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July 5, 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:

My letter of July 3, 1984 identified a number of changes that would be included in Revision 12 to the Catawba FSAR. One additional change has been identified as described below:

Section 5.2.5.2.3.1 and Table 5.2.5-1
The text and table were revised to be consistent with the revision to Section 11.2.2.7.2.2 which describes the improved detection method for unidentified leakage inside containment.

Revised FSAR pages reflecting these changes are attached. They will be incorporated in Revision 12 to the FSAR.

Very truly yours,

Hal B. Tucker

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Attachment

cc: Mr. James P. O'Reilly
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5.2.5.2.2 Intersystem Leakage

Leakage from the reactor coolant pressure boundary into connected systems is indicated by various radiation monitors, tank levels and other methods, as recommended in Regulatory Guide 1.45, position C4.

Leakage from the reactor coolant system to the main steam and feedwater systems through failed steam generator tubes is detected and monitored by radiation monitors located in the steam generator sample line and in the condenser steam air ejector exhaust. In the event of high radioactivity in the steam generator sample or the blowdown sample, sample and blowdown flows are terminated, preventing the release of radioactivity to the environment. Blowdown may be continued by realigning the flow to the polishing demineralizers in the condensate system. A control room alarm is actuated in all cases.

Leakage from the reactor coolant system to the component cooling system through failed tubes in the reactor coolant pump thermal barrier is detected and monitored by off-line gamma detectors located downstream from the component cooling water heat exchangers. In the event of high radioactivity, an alarm is actuated in the control room and the vent valves of the associated component cooling water surge tank are automatically closed.

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Leakage into parts of the safety injection systems is detected by pressure changes and increases in tank levels.

5.2.5.2.3 Unidentified Leakage

Indication of unidentified leakage from the reactor coolant pressure boundary to the Containment is provided by various direct and indirect methods with diverse principles of detection. The three primary methods of detection, as recommended in Regulatory Guide 1.45, position C3, are the containment sump level, the containment airborne radiation monitor, and the containment ventilation unit condensate drain tank level. Other indications of leakage include containment temperature, pressure, and humidity monitors, and volume control tank level.

5.2.5.2.3.1 Containment Sumps

The containment floor and equipment sump pumps, as well as the incore instrumentation room sump pumps, input to a plant computer program designed to detect unidentified leakage inside containment in excess of one gpm in less than an hour, as recommended in Regulatory Guide 1.45, position C5. In conjunction with the operator aid computer, sump level instrumentation monitors water level between the low and high setpoints and calculates rate of change. These values for both sumps re totaled and yield a computer alarm if the sum is greater than 1 gpm. While any of the sump pumps is running, leakrate is determined as a function of run time. The computer accumulates this time and provides an alarm if the leakrate is greater than 1 gpm. These arrangements will detect unidentified leakage in excess of 1 gpm within an hour.

The incore instrumentation room sump is located under the reactor vessel in the tunnel area, where no leakage is expected under normal conditions. Therefore, an alarm is actuated in the control room if this pump ever starts. A flow integrator is provided on the com-bined sump pump discharge for periodic monitoring with an accuracy of one gpm, as recommended by Regulatory Guide 1.45, position C2.

5.2.5.2.3.2 Containment Airborne Monitor

The containment airborne monitor continuously monitors the gaseous, iodine, and air particulate activity levels in the containment atmosphere, as described in Section 11.5.1.2.2.2. Unidentified leakage is detected and, to the extent practicable, quantified by these monitors with response times dependent upon the sum of the time for the leakage to mix with the containment volume and the time of transit from the point of leakage, the unidentified leakage rate, the identified baseline leakage rate, and the amount of gaseous fission product activity in the coolant for the gas monitor. In addition, for the iodine and particulate monitors, response times depend on the amount of corrosion and fission product activity in the coolant, the fraction of iodines and particulates which escape into the containment atmosphere, the amount of plate out on containment surfaces, and the collection rate of the filter mechanism. The amount of fission product inventory in the reactor coolant depends on the fraction of failed fuel, fission product inventory in the core, fission product escape rates, and reactor coolant processing history. Table 5.2.5-1 presents information on the sensitivity of the monitors.

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The containment airborne radiation monitoring system will remain functional during and following a safe shutdown earthquake, as recommended in Regulatory Guide 1.45, position C6.

5.2.5.2.3.3 Containment Ventilation Unit Condensate Drain Tank (CVUCDT)

The quantity and activity of the CVUCDT contents will also be an indicator of excessive leakage from the Reactor Coolant System. A sudden increase in the flow rate of ventilation unit condensate indicates an increase in the relative humidity of the containment atmosphere. Such an increase in clean condensate flow in the absence of containment purge is unusual and indicates leakage from a non-radioactive system. Increased radioactivity, as indicated by an alarm from the off-line gamma detector located in the CVUCDT pump discnarge, results in system isolation and implies reactor coolant leakage. A high level in the CVUCDT also actuates a control room alarm and, along with radioactivity measurements, quantifies the leak.

5.2.5.2.3.4 Humidity Detectors

Two humidity detectors (one each at the inlets to the upper and lower air handling units) are installed within the Containment. The humidity detectors provide information on changes in dewpoint and relative humidity.

Table 5.2.5.1

Leakage Detection Sensitivity

Detection Device	Parameter Monitored	Readout Location	Leak Rate	Sensitivity	Response Time
Containment Radiation Monitors	Radioactivity accumulated on filters and/or in gas samples of containment air	Control Room	1 gpm	The monitor sensitivities are given in Tables 11.5.2-2	Assume 90 second mixing time, an escape fraction of E-2 for radioactive air particulates, 0.7 gpm baseline leakage, 1) and leakage activity from 1% fuel defects, then leakage will be detected in less than 10 minutes. 2) and leakage activity from 0.1% fuel defects, then leakage will be detected in about 15 minutes. 3) and leakage activity from corrosion products only, then leakage will be detected in about 60 minutes.
Containment Sump Level Indicator	Water level in sump	Control Room	1 gpm	1 gpm within one hour	Leak detection within 20 minutes. See discussion in Section 11.2.2.7.2.2.
Ventilation Unit Condensate Drain Tank Level Indicator	Water level in tank	Control Room	1 gpm	The indicator can detect a change in water level of 5% of tank volume	Assume 50% of the leak reaches a sump and the transit time is negligible, then leakage will be detected in 40 minutes.
Volume Control Tank Level Indicator	Water Level in tank	Control Room	1 gpm	The indicator can detect a change in water level of 5% of tank volume	Assume 50% of the leak reaches a sump and the transit time is negligible, then leakage will be detected in 40 minutes.
Steam Generator Water Sample Monitor	Gross radioactivity in water	Control Room	20 gpd	The monitor sensitivities are given in Table 11.5.2-2	Assume secondary activities given in Table 11.1.1-4 for 0.12% fuel defects, then leakage will be detected in about 5 minutes.
Steam Generator Blowdown Monitor	Gross radioactivity in water	Control Room	20 gpd	The monitor sensitivities are given in Table 11.5.2-2	Assume secondary activities given in Table 11.1.1-4 for 0.12% fuel defects, then leakage will be detected in about 5 minutes.