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October 12, 1995

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/95-005

Gentlemen:

Attached is Licensee Event Report 413/95-005, concerning TECHNICAL SPECIFICATION VIOLATION DUE TO INADEQUATE WRITTEN COMMUNICATIONS.

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

Very truly yours,

W. R. McCollum, Jr.
Site Vice President
Catawba Nuclear Station

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RC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMD 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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	05000413	1 of 8

TITLE (4)
Technical Specification Violation Due to Indequate Written Communications

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
											Catawba Unit 2	05000 414
09	13	95	95	-	005	-	00	10	12	95		05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)					
POWER LEVEL (10)	100	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 (Specify in Abstract below and in Text, NRC Form 366A)		
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)			
		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	
	AREA CODE	
D. P. Kimball, Safety Review Group Manager	(803)	831-3743

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 fifteen single-space typewritten lines) (16)

On September 13, 1995, with Units 1 and 2 in Mode 1, Power Operation at 100% power, Safety Assurance determined that a reportable event involving Technical Specification (T/S) 3.6.1.2, Containment Leakage, had occurred. During testing of hydrogen gas analyzer systems (1A and 2B trains) leakage was detected. This condition was determined reportable because the 1A hydrogen analyzer measured leakage could potentially exceed allowable containment leakage limits during an accident. Maintenance repaired the leaks and the systems were tested and returned to service. The root cause of this event is inadequate written communication due to technical inaccuracies in calibration, maintenance, and test procedures for the hydrogen gas analyzer systems. Technical inaccuracies have existed since initial procedure preparation, because of less than adequate understanding of required containment integrity for these systems. Planned corrective actions include a thorough review of each containment penetration to ensure no additional containment integrity concerns exist and maintenance procedure changes to ensure containment integrity is maintained.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

BACKGROUND

The hydrogen analyzer provides continuous indication of hydrogen concentration in the containment atmosphere in the control room after appropriate solenoid valves are energized. It was added to the station design following the Three Mile Island, Unit 2 accident per Nuclear Regulatory Commission (NRC) NUREG-0737, Item C.4 (Ref. Final Safety Analysis Report Section 1.8.1.29.3.4). This hydrogen monitoring system consists of two redundant Teledyne analyzer systems with a dual range 0-10% and 0-30% hydrogen by volume. These analyzers operate independent of the recombiner system and are powered from independent Class 1E power supplies. Each analyzer has its containment sample and return lines, and is able to monitor either of two identical containment sampling headers or the calibration gases. Each analyzer has a local control panel indicator and alarm and a separate control room indicator and alarm, as well as a recorder. Each containment sampling header has three inlet samples available for monitoring top of containment, the recombiner operating level, and a steam generator cavity. Sample selection and switching is accomplished manually by the operator from the local analyzer control panel.

Technical Specification 3.6.1.2 states that containment leakage rates shall be limited to:

A combined bypass leakage rate of less than 0.07 La for all penetrations identified in Table #.6-1 as secondary containment bypass leakage paths when pressurized to Pa.

Technical Specification 3.6.4.1 states that two independent containment hydrogen monitors shall be operable in Mode 1, Power Operation, and Mode 2, Startup. The following action statements apply:

- With one hydrogen monitor inoperable, restore the inoperable monitor to operable status within 30 days or be in at least Hot Standby within the next 6 hours.

- With both hydrogen monitors inoperable, restore at least one monitor to operable status within 72 hours or be in at least Hot Standby within the next 6 hours.

Technical Specification (T/S) 3.6.1.1 states that primary containment integrity shall be maintained during Modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). The T/S states that without containment integrity, action is required to restore containment integrity within one hour or be in at least Hot Standby within the following six hours and in Cold Shutdown (Mode 5) within the following thirty hours.

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EVENT DESCRIPTION

August 31,1995

2020 hours Electrical System Engineering (ESE) notified the Shift Work Manager (SWM) and Operations Shift Manager (OSM) of a potential containment integrity concern with the four hydrogen analyzer systems. During the review of calibration procedures, ESE determined that a three way valve [EIIS:V] is aligned to a non-tested leak rate sample gas line with the containment isolation valves open. The containment isolation valves do not close automatically on any safety signal (normal position is closed). In this lineup containment integrity is not maintained. The calibration procedures were placed on administrative hold until changes were made to ensure containment integrity is maintained when using these procedures. In addition, it was discovered that no retest requirements are specified when maintenance is performed on the hydrogen gas analyzers or post accident gas sample panels (PAGSP). ESE performed a review of the Work Management System (WMS) and found that hydrogen analyzer 1B had corrective maintenance performed on it since the last Unit 1 refueling outage. Operations entered Unit 1 into a 1 hour Technical Specification (T/S) action statement to comply with T/S 3.6.1.1, Containment Integrity.

~2104 hours Maintenance was dispatched to remove power [EIIS:FU] from all four containment isolation valves on hydrogen gas analyzer 1B and Operations white tagged the valves closed.

Operations exited the one hour containment integrity T/S for hydrogen analyzer 1B and entered a 30 day T/S 3.6.4.1 action statement.

September 1,1995

~0020 hours ESE notified the SWM and OSM that corrective maintenance had been performed on all four post accident sample panels (PAGSP) since the last refueling outages on both units. Both units entered a one hour containment integrity T/S 3.6.1.1 action statement.

~0045 hours Maintenance was dispatched to remove power from the remaining 12 valves on the three trains of the hydrogen gas analyzers. Operations white tagged the control switch for each valve.

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~0430 hours Operations white tagged the PAGSPs and the hydrogen gas analyzers. This action was taken to prevent any testing, calibration, maintenance, or operation of either unit's PAGSP or hydrogen gas analyzers until a review of the procedures associated with the systems could be performed to ensure containment integrity would be maintained during use of these procedures.

~0730 hours The operations test group started type C leak rate testing all four hydrogen gas analyzer systems.

~2100 hours Hydrogen gas analyzer 2B test results were unsatisfactory. The operations test group proceeded to test hydrogen gas analyzer 1A, 2A, and 1B.

September 2, 1995

0030 hours Hydrogen gas analyzers 1B and 1A were declared operable.

1445 hours Hydrogen gas analyzer 2A was declared operable.

~1700 hours During the review of the completed type C leak rate test procedures, Engineering discovered that the hydrogen analyzers have not been leak rate tested properly since unit startup. A plan was put in place for Engineering to develop procedure changes for testing.

1730 hours Hydrogen gas analyzers 1A, 2A, and 1B were declared inoperable and re-entered in technical specification action item log (TSAIL). Hydrogen gas analyzer 2B remained inoperable because of the earlier unsatisfactory test results and did not require a new TSAIL entry.

September 3, 1995

Engineering made changes to PT/1(2)/A/4200/01C, Containment Isolation Valve Leak Rate Test. Type C leak rate testing was initiated. During testing unacceptable leakage was detected on 1A and 2B hydrogen gas analyzers. The Operations test group continued testing on the 2A and 1B hydrogen gas analyzers.

2200 hours Hydrogen gas analyzer 1B was successfully tested and declared operable.

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September 4, 1995

0122 hours Hydrogen gas analyzer 2A was successfully tested and declared operable.

September 5, 1995

~1520 hours Work order 9506939-01 was issued to investigate and repair hydrogen gas analyzer 2B; maintenance located the leak and made repairs.

September 7, 1995

~0200 hours Work order 9506946-01 was issued to investigate and repair hydrogen gas analyzer 1A; maintenance located the leak and made repairs. The Operations test group completed testing and hydrogen gas analyzer 1A was declared operable at 1840 hours.

September 8, 1995

0405 hours The operations test group completed testing and hydrogen gas analyzer 2B was declared operable.

CONCLUSION

The root cause of this event was inadequate written communication due to technical inaccuracies in calibration, maintenance, and test procedures for the hydrogen gas analyzer systems. Technical inaccuracies have existed since initial procedure preparation because of less than adequate understanding of containment integrity for these systems. During a review of instrument calibration procedures and maintenance history associated with the hydrogen gas analyzers and PAGSPs a containment integrity concern was identified. When calibrating the containment hydrogen gas analyzers and PAGSPs a non-tested leak rate flow path is used. This flow path is not Type C (10CFR50, Appendix J) tested and does not automatically isolate during a design basis event. Also during corrective maintenance activities which breach the containment pressure boundary, the required retest has not been specified. This condition has existed since the initial development of the test program. Operations removed power to all four (two per unit) hydrogen gas analyzer systems containment isolation valves and Type C retest was initiated for all Hydrogen Analyzer/PAGSPs containment penetrations [EIIS:PEN].

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During subsequent testing of hydrogen gas analyzer (1A and 2B) unacceptable leakage was detected. Corrective maintenance work orders 9506939-01 and 9506946-01 were issued. The leakage was identified and repairs were made. On September 13, 1995 this condition was determined to be reportable because of the potential leakage from hydrogen gas analyzer 1A exceeding allowable limits. When in standby alignment, the hydrogen gas analyzers are isolated from containment with valves that are Type C tested. Containment integrity is maintained in this configuration. In an accident, the emergency procedures direct operators to open the isolation valves to the hydrogen gas analyzers to place them in service. While valves exist which could be used to isolate the hydrogen gas analyzers, questions about the ability to readily detect leakage while in service has led to the conclusion that the potential for leakage to exceed the T/S limits of (0.07 La) may exist.

Technical inaccuracies occurred when the first calibration/test procedures and retest program requirements were developed for the hydrogen gas analyzer systems. Corrective action to review the containment integrity program at Catawba was initiated as a result of

Licensee Event Report (LER) 413/95-003. Specific corrective actions to address this event included leak repairs, revising the test procedures, changing the maintenance/calibration procedures, and putting in place interim measures for maintenance to contact Engineering prior to performing any corrective maintenance so retest requirements can be determined to ensure that containment integrity is maintained.

A review of the operating experience program database for the past 24 months prior revealed two LERs associated with containment integrity. LER 414/95-002 was attributed to less than adequate written communications due to technical inaccuracies. LER 413/95-003 was attributed to design due to unanticipated interaction of systems and components. This event is considered recurring. Corrective actions in LER 413/95-003 are currently being completed to address recurring containment integrity issues, therefore no additional corrective actions are necessary in this LER.

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CORRECTIVE ACTIONS

SUBSEQUENT

1) Calibration procedures were placed on hold until revisions were made to ensure containment integrity.

2) The following calibration procedures were revised to require that the containment isolation valves be verified closed with power removed so containment integrity would be maintained during system calibration.

- IP/1(2)/A/3176/001A, Procedure For Containment Hydrogen Monitor System (VY) Analog Channel Operational Test

- IP/1(2)/A/3176/001B, Procedure For Containment Hydrogen Monitor System (VY) 92 Day Channel Calibration

3) Periodic Test procedures PT/1(2)/A/4200/01C were revised to include all sections of the hydrogen gas analyzer systems/PAGSPs to ensure containment integrity.

4) Work orders 9506939-01 and 9506946-01 were issued to investigate and repair hydrogen analyzers 2B and 1A; maintenance identified the leaks and made repairs.

5) All four Hydrogen Analyzers/PAGSPs were tested properly and returned to service.

6) Interim measures were put in place for maintenance to contact Engineering prior to performing any corrective maintenance on the hydrogen analyzers /PAGSPs so retest requirements can be determined.

PLANNED

1) IP/1(2)/A/3176/001C, Procedure For Containment Hydrogen Monitor System (VY) 18 Month Channel Calibration, will be evaluated to determine if the testing now in the 92 day channel calibration procedure would satisfy the 18 month channel calibration procedure. The 18 month channel calibration procedure will be revised or made part of the 92 day channel calibration procedure. IP/1(2)/A//3176/02, Hydrogen Analyzer Miscellaneous Instruments, is being evaluated to determine what procedure steps to include to ensure containment integrity is maintained at all times.

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SAFETY ANALYSIS

These events involve identified leakage paths that, under design basis containment pressure, would have allowed unfiltered containment atmosphere to leak to the Auxiliary Building. No actual release occurred, however, a leak could have occurred following the design basis accident. The Emergency Procedure in use at the time (EP/1(2)/A/5000/E-1) places the analyzer in service soon after a primary or secondary break, and immediately thereafter places the hydrogen recombiner in service if the analyzer indicates the hydrogen concentration in containment is above 0.5%. Leak test results indicated that the 1A hydrogen analyzer had the worst case leakage. This leakage was in the portion of the hydrogen analyzer loop downstream of the containment isolation valves. Therefore, the post accident leakage would not have occurred until after the analyzers were placed in service, and, the containment isolation valves would have been available to isolate the leak.

The leak rate in the 1A hydrogen analyzer exceeded the allowable containment bypass leak rate defined in Technical Specification 3.6.1.2 (c) by a factor of two (2). A dose analysis has been performed by modeling a Control Room compensatory action (breach of Control Room). Reasonable values have been used for Annulus Ventilation (VE) [EIIS:VD] System and Control Room Ventilation (VC) [EIIS:VI] System flow rates and filtration efficiencies, core isotopics, ECCS leakage, Integrated Leak Rate Test values and Containment Spray (NS) [EIIS:BE] System flows. The analysis assumed no filtration of the leakage from the hydrogen analyzer. The analysis results indicate that the limiting doses (i.e., Control Room Operator) are within the pertinent guideline values as specified in General Design Criteria 19 and NUREG-0800, Standard Review Plan. Therefore, offsite doses are also below the pertinent guideline values.

To put this event into perspective, it can be compared to other accident sequences studied in the Catawba Individual Plant Examination (IPE). The Catawba Probabilistic Risk Assessment (PRA), or IPE, also evaluates both intact containment and containment failure sequences. The risk (Whole Body Person Rem per Year) from intact containment sequences (of which this event is a subset) constitutes less than 0.03% of the total plant risk due to all initiators. The intact containment leak rate used in the Catawba PRA was the overall design leak rate of 0.3% containment volume per day. The Catawba PRA assumes no credit for filtration of fission products for intact containment sequences. The additional leak rate from this instrumentation would not exceed the leakage assumption used in the Catawba PRA. Therefore, the Catawba PRA still applies.

NUREG-1493, Performance Based Containment Leak Test Program, evaluates the risk impacts of containment leaktightness, and concludes that containment leak rate can be increased from one to two orders of magnitude without significantly impacting total plant risk.

The health and safety of the public were not affected by this event.