UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos. 50-413/89-19 and 50-414/89-19

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-413, 50-414 License Nos.: NPF-35, NPF-52

Facility Name: Catawba 1 and 2

Inspection Conducted: June 16 - June 28, 1989

Inspectors: _____ 7/13/89
W. T. Orders Date Signed

_____ 7/13/89
M. S. Lesser Date Signed

Approved by: _____ 7/13/89
M. B. Shymlock, Section Chief Date Signed
Projects Section 3A
Division of Reactor Projects

SUMMARY

Scope:

This special inspection was conducted on site inspecting an event where both channels of the Reactor Vessel Level Instrumentation System (RVLIS) on Unit 2 were discovered inoperable by the licensee on June 16, 1989 and were determined to have been inoperable for a period of time in excess of the action statement allowed by Technical Specifications (TS).

Results:

In the areas inspected the following items were identified:

One apparent violation in that both channels of RVLIS were inoperable for approximately two weeks. (paragraph 9)

One apparent violation in that channel checks required by Technical Specification surveillances were not performed on the upper and lower ranges of RVLIS. (paragraph 9)

One apparent violation in that unqualified technicians were assigned to restore the safety related RVLIS system to operability after maintenance. (paragraph 6)

One apparent violation in that the procedure used to restore the RVLIS system to an operable status was inadequate. (paragraph 7)

One apparent violation in that the post maintenance testing was inadequate to detect the inoperability. (paragraph 8)

One strength in that the licensee's monthly RVLIS system walkdown is an initiative which goes beyond minimum NRC requirements and is credited with identifying the inoperability. (paragraph 7)

One weakness in that the licensee's program for N/A'ing procedural steps lacks guidance and is inconsistent. (paragraph 7)

REPORT DETAILS

1. Persons Contacted

Licensee Emplcyees

H. Barron, Operations Superintendent
J. Cox, Site Training Manager
T. Deese, Maintenance Engineering Services
*R. Glover, Compliance Engineer
R. Jones, Maintenance Engineering Services Engineer
*W. McCollum, Maintenance Superintendent
*T. Owen, Station Manager
*J. Stackley, Instrumentation and Electrical Engineer

Other licensee employees contacted included technicians, operators, and engineers.

NRC Resident Inspectors

*W. Orders
*M. Lesser

*Attended exit interview.

2. Brief Summary of Event

On June 16, 1989 the licensee was performing a routine monthly walkdown of the Unit 2 Reactor Vessel Level Instrumentation System (RVLIS). The unit was at 100% power at the time. Technicians immediately recognized a problem when the Upper Range level on both channels indicated greater than 90% instead of the expected value of less than 60% for the existing plant conditions. The technicians discovered the isolation valves for the upper range pressure transmitters to be closed on both channels rendering them inoperable. The RVLIS channels were required to be operable when the unit entered mode 3 on June 2, 1989.

3. System Description

The Reactor Vessel Level Instrumentation System (RVLIS) is a standard Westinghouse design for Upper Head Injection (UHI) reactors and uses differential pressure (dp) transmitters to measure reactor vessel level or relative void content of the Reactor Coolant (NC) System. RVLIS includes two redundant QA Condition 1 channels powered from Class 1E busses. Each channel consists of three dp transmitters and associated equipment to measure the pressure differential from the bottom of the reactor vessel to the top of the reactor vessel. The transmitters correspond to three ranges of indication to cover operation under various combinations of forced or natural circulation. The ranges are termed dynamic head, lower range and upper range.

The dynamic head senses dp between the vessel bottom and the hot leg and provides indication on a display in the control room of 0-120% dp and is used when reactor coolant pumps are operating. The lower range also senses dp between the vessel bottom and the hot leg and provides indication from 0-70% vessel level and would be used during natural circulation. The upper range senses dp between the hot leg and the top of the vessel and provides indication from 60-120% vessel level and would also be used during natural circulation.

During periods when reactor coolant pumps are operating, the upper and lower ranges indicate off scale and invalid in the control room. If reactor coolant pumps are not running the dynamic head will indicate invalid.

The equipment associated with each transmitter includes impulse tubing, temperature detectors, in-containment sensor bellows units, out-of-containment hydraulic isolators and the necessary electronic processing and display instrumentation. The sensor bellows is provided with two in line instrument root valves located inside containment. The dp transmitters have Magnex isolation valves located outside containment. The Magnex valve is a packless ball valve, hermetically sealed to eliminate the possibility of stem leakage. The Magnex valve handle is magnetically coupled through the pressure barrier to the stem.

4. Sequence of Events:

Date	Time	
5/19/89	-	With unit 2 in a refueling outage, calibrations are complete on the RVLIS system which is then returned to service.
5/21/89	1015	Unit enters mode 4 in preparation for startup.
5/23/89	1100	Failure of #1 seal on reactor coolant pump 2D; unit cooldown to mode 5 to drain system and repair seal.
5/25/89	-	RVLIS Unper Range channels are isolated by shutting the sensor bellows valves and the Magnex valves and tubing is disconnected in order to vent reactor vessel.
5/28/89	-	Reactor coolant pump seal work is complete and system is ready to be filled. Two Instrument and Electrical (IAE) technicians are assigned to connect RVLIS tubing and restore system. Tubing is connected and the sensor bellows valves are opened however the Magnex isolation valves for both channels are not opened.
-	-	Post maintenance test is a functional verification to ensure tubing does not leak.

5/31/89	2056	Unit enters mode 4.
6/1/89	-	Operations performs TS 4.3.3.6 surveillance monthly channel check on RVLIS by comparing dynamic range values with expected values.
6/2/89	0043	Unit enters mode 3 at which time two channels of RVLIS are required to be operable per TS 3.3.3.6.
6/6/89	1458	Unit enters mode 2.
6/7/89	0425	Unit enters mode 1.
6/16/89	1130	While performing monthly walkdown of RVLIS it is noted that both channels of upper range RVLIS indicate values of 94% and 99% instead of the expected values of less than 60% The Magnex isolation valves for the upper range transmitters are found isolated.
-	-	Licensee declares both channels of RVLIS inoperable.
-	-	Senior Resident Inspector becomes aware of problem during a routine tour of the control room and discussions with operators.
-	1300	Channel B Magnex valve is opened and channel declared operable; other Magnex valve is stuck closed due to system pressure.
-	1708	Licensee receives procedure from Westinghouse and opens the stuck valve and Channel A is declared operable.

5. Description of Event

On May 19, 1989 Unit 2 had completed its second refueling outage and was in mode 5 making preparations for restarting the unit. An 18 month calibration of both channels of the RVLIS System had been completed under work Request 5992 SWR, using IP/2/A/3122/02, System Calibration Procedure For Inadequate Core Cooling Monitor External Analog Transmitters. The system lineup was completed and both channels were declared operable. The unit entered mode 4 on May 21, however, excessive reactor coolant (NC) pump seal leakoff on NC pump 2D indicated a problem with the number one seal and the licensee was forced to return the unit to mode 5, drain the NC system and repair the seal. In order to vent the reactor vessel head it was decided to disconnect the RVLIS tubing from 2NC279, RVLIS Isolation Valve, on the head and use that valve as a vent. Work Request 5345 SWR was generated to isolate RVLIS using portions of IP/2/A/3122/02.

Since only the upper range RVLIS would be disconnected and rendered inoperable, the work supervisor N/A'd the non applicable steps of IP/2/A/3122/02. On May 25 the upper range of both channels was isolated by shutting the Magnex isolation valve and the two sensor bellows isolation valves, associated with each channel and disconnecting the tubing from 2NC279. On May 28, the licensee completed work on the NC pump seal and the reactor coolant system was ready to be filled. Two IAE technicians on the night shift were assigned the job of restoring the RVLIS system and closing the work request. Using the same procedure which had been tailored for the specific job by N/Aing non-applicable steps, the technicians reconnected the tubing and opened the sensor bellows isolation valves. The technicians, however, failed to open the Magnex isolation valves. Later on May 28, the post maintenance test was performed which consisted of only visual inspection of the tubing for leaks. A verification of RVLIS operability was not performed.

On June 1 in preparation for Mode 3, operations personnel completed PT/2/A/4600/03A, Monthly Surveillance Items. Included as Step 18 on enclosure 13.4 is the monthly channel check on the RVLIS channels required by Technical Specification 4.3.3.6. The acceptance criteria requires "two operable channels reading within +/- 3% of the expected value for existing pump combination and reactor power level (refer to Unit 2 Data Book)." It should be noted that with the reactor coolant pumps on only the dynamic range of RVLIS provides a valid indication in the control room. The surveillance was performed and no discrepancies were noted.

On June 2 at 12:43 a.m. Unit 2 entered mode 3 at which time Technical Specification 3.3.3.6 required both channels and a minimum of 1 channel of RVLIS to be operable. While both channels' lower range and dynamic head were operable, both channels of upper range were inoperable since the associated Magnex valves were isolated. The unit subsequently entered mode 1 and increased power to 100%.

On June 16, IAE technicians were assigned to perform a monthly walkdown of the RVLIS System under work request 6845 SWR using IP/2/A/3122/01, Inadequate Core Cooling System Walkdown Checklist. The purpose of the procedure is to obtain monthly data for trending and/or analyzing of possible system problems. The procedure is not intended to meet any NRC requirements or commitments. The walkdown includes a review of a "diagnostic page" on the control room display, monitoring hardware ambient temperature and cycling of the Magnex isolation valves. While the technicians were performing the procedure, it became evident while viewing the diagnostic page that there was a problem with the RVLIS upper ranges. Train A upper range indicated 94% and Train B indicated 99%, however, both should have read 60% (off scale low). The technicians determined the

Magnex valves were closed and informed appropriate personnel. At 11:30 a.m. both channels of RVLIS were declared inoperable by the Shift Supervisor and the unit was placed in the 48 hour action statement of TS 3.3.3.6. The Shift Supervisor directed the IAE technicians to return the channels to an operable status. The Magnex valve for channel B was opened and the channel was declared operable at 1:00 p.m.. However, due to the pressure differential across the ball valve, Channel A Magnex Valve was stuck closed. After consulting with Westinghouse a special procedure was used and the Channel A valve was opened and declared operable at 5:08 p.m.

The licensee inspected the Magnex valves on Unit 1 and verified them to be open.

6. Use of Non Qualified Technicians

It was determined that the technicians assigned to restore the RVLIS system on May 28, were not qualified under the licensee's Employee Training and Qualifications System (ETQS) program to perform work on that system. 10 CFR 50, Appendix B, Criterion II, requires that the licensee provide training of personnel performing activities affecting quality as necessary to assure suitable proficiency is achieved and maintained. Duke Power Company Topical Report Quality Assurance Program, sections 17.0.2 and 17.2.2 state that the qualifications of personnel are in accordance with Regulatory Guide 1.8. Personnel Selection and Training. Regulatory Guide 1.8 incorporates ANSI N18.1-1971 which requires a training program for maintenance personnel. The training program shall be such that fully trained and qualified personnel are available at the times required and shall be to ensure the safe and reliable operation of the plant. The licensee's ETQS program is established to meet this and other industry requirements. The program is such that once employees are qualified to tasks, they may perform related procedures without direct supervision. Task qualification is an independent evaluation of an employee's ability to perform all elements of a task. The qualification process utilizes Training and Qualification Guides (T&Q) for establishing the prerequisites and describing the qualification elements.

T&Q Guide for Task #IE-8936 provides the qualification requirements for work on The Inadequate Core Cooling Monitor (ICCM) which includes RVLIS. The task requires actual performance of IP/2/A/3122/02 under direct supervision of a qualified person and an explanation of procedural steps not actually performed.

Section 902 of the ETQS manual requires that supervisors assign work only to qualified individuals or ensure that a qualified person is directing the work of a non-qualified person to the extent required to ensure the task is performed in a satisfactory manner. The supervisor failed to meet this requirement when assigning personnel to restore the RVLIS. The licensee's investigation determined that the supervisor knew the technicians were not qualified on RVLIS, but opted to allow them to

consult over the telephone with a qualified technician. The supervisor apparently elected to shortcut the process because he perceived the work to be urgent and his belief that the work was a simple task.

The technicians, who performed the work, clearly were not familiar with procedure and the system terminology. This was exemplified when they documented opening the Magnex valves when in fact they had opened the sensor bellows valves. A detailed review of the completed isolation portion of the procedure would have revealed that both sets of valves had been isolated. This is identified as an apparent violation of the licensee's quality assurance program in that personnel who were not qualified to do so, were assigned to perform maintenance activities on safety related equipment.

7. Procedure Adequacy

Standing Work Request 6845 SWR is the mechanism to perform the monthly walkdown of the RVLIS system using IP/2/A/3122/01, Inadequate Core Cooling System Walkdown Checklist. This procedure is an example of a licensee initiative which goes beyond minimum NRC requirements. In this case the performance of the procedure detected the inoperable channels. This initiative is considered a strength.

Standing Work Request 5345 SWR exists to remove and replace RVLIS tubing for reactor head removal and replacement. The work request requires the use of IP/2/A/3122/02, System Calibration Procedure For Inadequate Core Cooling Monitor External Analog Transmitters. Although the reactor head was not to be removed, in this case, the decision was made to use the standing work request and to N/A the non applicable steps in the procedure.

On May 25 qualified technicians performed steps to isolate RVLIS and disconnect the tubing. After verifying initial conditions and prerequisites, technicians performed step 10.2.1 of IP/2/A/3122/02 which states "close Magnex isolation valves on both Train A and Train B". This step was performed for the upper range Magnex Valves and N/A'd for the dynamic head and lower range Magnex valves. The step was initialled and independently verified. Additionally, the technicians wrote "Closed Magnex valves for 2NC6390 and 2NC6420" (Channel A and B respectively) under the "action taken" portion of the work request. The technicians then performed step 10.2.2.B which states "Close both isolation valves for sensor bellows". Although this step was initialled and independently verified, it was not documented under the "action taken" portion of the work request. The technicians then completed steps to disconnect the tubing.

The isolation portion of the procedure appeared to be acceptable, however, the restoration portion was inadequate as evidenced by the following:

a. Section 10.9 of the procedure is used to restore the system back to an operational status. Step 10.9.2.H states "Open head sensor isolation valves". The sign off sheet for this step was not with the completed work request. It is suspected the step had been mistakenly N/A'd by the supervisor and since all other steps on that sheet were not applicable, the sheet was discarded. The licensee was unable to substantiate or refute this and was unable to produce the sheet in question. The licensee was also unable to determine if this step had been included as part of the restoration procedure.

b. Step 10.9.9 states "open all Magnex Isolation Valves for Train A and Train B". The supervisor had intended to N/A opening the Magnex valves for the dynamic head and lower range by drawing a line through the steps on the sign off sheet, writing "N/A" and initialing by the line, however, his initials crossed into the sign off steps for the upper range Magnex Valves. This gave the appearance that all of step 10.9.9 was not applicable.

Since these two steps were required to adequately restore the system and the requirement to perform the steps had effectively been N/A'd, it is concluded that the procedure was inadequate and is identified as an apparent violation of Technical Specification 6.8.1.

On May 28, the non qualified technicians attempted to restore the system. Having received instructions over the telephone they reconnected the tubing and opened the sensor bellows isolation valves.

The technicians apparently thought that step 10.9.9, requiring the Magnex valves to be opened, was not applicable due to the appearance that the step had been N/A'd. Under the "action taken" portion of the work request, they documented that they had "opened Magnex valves for 2NC6420 and 2NC6390". In fact they had only opened the sensor bellows valves and not the Magnex Valves. In summary it is hypothesized that this event probably occurred due to a combination of the following:

a. The IAE technicians restoring the system were not qualified on RVLIS and were not familiar with terms used in the procedure.

b. The procedure as issued was inadequate in that:

   The steps to open the sensor bellows valves had been mistakenly N/A'd. (cannot be substantiated).

   The steps to open the Magnex Valves appeared to the technicians to have been N/A'd.

c. Only the opening of the Magnex valves had been documented in the "action taken" portion of the work request.

The inspectors reviewed the licensee's administrative requirements for N/A'ing procedures. At the top of the hierarchy of requirements is Station Directive 4.2.1, Development, Approval and Use of Station Procedures. This directive has no provisions for N/A'ing steps. Operations Management Procedure 1-4, Use of Procedures and Maintenance, and Manual Procedure 6.5, Use of Mechanical Maintenance Procedures, provide guidance on how to N/A steps, however, there is no corresponding IAE procedure. Step 5.4.1 of IP/2/A/3122/02, the procedure used for the RVLIS work, states "Have Work Supervisor review and mark N/A steps not applicable to work being performed". There exists, however, no guidance on how to accomplish this as there does in other groups.

The following inconsistencies were identified:

a. One method to indicate non applicable steps is to line through the sign offs on the data sheet of a procedure. Using this method, there is no way to indicate non applicable steps for which there is no associated sign off.

b. IAE requires the supervisor to N/A steps. Mechanical Maintenance allows the technicians to N/A steps with the supervisors concurrence. The performance group does not allow steps to be N/A'd, but, requires a procedure change.

c. The method of drawing one line through multiple sign offs appears to be inconsistent with an "attention to detail" approach towards maintenance.

The lack of requirements for N/A'ing steps in IAE procedures and the above inconsistencies comprise a weakness in the licensee's program for the use of procedures, a weakness which contributed to this event.

8. Post Maintenance Testing

Section VIII of Work Request 5345 SWR documented the Post Maintenance Test (PMT) for the RVLIS tubing isolation. A "functional verification" was performed which merely inspected the tubing for leaks. A "retest" was documented as not being required.

The inspectors compared this to the licensee's PMT program to determine adequacy. Maintenance Manual Procedure (MMP) 1.0, Work Request Preparation provides guidance for PMT. A retest is defined as a test to demonstrate that a component meets the minimum acceptance criteria as defined in Technical Specifications or other regulatory documents and is in addition to testing which follows maintenance or incidental adjustments. The retest must adequately test all components on which maintenance or incidental adjustments were performed if a reasonable possibility exists that the parameter to be tested was affected by the maintenance.

A functional verification is defined as one which demonstrates that a component will operate as designed. The licensee's policy is that an independent verification such as a valve lineup is an acceptable functional verification if it is reasonable to expect the system will be restored to an operable status. The maintenance activity itself, however, must not be expected to degrade the system. In the case where an instrument is valved out and impulse lines disconnected, various scenarios can be postulated such as crimped tubing, foreign material, inadequate fill and vent, etc. which would invalidate this type of functional verification.

Section 4.9.10 of MMP 1.0 provides guidance for performing functional verifications and states "instruments should be placed in operation and verified for correct reading on local and remote gauges". In that MMP 1.0 requires a functional verification and that the one performed on RVLIS did not demonstrate that RVLIS would, "...operate as designed," it is concluded that the post maintenance test was inadequate and is identified as an apparent violation of Technical Specification 6.8.1, for failure to follow procedure, MMP1.0.

The licensee's proposed corrective action will ensure the walkdown of the RVLIS System using IP/2/A/3122/01 is performed after maintenance, however, the broader policy issue of functional verifications of instruments in general should be reviewed.

9. Technical Specification Requirements

Technical Specification 3.3.3.6 requires the accident monitoring instrumentation shown in Table 3.3-10 to be operable in modes 1, 2, and 3. Table 3.3-10 specifies, for the Reactor Vessel Water Level Instrumentation, the total number of channels as 2 and the minimum number of channels operable as 1.

The action statements specify:

a. With the number of OPERABLE accident monitoring instrumentation channels less than the Total Number of Channels shown in Table 3.3-10, restore the inoperable channel(s) to OPERABLE status within 7 days, or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With the number of OPERABLE accident monitoring instrumentation channels less than the Minimum Channels OPERABLE requirements of Table 3.3-10, restore the inoperable channel(s) to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

Definition 1.18 of the Technical Specifications states: A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s), and when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing their related support function(s).

The Technical Specification bases for accident monitoring instrumentation states: The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," May 1983 and NUREG 0737, "Clarification of TMI Action Plan Requirements," November 1980.

The RVLIS requirements stem from NUREG 0737 Item II.F.2, Instrumentation For Detection of Inadequate Core Cooling which states: The indication of ICC must be unambiguous in that it should have the following properties:

a. It must indicate the existence of inadequate core cooling caused by various phenomena (i.e., high-void fraction-pumped flow as well as stagnant boil-off); and,

b. It must not erroneously indicate ICC because of the presence of an unrelated phenomenon.

The indication must give advanced warning of the approach of ICC. The indication must cover the full range from normal operations to complete core uncovery. For example, water-level instrumentation may be chosen to provide advanced warning of two-phase level drop to the top of the core and could be supplemented by other indicators such as incore and core-exit thermocouples provided that the indicated temperatures can be correlated to provide indication of the existence of ICC and to infer the extent of core uncovery. Alternatively, full-range level instrumentation to the bottom of the core may be employed in conjunction with other diverse indicators such as core-exit thermocouples to preclude misinterpretation due to any inherent deficiencies or inaccuracies in the measurement system selected.

Generic Letter 83-37, NUREG 0737 Technical Specifications, required the RVLIS system to be included in Technical Specifications and that the system be used to provide indication of the approach to, the existence of, and recovery from inadequate core cooling.

During the period from June 2, 1989 to June 16, 1989 both channels of upper range Reactor Vessel Water Level Instrumentation were isolated and therefore inoperable. This constitutes an apparent violation of TS 3.3.3.6 in that both channels were inoperable for approximately 14 days, which is greater than the 48 hours allowed by the action statements.

Technical Specification 4.3.3.6 requires a monthly Channel Check of RVLIS at least once per 31 days and a channel calibration at least once per 18 months. The licensee's channel calibration as performed by IP/2/A/3122/02 appears to be acceptable. The monthly channel check is accomplished by PT/2/A/4600/03A, Monthly Surveillance Items, item 18 of enclosure 13.4. The acceptance criteria requires two operable channels reading within +/- 3% of expected values for pump combination and reactor power level. The expected valves are located in OP/2/A/6700/01, Unit Two Data Book, in tables 2.6.2, and figures 2.6.3 and 2.6.4 With reactor coolant pumps running the licensee compares the dynamic head values to the Data Book to perform the channel check. Since the upper and lower ranges indicate invalid and off scale low in the control room with reactor coolant pumps on, channel checks on these are not performed.

A channel check is defined in Technical Specifications as the qualitative assessment of channel behavior during operation by observation. This is not being performed on the upper and lower ranges of RVLIS. This is identified as an apparent violation of TS 4.3.3.6.

10. Safety Significance

In this event both channels of upper range RVLIS were isolated from June 2, 1989 to June 16, 1989 while the reactor was operated in modes 1, 2, and 3. The "as found" conditions of Channels A and B were 94% and 99% level respectfully. The upper range level channels are referred to at various points in the licensee's Emergency Procedures (EPs), generally to detect the onset of void formation in the reactor vessel and to take appropriate corrective action or as a condition for starting reactor coolant pumps.

a. Emergency Procedure, EP/2/A/5000/1A1, Natural Circulation Cooldown, has the operator verify that a void does not exist in the upper head area by checking upper range RVLIS >97%. If symptoms of upper head voiding are observed a choice is made depending upon whether or not rapid depressurization is deemed necessary. If rapid depressurization is not required operators are directed to procedures to collapse the void which may eventually lead to venting the head. If rapid depressurization is required, the operator is tasked to start a Reactor Coolant (NC) pump. Again, upper range RVLIS is checked >97% as condition for starting. If this condition cannot be met, pressurizer level is increased >50%, pressurizer heaters are energized and NC subcooling is established at >50 degrees F. This is done so that when voids are condensed, the resulting pressurizer outsurge would not cause pressurizer level or NC subcooling to be lost.

If an NC pump cannot be started, Upper Range RVLIS is again monitored during the cooldown and depressurization to minimize the potential for introducing voids into the loops. Operators must repressurize the NC system to maintain upper range level >72%.

As the NC system is cooled to 200°F, the upper head temperature will lag and a sufficient period of time must be allowed for the upper head to cool below 200°F. Upper Range RVLIS must be used as an indication during depressurization of when to stop cooldown and allow further upper head cooling since there is no direct temperature indication in this region.

b. EP/2/A/5000/1C1, Safety Injection Termination Following High Energy Line Break, and EP/2/A/5000/1C2, Post LOCA Cooldown and Depressurization, also have similar steps to check Upper Range RVLIS >97% as a condition for starting reactor coolant pumps or exiting the procedure (if <97%) to enter EP/2/A/5000/2F3, Void in Reactor Vessel.

In the event of certain accidents with reactor coolant pumps off (Natural circulation cooldown, small to medium break LOCA, excessive cooldowns) and upper range RVLIS isolated, the control room display would have erroneously indicated Channels A and B RVLIS at 94% and 99% respectively, regardless of actual level. Operators using the EPs would not have had adequate instrumentation available to detect a void in the head and to monitor the approach to inadequate core cooling. The criteria, as set forth in several steps of the EP's, for satisfying that no voids exist, is upper range RVLIS at greater than 97%. Assuming a single channel failure, operators would have been deceived into believing that no voids existed. This would have led to inadequate corrective actions to collapse the void or to premature restart of forced circulation and a subsequent loss of subcooling. The expected response for some actions in turn would not have been achievable. At the very least the above discussed inadequacies would have confused the operators and hampered accident recovery. Had the inoperability been detected the ability to restore the instrumentation to service is questionable weighing the difficulty encountered by the licensee in opening the Magnex valve on June 16.

11. Reportability

The licensee promptly submitted a courtesy Licensee Event Report (LER) 414/89-16 on June 26, 1989, 10 days after discovery of the inoperability. It should be noted that it was the licensee's desire to provide information to the NRC and to initiate corrective action in a timely manner which prompted the courtesy LER. The LER states that with the upper range channels isolated "RVLIS could still perform its functions required under NUREG 0737, Supplement 1". The licensee also states "A Technical Specification violation did not occur in this situation because the use of the dynamic head dp and lower range RVLIS scales can meet the requirements stated without reliance on the upper range scale."

The NRC does not concur with these conclusions. NUREG 0737 required the RVLIS system indication to cover the full range from normal operations to complete core uncovery. Generic Letter 83-37, NUREG 0737 Technical Specifications, states the system would provide indication of the approach to, the existence of, and the recovery from inadequate core cooling. With the Upper Range channels inoperable, these requirements were not met and therefore the licensee was not in compliance with the Technical Specification.

On the basis that a technical specification violation did occur, the report then would be required by 10CFR50.73, which requires any operation or condition prohibited by the Technical Specifications to be reported.

The LER also refers to the McGuire Nuclear Station Technical Specifications which are different than Catawba's for the RVLIS system. The LER states that McGuire's basis for RVLIS does not require upper range. The licensee, however, may not rely on the McGuire TS because they do not apply at Catawba. Additionally, the basis as stated in the McGuire TS has not been approved and is currently being reviewed by NRR. These items were discussed with the licensee. The licensee agreed with the position and informed the inspectors that the LER would be revised. At the writing of this report the revised LER had not been received.

12. Exit Interview

The inspection scope and findings were summarized on July 7, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. The following dissenting comments were received from the licensee:

> The licensee did not consider the procedure used to restore the RVLIS system as inadequate, but agreed that the method used to N/A steps contributed to the event.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Findings

One apparent violation in that both channels of RVLIS were inoperable for approximately two weeks. (paragraph 9)

One apparent violation in that channel checks required by Technical Specification surveillances were not performed on the upper and lower ranges of RVLIS. (paragraph 9)

One apparent violation in that unqualified technicians were assigned to restore the safety related RVLIS system to operability after maintenance. (paragraph 6)

One apparent violation in that the procedure used to restore the RVLIS system to an operable status was inadequate. (paragraph 7)

One apparent violation in that the post maintenance testing was inadequate to detect the inoperability. (paragraph 8)

One strength in that the licensee's monthly RVLIS system walkdown is an initiative which goes beyond minimum NRC requirements and is credited with identifying the inoperability. (paragraph 7)

One weakness in that the licensee's program for N/A'ing procedural steps lacks guidance and is inconsistent. (paragraph 7)