these valves are important in preventing overpressurization and rupture of the ECCS low pressure piping which could result in a LOCA that bypasses containment, these valves should be tested periodically to ensure low probability of gross failure.

The Surveillance Requirements for Reactor Coolant System pressure isolation valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the pressure isolation valve is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.

The limitation on total UNIDENTIFIED LEAKAGE, IDENTIFIED LEAKAGE and reactor coolant pump seal leakage provides assurance that normal OPERATIONAL LEAKAGE will be within the capacity of the standby makeup pump.