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April 15, 1994

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/94-004

Gentlemen:

Attached is Licensee Event Report 413/94-004 concerning MISSED TECHNICAL SPECIFICATION 3.4.6.1 ACTION STATEMENT.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

for DL Rehn

D. L. Rehn

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	05000413	1 OF 10

TITLE (4)
Missed Technical Specification 3.4.6.1 Action Statement

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
03	18	94	94	-- 004 --	00	04	18	94	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	97

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Z.L. Taylor, Compliance Manager	(803) 831-3812

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 18, 1994, at 1735 hours, Unit 1 was in Mode 1, Power Operation, at 97% power. During a procedure completion review, Operations personnel discovered that the minimum number (two) of Reactor Coolant (NC) System Leakage Detection systems were not operable during the time the Operator Aid Computer (OAC) was out of service. The action statement for Technical Specification (T/S) 3.4.6.1 states that with less than two of the three NC Leakage Detection systems operable be in at least Hot Standby within the next six hours. With the OAC out of service for six hours and 41 minutes, the six hours action statement was violated. This was discovered after the OAC was returned to service. The cause of this event is attributed to less than adequate written communication associated with Leakage Detection System instrumentation documentation. After the event, Engineering performed a past operability review and determined that the NC Leakage Detection Systems were past inoperable. Corrective actions included providing instructions to Operations describing actions to take for each NC Leakage Detection system when the OAC is out of service, revising setpoints for Radiation Monitor EMF39, OAC program change, and revising the Loss of OAC procedure, T/S Interpretation, Final Safety Analysis Report (FSAR), and Design Basis Documents.

BACKGROUND

The purpose of the Liquid Waste [EIIS:WD] (WL) System is to collect, segregate, and process all radioactive and potentially radioactive liquids generated in the plant. In general, all reactor grade liquids are recycled and all non-reactor grade liquids are processed and disposed of in accordance with applicable Nuclear Regulatory Commission (NRC) regulations. The WL System is designed to control and minimize releases of radioactivity to the environment.

Containment [EIIS:NH] Floor and Equipment Sumps are two stainless steel lined sumps in each Reactor Building [EIIS:NG], located diametrically opposite each other, serving to collect liquids from piped up equipment drains and leakage that runs directly into the sump from the floor. Each sump, designated Sump A and B, holds approximately 400 gallons and has two 50 gallon per minute (gpm) sump pumps [EIIS:P], which alternate starting on high level signal and stop on low sump level. Piping [EIIS:PSP] is provided to remove the contents of the sumps to the Floor Drain Tank or to the Waste Evaporator Feed Tank.

The Containment Floor and Equipment Sump pumps and level instrumentation input to a plant computer program designed to detect 1 gpm of unidentified leakage inside containment in less than one hour as recommended by NRC Regulatory Guide 1.45. Since all Reactor Coolant [EIIS:AB] (NC) System pump seal leakoffs, as well as other normally discharging fluids, are routed to the Reactor Coolant Drain Tank, all liquid entering the Containment Floor and Equipment Sumps during normal station operation is unidentified leakage. Sumps A and B have a level transmitter [EIIS:XT] (WLLT-6870 and WLLT-6880 respectively) that performs the leakage detection required by Technical Specification (T/S) 3.4.6.1. This level instrumentation, in conjunction with the OAC, monitors water level between the low and high setpoints and calculates a rate of change. These values for both sumps are totaled and yield a computer alarm if the sum is greater than one gpm. While any of the sump pumps are running, leak rate is determined as a function of run time. The Operator Aid Computer (OAC) accumulates this time and provides an alarm if a greater than 1 gpm leak is detected.

The Process and Effluent Radiological Monitoring [EIIS:IL] (EMF) System monitors primary and secondary systems and is designed to provide early warning to Station personnel of equipment, component, or system malfunctions or potential radiological hazards that occur during normal plant operation, including anticipated operational occurrences, so that corrective action can be taken to prevent exceeding the limits of the Station's T/S. The sensors from the radiation monitors output to various indications [EIIS:XI] and, where required, control functions [EIIS:XC] (e.g., automatic system isolation, placing filters in service, etc.).

The containment airborne monitor continuously monitors the particulate, gaseous, and iodine activity levels in the containment atmosphere. 1(2)EMF38 is the containment particulate radiation monitor, 1(2)EMF39 is the containment gaseous radiation monitor, and 1(2)EMF40 is the containment iodine radiation monitor.

Unidentified leakage is detected and, to the extent practicable, quantified by these monitors with response times dependent upon the following:

a) the sum of the time for the leakage to mix with the containment volume and the time of transit from the point of leakage

b) the unidentified leakage rate

c) the identified baseline leakage rate

d) the amount of gaseous fission product activity in the reactor coolant for the gas monitor.

In addition, for the iodine and particulate monitors, response times depend on the following:

a) the amount of corrosion and fission product activity in the reactor coolant

b) the fraction of iodines and particulates which escape into the containment atmosphere

c) the amount of plate out on containment surfaces

d) 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.

Control Room alarms are provided to notify Operators of activity in excess of preset limits.

The Ventilation Unit Condensate Drain Tank (VUCDT) is a subsystem of the WL System. Condensation from the containment ventilation units is collected in a 5000 gallon tank in the Auxiliary Building [EIIS:NF] outside each Reactor Building. The OAC calculates a VUCDT level change rate and provides an alarm if the rate equivalent to 1 gpm is exceeded. VUCDT contents are automatically pumped to the WL System for processing.

T/S 3.4.6.1 states that the following Reactor Coolant System Leakage Detection Systems shall be OPERABLE in Mode 1, Power Operation, Mode 2, Startup, Mode 3, Hot Standby, and Mode 4, Hot Shutdown:

a) The Containment Atmosphere Gaseous Radioactivity Monitoring System

b) The Containment Floor and Equipment Sump Level and Flow Monitoring Subsystem, and

c) Either the Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem or the Containment Atmosphere Particulate Radioactivity Monitoring System.

With only two of the above required Leakage Detection Systems OPERABLE, operation may continue for up to 30 days provided grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours when the required Gaseous or Particulate Radioactivity Monitoring System is inoperable; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN (Mode 5) within the following 30 hours.

Per the T/S Interpretation Manual, T/S requirement 3.4.6.1 part b (Containment Floor and Equipment Sump Level and Flow Monitoring Subsystem) is satisfied by the following WL instruments: WLLT-6870 (Sump "A") and WLLT 6880 (Sump "B"). Both instruments are required to be OPERABLE in order to satisfy this part of the Limiting Condition of Operations; Level and Flow Monitoring. Per the Basis/Discussion section of this T/S Interpretation, these WL instruments (level transmitters) perform the Leakage Detection required by T/S. The transmitter output supplies a computer alarm for Unidentified leakage > 1 gpm in Containment (computer point D4554). Both the LEVEL and FLOW requirement is met by the absence of this computer alarm.

NRC Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, describes acceptable methods of implementing General Design Criterion 30, Quality of Reactor Coolant Boundary, of Appendix A to 10CFR50 with regard to the selection of leakage detection systems for the reactor coolant pressure boundary.

PT/1(2)/A/4600/09, Loss of Operator Aid Computer, provides a method of documenting T/S requirements normally performed by the OAC in the event the unit OAC is out of service.

EVENT DESCRIPTION

On March 14, 1994, the Unit 1 Containment Particulate Monitor (EMF38) and Containment Gaseous Monitor (EMF39) were declared inoperable due to problems with a Containment Isolation valve [EIIS:V]. The inoperable EMFs were placed in the Technical Specification Action Item Log (TSAIL) under entry 738. A note was placed in the remarks section beside each TSAIL entry to restore the EMFs to operable status prior to making any additional NC Leakage Detection Systems inoperable. With these two monitors inoperable, only two of the three NC Leakage Detection Systems remained operable. Grab samples were being obtained and analyzed per the T/S 3.4.6.1 Action Statement.

On March 18, 1994, at 0800 hours, Operations discussed removing the OAC from service and the effect it would have on the NC Leakage Detection systems. Operations referenced T/S Interpretation for T/S 3.4.6.1 which stated that instruments WLLT6870 and WLLT6880 are required to be operable in order to satisfy the Limiting Condition for Operation for the Containment Floor and Equipment Sump Level and Flow Monitoring System. Based on review of the interpretation, Operations concluded that no additional components of the NC Leakage Detection System would be rendered inoperable.

On March 18, 1994, at 0909 hours, the OAC was taken out of service for maintenance. Operations entered the Loss of OAC Procedure (PT/1/A/4600/09) and was to calculate leakage every 12 hours by logging the change in containment floor and equipment sump inventory for a ten minute period. The containment floor and equipment sump leakage calculation did not have to be performed until 1900 hours since the previous leakage calculation was verified by the OAC at 0700 hours.

On March 18, 1994, at 1550 hours, the OAC was returned to service.

On March 18, 1994, at 1735 hours, during a completion review of the Loss of OAC procedure, Operations discovered that during the time the OAC was out of service (6 hours and 41 minutes), the Containment Floor and Equipment Sump Level and Flow Monitoring System was inoperable according to the basis for the T/S Interpretation for T/S 3.4.6.1. The basis implies that with computer point D4554 out of service, the requirements of Regulatory Guide 1.45 cannot be met. Computer point D4554 alarms if unidentified leakage in Containment is greater than 1 gpm. With less than two of the three NC Leakage Detection Systems operable, the action statement requires to be in at least Hot Standby within six hours. The OAC was down six hours and 41 minutes, thus violating the action statement for T/S 3.4.6.1.

On March 24, 1994, Engineering performed a current operability review for the NC Leakage Detection Systems. Engineering determined that the Containment Atmosphere Particulate Radioactivity Monitor (EMF38) for both Units and Unit 2 Containment Atmosphere Gaseous Radioactivity Monitor (EMF39) were not currently capable of meeting the 1 gpm per hour requirements outlined in the FSAR and Regulatory Guide 1.45. The other NC Leakage Detection Systems were currently operable with the OAC inservice. Engineering also concluded that all of the NC Leakage Detection Systems would be inoperable if the OAC is taken out of service without compensatory actions.

On March 24, 1994, at 1800 hours, Engineering supplied Loss of OAC compensatory action instructions to Operations. The compensatory actions would maintain the VUCDT Level Monitoring system, Containment Floor and Equipment Sump Level Monitoring System, and the Containment Atmosphere Gaseous Radioactivity Monitors (EMF39) operable if the OAC was taken out of service.

On April 6, 1994, Engineering declared the NC Leakage Detection Systems past inoperable because the systems were not always capable of meeting the requirements of the FSAR and Regulatory Guide 1.45.

CONCLUSION

This incident is attributed to less than adequate written communication within Leakage Detection System instrumentation documentation.

The interpretation section of the T/S 3.4.6.1 Interpretation did not state that computer point D4554 was used to meet the level and flow requirements for the Containment Floor and Equipment Sump Level Subsystem. The information concerning computer point D4554 was

discussed in the Bases section of the T/S Interpretation. The computer point information should have been in the Loss of OAC procedure since this piece of information directly affects the ability of the system to meet the requirements of Regulatory Guide 1.45. No procedures were in place to monitor the Containment Floor and Equipment Sump during periods when the OAC was inoperable. In addition, no procedures were in place to monitor VUCDT level when the OAC was out of service.

The licensing basis of EMF38 and EMF39, with respect to T/S 3.4.6.1, is that they are set up to detect a leak of 1 gpm in less than one hour. Per Section 5.2.5.1 of the Final Safety Analysis Report, procedures for converting various indications to a common leakage equivalent should be available to the operators. These procedures were not available for EMFs 38 and 39.

Engineering determined that the Containment Particulate Monitor (EMF38) for both Units and the Containment Gaseous (EMF39) Monitor for Unit 2 could not meet the 1 gpm within one hour requirements outlined in the FSAR and Regulatory Guide 1.45. The setpoints for EMF38 on both units had been set at a level to alarm consistent with 10CFR20 dose limitations. This setpoint is higher than the level which would have indicated leakage of 1 gpm. Due to fuel defects present during Unit 2 Cycle 6 operation, the setpoints for 2EMF39 were set higher than normal to compensate for background activity and would not alarm at a level which would indicate unidentified leakage of 1 gpm or greater based on the failed fuel value specified in FSAR Table 5-10.

Engineering provided instructions to Operations describing compensatory actions to be taken when the OAC is removed from service and Operations revised the Loss of OAC procedure to include actions to be taken when the OAC is removed from service such that the NC Leakage Detection System remains operable. Engineering also provided instructions to Operations describing compensatory action to be taken to return 2EMF39 to operable status. The setpoints for 2EMF39 were revised and an OAC program change was implemented which provides an alarm on a change in count rate on EMF39 to alert the Operators of a potential leak. This eliminated the compensatory actions for 2EMF39.

A review of the Operating Experience Program database for the 24 months prior to this event did not identify any events that involved NC Leakage Detection System action statements being missed as a result of written communication. Two previous events were identified which are similar to the current event in that they involved use of the T/S Interpretation Manual. Licensee Event Report (LER) 414/93-005 involved equipment required for the operability of the Safe Shutdown Facility (SSF). LER 413/93-012 involved entry into Mode 3, Hot Standby, from

Mode 4, Hot Shutdown, with an inoperable Auxiliary Feedwater [EIIS:BA] (CA) System Pump Turbine [EIIS:TRB]. Corrective action associated with the previous events included clarification of T/S Interpretations. The root cause of LER 414/93-005 was attributed to Design Analysis; the root cause of LER 413/93-012 was attributed to incorrect use of T/S and T/S Interpretations. Even though the specific root causes of the previous events are not applicable to the current event, a discernable trend of use of T/S Interpretations either directly or indirectly affecting events can be identified. This trend will be documented and resolved per Problem Investigation Process (PIP) 0-C94-0442. This does not denote a recurring event.

CORRECTIVE ACTION

SUBSEQUENT

1) Engineering declared Unit 1 and Unit 2 Containment Particulate Monitors (EMF38) inoperable.

2) Engineering declared Unit 2 Containment Gaseous Monitor (EMF39) inoperable.

3) Engineering provided instructions to Operations describing the data to be logged manually for Unit 2 EMF39 operability.

4) Engineering provided instructions to Operations for manual logging of the VUCDT level data to comply with T/S 3.4.6.1 should the OAC be taken out of service.

5) Engineering provided instructions to Operations for manual logging of the Containment Equipment Floor and Equipment Sump level data to comply with T/S 3.4.6.1 should the OAC be taken out of service.

6) OAC has been programmed to alarm on a change in count rate on EMF39 to alert the operator of a potential leak. In conjunction with this change the Computer Alarm Response Manual was revised to alert the operator of a potential NC leak when the trip two setpoint is received on EMF39.

7) Note was sent to Operations clarifying the action statement of T/S 3.4.6.1.

8) Loss of OAC procedure (PT/1/A/4600/09) was revised to describe compensatory actions necessary to maintain the NC Leakage Detection Systems operable when the OAC is taken out of service.

PLANNED

1) Operations will review T/S for all items that require the OAC for operability determination and will revise the Loss of OAC procedure as necessary per the conclusions of this review.

2) Revise the T/S Interpretation for T/S 3.4.6.1 to clarify the action statement.

3) Revise the FSAR to document deviations concerning NC Leakage Detection Systems.

4) Revise the Design Basis Documents concerning NC Leakage Detection Systems.

5) Evaluate options necessary to return EMF38 to operable status for NC Leakage Detection.

SAFETY ANALYSIS

The investigation into this event determined that the consequences of the NC Leakage Detection System instrumentation being inoperable does not increase the consequences of an accident currently analyzed in the FSAR. Specifically, the following instrumentation required by T/S 3.4.6.1 has been inoperable:

- the Containment Particulate Monitors (EMF38) for both units have been inoperable due to the setpoint being set for 10CFR20 limits instead of leak detection limits,
- the Containment Gas Monitor (EMF39) on Unit 2 has been inoperable due to its setpoint being set higher due to the presence of defective fuel on Unit 2 during 2EOC6, and
- both the Containment Floor and Equipment Sump Level and Flow Monitoring and the Containment Ventilation Unit Condensate Drain Tank level Monitoring Subsystem have been inoperable during periods of time when the OAC has been unavailable.

The safety significance of these NC Leakage Detection Systems are reviewed below.

The intent of the T/S 3.4.6.1, Leakage Detection Systems, is to provide the operator early indications of degrading conditions inside containment which may be indicative of a reactor coolant pressure boundary leak. With such a warning the operator could take steps such as initiating a unit shutdown followed by a cooldown of the affected unit with intent of accomplishing this prior to a defect in the reactor coolant pressure boundary propagating into a break. The Final Safety Analysis Report does not take credit for such preventative measures. Instead it assumes that the catastrophic failure occurs as the basis for the accident analysis. Therefore, the consequences of this instrumentation being inoperable does not increase the consequences of an accident currently analyzed in the FSAR.

As discussed in the Catawba FSAR, alternative instrumentation is available to the operator for determining, in an ongoing manner, the integrity of the reactor coolant pressure boundary. The Chemical Volume and Control Systems Volume Control Tank (VCT) would be the primary indicator of reactor coolant pressure boundary integrity. Any leakage from the reactor coolant system would show up, in a short period of time, as a need to increase the frequency of makeups to the VCT. In addition, as discussed in the FSAR, humidity instrumentation is provided in upper and lower containment of both units. An increase in humidity would be indicative of an increase of water inputs to that region of containment. Finally, even though the OAC program which monitors the containment floor and equipment sumps and/or the containment ventilation unit condensate drain tank may not have been available, the alarms indicating high levels in these tanks and the increased frequency of getting these alarms would alert the operators to degrading conditions inside of containment.

In conclusion, based on the consequences not being worse than those evaluated in the FSAR and the alternative instrumentation available to the operator which would indicate potential degradation of the reactor coolant pressure boundary, the health and safety of the public were not affected by this incident.