DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

October 19, 1982

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:

Mr. R. L. Tedesco's letter of July 12, 1982 transmitted the preliminary draft SER from the Instrumentation and Control Systems Branch. Section 7.1.3.1 of this document identified two open items ((2) and (3)) related to the Auxiliary Feedwater System.

During a September 7-9, 1982 meeting with the Staff, Duke agreed to address the nine concerns identified in Ms. E. G. Adensam's letter of June 9, 1982. This response is attached.

Very truly yours,

Hal B. Tucker

Hal B. Tucker by HBT

ROS/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
314 Pall Mall
Columbia, South Carolina 29201

B001

cc: Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Mr. Henry A. Presler, Chairman
Charlotte-Mecklenburg Environmental Coalition
943 Henley Place
Charlotte, North Carolina 28207

RESPONSE TO ICSB INSTRUMENTATION AND CONTROL CONCERNS FOR CATAWBA AUXILIARY FEEDWATER SYSTEM

Response to Concerns 1, 2, and 4

The auxiliary feedwater system can fulfill its safety function following an initiating event and assuming a single active failure and can do so without requiring operator action outside the control room for at least 30 minutes following any design basis event. The auxiliary feedwater system is not dependent upon the use of non-safety grade equipment or local operation of equipment to bring a unit to and maintain hot standby following any design basis event for which system function is required.

Hot standby is recognized as being a safe plant condition. Following unit transients, the unit will be taken to and maintained at hot standby for a period of time sufficient to assess the situation and take the necessary corrective actions. The unit can be taken to and maintained at hot standby utilizing the safety grade main steam safety valves to control steam generator pressure and safety grade auxiliary feedwater isolation valves to control steam generator level. These are safety grade components and do not require local manual operation.

Normally the steam generator power operated relief valves (PORVs) will be used to control steam generator pressure during hot standby and must be used to control the rate of heat removal while taking the plant to cold shutdown. These valves are pneumatically operable from the control room and the auxiliary shutdown panels. The air supply system to these valves is highly reliable but is not safety grade. The unit can be taken to a cold shutdown condition by manually operating the steam generator PORVs using local handwheels in the event instrument air

is not available. Operation of these valves is not required to achieve or maintain hot standby. Manual operation of the valves is acceptable to achieve cold shutdown considering the time frame involved (generally cooldown will be preceded by an hour or more of hot standby) and the fact that hot standby can be maintained without the use of the PORVs.

Normally the auxiliary feedwater control valves will be used to control steam generator level during hot standby and cooldown. These valves are pneumatically operable from the control room and the auxiliary shutdown panels. The air supply system to these valves is highly reliable but is not safety grade. Operation of these valves is not required to achieve or maintain hot standby. The safety grade auxiliary feedwater isolation valves can be used to control steam generator level in the event instrument air is not available. These valves are operable from the control room and the auxiliary shutdown panels and are not dependent on any non-safety equipment. Alternately, the auxiliary feedwater control valves can be manually throttled using local handwheels if instrument air is lost.

The steam generator PORVs and auxiliary feedwater control valves are supplied control air by the Instrument Air System which is non-safety grade but consists of redundant equipment and can be supplied blackout power. Instrument air can be provided by any of the three instrument air compressors or either of the two station air compressors which automatically backup instrument air. The instrument air compressors and dryers can be manually loaded on the blackout bus during sequence #13 no later than 12 minutes in the event of a station blackout. Based on the above, the complete unrestoreable loss of instrument air is very unlikely. However as discussed above the design of the auxiliary feedwater system provides the capability to reach and maintain a stable

hot shutdown condition and subsequently proceed to cold shutdown without the use of instrument air.

Response to Concern 3

Operator action to control auxiliary feedwater flow is not required prior to 10 minutes after system initiation.

In addition to normal control via the auxiliary feedwater control valves, control of steam generator level from the control room is provided which is not dependent upon non-safety grade equipment and can be accomplished assuming a single active failure. Steam generator level may be controlled from the control room by either of two safety related means. Steam generator level may be controlled by starting and stopping the auxiliary feedwater pumps or by opening and closing the auxiliary feedwater safety grade isolation valves. Each steam generator can be supplied auxiliary feedwater from both a motor driven pump and the turbine driven pump. Lines from each of the two pump sources to a steam generator each contain an auxiliary feedwater isolation valve. These valves are powered from the train of Essential AC power associated with their pump drive. This means that those valves associated with Steam Generator's A& B fed from Motor Driven Pump A are powered from Train A. Those valves associated with Steam Generator's C & D fed from Motor Driven Pump B are powered from Train B. The valve arrangement for the Turbine Driven Pump is as follows; Steam Generator A & B Block Valves are powered from Train B, and Steam Generator C & D Block Valves are powered from Train A. All valves are powered by 575 VAC fed from Essential Motor Control Centers.

These means of controlling steam generator level are safety grade and provide the redundancy necessary to satisfy single failure requirements.

Normally the auxiliary feedwater control valves will be used to control steam generator level. These valves are pneumatically operable from the control room and auxiliary shutdown panels. Power for the Control Valve electronic signal loops is associated in a similar manner as the block valves except fed from the inverter-backed 240/120 VAC Auxiliary Control Power system. Those sources for the control valves for Steam Generator A & B Motor Driven Pump and Steam Generator C & D Turbine Driven Pump are the same while the source for Steam Generator C & D Motor Driven Pump and Steam Generator A & B Turbine Driven Pump are the same.

These valves receive control air from reliable non-safety grade instrument air systems. Redundant and safety grade means of controlling steam generator level is provided by auxiliary feedwater isolation valves and by stopping and starting the auxiliary feedwater pumps. Additionally, the auxiliary feedwater control valves can be manually operated utilizing a local handwheel to control steam generator level.

Response to Concern 5

Termination of auxiliary feedwater flow to a faulted steam generator is not required prior to 30 minutes following development of the faulted condition.

The auxiliary feedwater safety grade isolation valves or auxiliary feedwater control valves may be used to terminate flow to a faulted steam generator. These valves provide redundant means of isolating auxiliary feedwater to a faulted steam generator. The safety grade auxiliary feedwater isolation valves may be operated from the control room, auxiliary shutdown panels, or locally and have safety grade power supplies and controls. In case of a failure of an isolation valve, the auxiliary feedwater control valves may be operated from

the control room or auxiliary shutdown panels if instrument air is available. If instrument air is not available, the valves may be manually closed. These valves are located in the auxiliary feedwater pump room (which is quickly accessible from the control room), have handwheels for manual operation, and are accessible to the operator. Operator action outside the control room under postulated single failure conditions is justifiable considering the location of the valves and since termination of flow is not required within 30 minutes.

Response to Concern 6

The Catawba Auxiliary Feedwater System is designed with a "Flow Optimization/Runout Protection" feature which will provide capability to terminate motor driven Auxiliary Feedwater flow to either Steam Generator B or C if a faulted condition occurs with these steam generators or associated piping. This feature conforms to the requirements as stated in GDC-2 and GDC-4 in order to assure that they will not inadvertently operate due to the external influences as described in the above design criteria. These circuits are an independent feature of the auxiliary feedwater system and will not compromise other circuitry associated with required system performance.

Response to Concern 7

The Catawba Auxiliary Feedwater system design contains provisions to insure that no flow path is blocked by system control features. The control valves are fitted with a safety class solenoid which vents air from the operator and fails the valve open to assure flow. The isolation valves are normally open except those on Steam Generators A & D associated with the Turbine driven pump. The safety grade isolation valves have indicating lights in the control room and computer alarms in conjunction with inputs to the bypassed and inoperable status indication system. Pump suction isolation valves are open and have power removed from the motors to insure open status. Supply source valves are also normally open

from the condensate grade sources. The nuclear service water sources are normally closed, but two trains are provided and either will open upon a low suction pressure signal from system logic circuits.

All motor operated suction isolation valves have inputs to the bypassed and inoperable status indication system. The manual valves associated with the flow paths are physically locked in the open position to ensure an open flow path. The manual valves associated with pump performance testing and which are used during scheduled testing have inputs to the bypassed and inoperable status indication system.

Response to Concern 8

a) As discussed in the response to ICSB Concern 7, those remotely operated valves that are capable of blocking flow to a pump or steam generator are either failed open upon automatic initiation, have safety grade control room position indication, have inputs to the bypassed and inoperable status indication system, or are locked open. All manual valves except those associated with pump performance testing are locked open. The performance test valves have inputs to the bypass and inoperable status panel.

b) The Catawba Auxiliary Feedwater system does not have a single valve or multiple valves in series which could be placed in a position which could block all system flow.

Response to Concern 9

The Power Operated Relief Valve solenoid valves are powered from the class 1E 125 VDC Auctioneered Power System. These valves receive power from two battery systems through an auctioneering scheme that allows both the 125 VDC Vital Instrumentation and Control batteries and the Diesel Generator starting batteries to supply source voltage. These valves are designed to close upon loss of power or loss of motive air. This is

a failsafe position which assures isolation of a steam generator. These valves may be reset from the control room and throttled for a controlled cooldown. If both of the above described sources are not available, then manual handwheels are provided to allow manual throttling.

RESPONSE TO SUMMARY OF MAJOR CONCERNS

1) See response to ICSB concerns 1, 2, & 4. A safety grade air system is not required to achieve or maintain hot standby from the control room. Hot standby is a safe plant condition. Operator action outside the control room during plant cooldown is acceptable as justified considering the time frames involved.

2) See response to ICSB concern 3.

3) See response to ICSB concern 1, 2 & 4.

4) See response to ICSB concern 5.

5) As discussed in the response to ICSB Concerns 7 & 8 the manual handwheel operated valves are locked open. Those valves that are frequently used for testing purposes have inputs to the bypassed and inoperable status indication system to alert the operator if they are not closed.