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May 6, 1994

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

Subject: McGuire Nuclear Station Unit 1 and 2
Docket No. 50-369
Licensee Event Report 369/94-02
Problem Investigation Process No.: 0-M94-0413

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 369/94-02 concerning failure to comply with the Technical Specification for the Reactor Coolant System Leakage Detection Systems. This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (i). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

T.C. McMeekin

TLP/bcb

Attachment

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APPROVED OMB NO. 3150-0104
 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 300 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-510), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545 AND TO THE PAPERWORK REDUCTION PROJECT, 3150-0104, OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME(1)

McGuire Nuclear Station, Unit 1

DOCKET NUMBER(2)

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TITLE(4) Failure To Comply With Technical Specifications Action Statement For Reactor Coolant Leakage Detection Systems Due To The Omission Of Relevant Information.

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 NAMES	DOCKET NUMBER(S)
04	06	94	94	02	00	05	06	94	McGuire, Unit 2	05000 370

OPERATING MODE(9)	1	THIS REPORT IS SUBMITTED PURSUANT TO REQUIREMENTS OF 10CFR (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	Rickey Deese, Manager	TELEPHONE NUMBER	
AREA CODE	704		875-4065

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)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE(15)	MONTH	DAY	YEAR
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ABSTRACT (limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines (16))

Engineering and Regulatory Compliance personnel initiated an investigation into the stations ability to meet the requirements of Technical Specification (TS) 3.4.6.1, Reactor Coolant System Leakage Detection Systems. On April 8, 1994, Engineering personnel determined that the systems which are specified in TS 3.4.6.1, were past inoperable on both units. This inoperability was due to their inability to provide an alarm in the Control Room of an increase in Reactor Coolant system leakage, of >= 1 gallon per minute, within 1 hour. Technical Specification 3.4.6.1 is applicable in modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). The alarm requirements are specified in Regulatory Guide 1.45, dated May, 1973. The cause of the event is the omission of relevant information in the original design requirements. Both units were in mode 1 at 100 percent power at the time of the event discovery. Corrective actions include modifications to the Operator Aid Computer to allow monitoring of portions of the Liquid Waste systems to detect Reactor Coolant system leaks. Additional corrective actions changed the allowable alarm setpoint of the containment atmosphere radiation monitors and will include changes to the design basis documents for the Liquid Waste and Radiation Monitoring systems.

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EVALUATION:

Background

Technical Specification (TS) 3.4.6.1, Reactor Coolant (NC) System [EIIS:AB] Leakage Detection Systems, states;

The following Reactor Coolant System Leakage Detection Systems shall be Operable:

- a. The Containment Atmosphere Gaseous Radioactivity Monitoring System (EMF-39).
- b. Either the Containment Floor and Equipment (CF&E) Sump Level System or the Flow Monitoring System, and
- c. Either the Containment Ventilation Condensate Drain Tank (VUCDT) Level Monitoring System or a Containment Atmosphere Particulate Radioactivity Monitoring System.

This TS is applicable in Modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). The action statement of TS 3.4.6.1 states that with only two of the required Leakage Detection Systems operable, operation may continue for up to thirty days provided that grab samples of the Containment Atmosphere are taken and analyzed once per twenty four hours. Otherwise, the Unit is to be placed in Mode 3 within the next 6 hours and in Mode 5 (Cold Shutdown) within the following 30 hours.

The Process and Effluent Radiological Monitoring (EMF) system [EIIS:IL] monitor primary and secondary systems to provide early warning to station personnel of equipment, component or system malfunctions. Containment Atmosphere Particulate and Gaseous Detectors, EMF-38 and EMF-39 respectively, are provided for each unit to monitor the containment atmosphere for radioactive particulates and gasses. These monitors have indications and alarms in the Control Room [EIIS:NA].

The Containment Floor and Equipment (CF&E) sumps, are a sub-system of the Liquid Waste (WL) system [EIIS:WD]. These sumps are located in the containment building, of each unit, diametrically opposite each other, outside the crane wall. These sumps collect liquid that leaks from systems inside the containment building. The CF&E sump pumps [EIIS:P] take the water collected in the sumps and discharge it to the WL system external to the containment building for processing. Each CF&E sump is provided with level instrumentation which is displayed in the Control Room.

The Ventilation Unit Condensate Drain Tank (VUCDT) is a sub-system of the WL system. The VUCDT, of each unit, receives water which is condensed by the Containment Ventilation cooling units and stores the water prior to subsequent release. The VUCDT is provided

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with level instrumentation, displayed in the Control Room. The VUCDT level instrumentation also has an output to the Unit 2 Operator Aid Computer (OAC).

Description of Event

A conference was held with Engineering personnel from the McGuire and Catawba Nuclear stations concerning the ability of the Containment Atmospheric Radiation monitors, EMF-38 and EMF-39, to function as a part of the Reactor Coolant Leakage Detection systems which are required by TS 3.4.6.1 Engineering and Regulatory Compliance personnel began an investigation into the licensing requirements of these EMFs to determine present and past operability as documented on Problem Investigation Process report PIP M94-0413. The licensing basis of this TS requirement was determined to be the need to be in compliance with Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, dated May, 1973. Review of this Regulatory Guide and the design basis document associated with the EMFs revealed that the regulatory basis was not addressed as being the design basis.

Engineering personnel determined, on April 6, that EMF-38 and EMF-39 may have been past inoperable depending upon the background radiation levels in the Containment. This potential inoperability is due to a requirement, found in Reg Guide 1.45, that the NC leakage detection systems be capable of providing an alarm in the Control Room of an increase in NC system leakage of ≥ 1 gallon per minute (GPM), within 1 hour. Typically, the alarm setpoint of these EMFs is set at 3 times the background reading of the instrument. This setpoint was chosen to ensure compliance with the requirements of 10CFR-20 and the Offsite Dose Calculation Manual (ODCM). However, the alarm requirements from Reg Guide 1.45 are calculated using assumed values for NC system activity. Therefore, with a high background reading on the instrument, and a correspondingly high value for 3 times background, the assumed activity would not be sufficient to actuate the alarm within 1 hour for a leak of 1 GPM. Further research into the requirements of TS 3.4.6.1 also revealed that the CF&E Sump level indicating system and the Containment Ventilation Unit Condensate Drain Tank level indicating system were both past inoperable per TS 3.4.5.1 due to their inability to provide a warning of leakage in excess of 1 gallon per minute (GPM) in less than 1 hour.

On April 6, 1994, while Engineering was pursuing completion of operability calculations, Operations (OPS) personnel issued Operations Special Order 94-06. This special order was written due to the questions surrounding the stations ability to meet the intent of Reg Guide 1.45. This order instructed the Ops shift personnel to monitor the level in the CF&E sump once per hour, and to calculate a volume input into the sumps. Special Order 94-06 also provided actions to be taken if EMF-38 became inoperable.

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Special Order 94-06 was deleted on April 7, due to Ops personnel issuing procedure PT/O/A/4200/40, Reactor Coolant Leakage Detection, which provides specific instructions to the Control Room personnel to monitor various indications for NC system leakage.

On April 8, 1994, Engineering personnel completed calculations which determined that the NC system leakage detection instruments, as described in TS 3.4.6.1, are conditionally operable, provided that the alarm setpoint of EMF-38 is maintained ≤ 637 counts per minute (cpm) above background. The remaining portions of the NC leakage detection systems are being maintained conditionally operable by use of PT/O/A/4200/40. However, Engineering personnel directed OPS personnel to declare EMF-39 inoperable due to the high background reading on the instrument and the invalid assumptions which were used in the original calculation.

Conclusion

The cause of this event is the omission of relevant information from the original design requirements. Investigation into this issue was initiated due to concerns about the ability of the containment atmosphere radiation monitors to meet the requirements of Reg Guide 1.45. The original thought of Engineering personnel is that the monitors were operable with their alarm setpoint at the usual value of 3 times the background reading. However, the investigation into the basis of TS 3.4.6.1 revealed the requirement to have an alarm in the Control Room within 1 hour for any NC system leak rate of 1 GPM. Engineering personnel performed further calculations to verify compliance with the basis of the TS and discovered a problem with high background readings. With the source terms that need to be assumed in the calculation the monitors would not provide an alarm due to a leak rate increase of 1 GPM, within 1 hour, and hence the monitors were inoperable. The need to meet the requirements of Reg Guide 1.45 is clearly stated in the basis section of the TS and in the Final Safety Analysis Report (FSAR). However, specifics of what this Reg Guide required was not incorporated into the systems or procedures associated with TS 3.4.6.1. There were no requirements to calculate an input rate into the CF&E or the VUCDT. There were no directions to set the alarms of the EMFs to a specific value based on NC leakage. Additionally, capability of the instrumentation to calculate the input to the CF&E sumps or to the VUCDT was not a part of the system design. The level monitoring instrumentation for these portions of the WL system are designed with sufficient sensitivity to discriminate inputs at the 1 GPM range. However, the instrumentation had no capability to calculate the input flow. The need to meet the Reg Guide requirements is not clearly stated in the design basis document (DBD) for the liquid waste system, nor is Reg Guide 1.45 mentioned in the DBD for the radiation monitoring system. The DBD for a system would typically consider the design requirements of a system at the time of the original design. Once the design requirements are established, the DBD is written to

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document how the requirements are being met. An opportunity existed to discover this problem when the DBDs were being written for the WL and EMF systems. However, this opportunity was missed.

A search of the Problem Investigation Process (PIP) database for the previous 24 months revealed no other events where relevant information was omitted from the design basis requirements or documentation for any systems. Therefore, this event is considered not recurring.

There were no personnel injuries, radiation overexposures or unplanned releases of radioactive material as a result of this event.

This event is not NPRDS reportable.

CORRECTIVE ACTIONS:

- Immediate:**
- 1) Engineering personnel directed Ops personnel to pay particular attention to the readings of EMF-38 and EMF-39.
 - 2) Engineering and Regulatory Compliance personnel initiated an investigation into the requirements for and the licensing basis of the systems listed in TS 3.4.6.1.
 - 3) Operations personnel issued Special Order 94-06, to provide actions to monitor for NC system leakage.

- Subsequent:**
- 1) Engineering personnel completed calculations and took the necessary actions to make the systems listed in TS 3.4.6.1 conditionally operable.
 - 2) Operations personnel issued PT/O/A/4200/40, Reactor Coolant Leakage Detection, and deleted Special Order 94-06.
 - 3) Engineering personnel directed Information Technology (IT) personnel to add a rate of change alarm to the OAC, of both units, for EMF-39.

- Planned:**
- 1) Engineering personnel will change the design basis document, of both units, for the Liquid Waste system to include a more clear reference to the need for NC system leakage detection capability.

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- 2) Engineering personnel will change the design basis document, of both units, for the containment atmospheric radiation monitors to include the need for NC leakage detection capability.
- 3) Engineering personnel will have IT personnel add a rate of change alarm to the OAC, of both units, for EMF-38.
- 4) Engineering personnel will provide to Regulatory Compliance personnel the information necessary to update the FSAR section 5.2, to reflect the capabilities for NC system leakage detection by EMF-38 and EMF-39.
- 5) Engineering personnel will initiate a modification which will provide monitoring of the CF&E sump level by the OAC of both units. This modification will also provide a rate of change alarm on the OAC for CF&E sump level changes.
- 6) Engineering personnel will evaluate the VUCDT as a means of providing NC leakage detection that is within the present system capabilities.
- 7) Operations personnel will change the loss of OAC procedures, for each unit, to provide compensatory action to monitor NC system leakage.

SAFETY ANALYSIS:

The inoperability of these parts of the NC system leakage detection systems is based upon their ability to provide an alarm in the Control Room. The alarm, for each portion of the leakage detection systems, should be set such that an increase in leakage from the NC system of ≥ 1 GPM alarms within 1 hour. This alarm capability was not provided for in the original setup of the instrumentation loops. Upon discovery that this alarm function was necessary, Engineering personnel took immediate actions to make the monitors operable by, either, calculating the most limiting alarm setting and having the alarm setpoint changed to this new value or by having OPS increase their surveillance of the indications. The systems which makeup the NC leakage detection systems have the sensitivity necessary to meet the Reg Guide 1.45 requirements, and with the compensatory actions taken by OPS and Engineering these systems are operable.

The Control Room personnel have available to them a highly accurate program on the OAC to calculate the leak rate from the NC system. This program, which is required every 72 hours, is performed every 24 hours, or whenever a change in leakage is suspected. Operations personnel continuously monitor the NC system and other systems which are

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connected to the NC system. This monitoring provides a leakage detection capability of equivalent sensitivity to that which is required by TS 3.4.6.1, and without the use of the components specified by this TS. Therefore, this event is not considered significant.

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