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March 22, 1985

Mr. James M. Taylor, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: McGuire Nuclear Station
Response to IE Inspection Report
50-369/84-34 and 50-370/84-31

Response to Proposed Civil Penalty:
EA84-130

Dear Mr. Taylor:

By letter dated February 20, 1985, NRC issued Inspection Report 50-369/84-34 and 50-370/84-31 and proposed Civil Penalty EA 84-130 as a result of an event at McGuire. The event involved the failure of the Upper Head Injection (UHI) accumulator system isolation valves to close at the required UHI accumulator water level.

Attachment 1 provides Duke comments on the Enforcement Policy and the proposed imposition of civil penalty for this Severity Level III violation. Attachment 2 provides a general discussion of events and concerns identified during the course of investigating this event. Finally, Attachment 3 provides specific responses to the Notice of Violation.

The NRC Enforcement letter conveys a concern about Duke Power Company's philosophy with respect to surveillance testing. NRC apparently believes surveillance testing should include post-modification functional testing for accumulator differential pressure transmitters which is capable of detecting any predictable error in the installation. As Duke understands this concern, there are two aspects of testing which are in question. The first is the post-modification installation testing which Duke agrees must be sufficient to assure the modification has been properly installed and is capable of performing its intended function. As noted in Attachment 3, response to Violation 3, additional steps have been taken to assure that proper post-modification testing is specified and accomplished. The second aspect concerns periodic surveillance as required by Technical Specifications or by other documents. In this respect Duke considers that such testing may be different than that conducted as part of post-modification testing so long as there is reasonable confidence that such testing will demonstrate that the system is capable of performing its intended function.

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In the specific instance of the UHI water level transmitter testing, had the post-modification test been a wet-calibration test, the crossed impulse lines would have been identified and then corrected. Testing conducted thereafter using the dry calibration method would have been a wholly acceptable means to accomplish the periodic surveillance.

The NRC letter also requested that the Duke response specifically provide: 1) the corrective actions planned with regard to ensuring that future plant modification procedures provide adequate direction with respect to how the modification is to be properly accomplished; 2) the corrective actions to ensure that functional testing associated with post-modification work will be adequate to demonstrate affected systems and components will function satisfactorily in service; and 3) corrective actions planned to ensure required periodic surveillance testing provides an adequate degree of assurance of systems and components reliability. The Duke responses to the first two items are included in Attachment 3 and to the third item in Attachment 2. Duke has addressed NRC Unresolved Item (369/84-34-04, 370/84-31-02) and Inspector Followup Item (369/84-34-06, 370/84-31-04) in Attachment 2.

While Duke admits the violations contained in the Inspection Report, Duke is requesting the NRC consider factors which support mitigation of the proposed Civil Penalty.

I declare under penalty of perjury, that the statements set forth herein are true and correct to the best of my knowledge.

Very truly yours,

W H Owen

W. H. Owen

Attachments

RLG/mjf

cc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. W. T. Orders
NRC Resident Inspector
McGuire Nuclear Station

ATTACHMENT 1

Duke Power Company
McGuire Nuclear Station
Comments on Enforcement Policy
and Proposed Civil Penalty (EA 84-130)

The Enforcement Policy is designed to promote and protect the radiological health and safety of the public by

- Ensuring compliance with NRC regulations and license conditions;
- Obtaining prompt correction of violations;
- Deterring future violations; and
- Encouraging improvement of licensee performance including prompt identification and reporting of potential safety problems.

The Policy states that Severity Level III violations are cause for significant concern and that civil penalties are considered for Severity Level III violations. While Duke admits that the violations occurred and they warrant being categorized as Severity Level III, Duke does believe that factors exist which support a reduction of the proposed civil penalty.

NRC states that mitigation factors in the enforcement policy were considered but found not to be applicable. Duke requests that NRC reconsider the following factors as they appear to be applicable:

1. Prompt Identification and Reporting

   The event was identified by technicians following a routine boron sample of the UHI system. Reasonably prompt actions were taken to confirm the presence of nitrogen saturated water on Unit 1 and then similar efforts were taken for Unit 2. Unit 1 was shut down and Unit 2 was reduced in power to below 46% FP in accordance with Technical Specifications. Once the units were in these modes, and the additional level instrumentation errors identified, prompt actions were taken to correct the errors and to report the events.

2. Corrective Action to Prevent Recurrence

   The UHI system is unique at McGuire in its design and consideration of operational requirements. It was designed as a static system yet it operates as a quasi-static system. The problems that have occurred appear to have been unique to the UHI system. Nevertheless, as detailed in Attachment 3, a review of all other differential pressure transmitter installations has identified no other installation errors.

   To provide assurance that future modifications of differential transmitters will not result in crossed impulse lines or improper setpoints, several procedural changes have been implemented. These are discussed in Attachment 3.

3. Past Performance

In this general area of concern there has been no previous history. Modifications and setpoints have been in general properly implemented. As stated earlier, this particular event was created by the unique design of the UHI system.

4. Prior Notice of Similar Event

To our knowledge, there has been no prior notice of any event directly related to this particular situation.

5. Multiple Occurrences

This factor does not appear to be applicable in this instance.

In view of the fact that Duke discovered the event, reported the events immediately upon discovery, and took prompt action to preclude recurrence, Duke requests that NRC mitigate the proposed penalty in its entirety.

As expressed before (Duke letters dated July 1, 1983 and July 6, 1984), Duke has strong objections to NRC's current Civil Penalty procedure. In Duke's view, that process does not foster improved licensee conduct and indeed may ultimately prove to be counter-productive. To cure this, Duke believes NRC should restructure the enforcement process. Such restructure would have two salutary benefits: it would make NRC's enforcement procedures less adversarial in nature, and it would serve as official recognition that licensees have substantial incentives - well beyond those provided by simple imposition of a civil penalty - to operate their facilities safely.

The essence of Duke's complaint is twofold: Duke does not agree with the practice of issuing press releases contemporaneously with a notice of violation; and Duke believes that the current enforcement process adversely affects licensee morale and could, if it continues to be followed, potentially affect the willingness of licensee employees to investigate unusual occurrences and violations to the NRC. Duke notes that the Commission has established an Advisory Committee to review NRC Enforcement Practice and Procedure, and that through solicitation of comments (filed on February 28, 1985) and meetings such as that of January 30, 1985, with regional administrators, the Committee is actively studying the process. Duke commends this approach to the Commission as the current enforcement practice and procedure have become disconnected from their underlying purpose. Therefore, Duke believes that such a review is in order, is overdue, and urges the Commission to take action quickly to remedy problems of the nature discussed below.

Duke wishes to make clear that it continues to object strongly to the issuance of press releases concurrent with proposed Civil Penalties. As Duke has stated before, this practice is fundamentally unfair to licensees, as it often leads to substantial media coverage of a proposed Civil Penalty, in many cases before licensees have full notice of the particulars of the NRC's conclusions regarding why it believes Civil Penalties should be issued. And the publicity thus engendered by the NRC's current policy often serves as a disincentive to licensees to contest Civil Penalties. In this particular instance, Duke identified, reported, and corrected the alleged violations. NRC was fully aware of this fact, yet it failed to reduce the base Civil Penalty accordingly. Duke could contest the Civil Penalty on this basis; however, to do so would generate even more publicity. Unless NRC agreed to withdraw the proposed Civil Penalty in full, it would issue an order imposing the penalty, even if reduced, which would in turn trigger yet another round of press releases and media stories. Finally, Duke believes that it does a disservice to the regulatory process to subject licensees to publicity regarding NRC imposition of a Civil Penalty - either proposed or final - when licensees discover, correct, and report alleged violations.

Finally, Duke continues to question the regulatory basis for proposing Civil Penalties when licensees discover, correct, and report alleged violations. Civil Penalties should be proposed to attract the attention of management so that future violations of NRC requirements will be deterred. But, when a licensee discovers, corrects, and reports alleged violations, no such purpose is served by imposition of a Civil Penalty, with its attendant publicity. To the contrary, assessment of a Civil Penalty under these circumstances is, if anything counterproductive. Morale of the plant staff is jeopardized because the civil Penalty is often viewed as a sign that corrective actions previously taken and thought to be effective are somehow not adequate. Moreover, action of this nature tends to cause a licensee to view Civil Penalties as inevitable, and has the potential for discouraging employees from investigating unusual occurrences that could result in a violation. As a result, while Civil Penalties may gain the attention of management, and may result in stories for the local media, they do not necessarily motivate management or employees to improve their level of performance.

ATTACHMENT 2

Duke Power Company
McGuire Nuclear Station
Discussion of Concerns
Identified During Investigation of Inoperable UHI Event

The following paragraphs provide discussions of events and concerns identified during the process of investigating the initiating event of high nitrogen in the UHI water accumulator on McGuire Unit 1.

On October 30, 1984, a shutdown of McGuire Unit 1 was initiated due to a concentration of nitrogen in the upper head injection (UHI) accumulator in excess of technical specification limits. The unit was at 100% power at the time shutdown was begun. Technical specification limits for dissolved nitrogen (which is used to pressurize the system) are 80 cubic feet of nitrogen per 1800 cubic feet of water; just before the shutdown was begun UHI dissolved gas concentration was confirmed to be at about 124 cubic feet per 1800 cubic feet of water. The high concentration of nitrogen was suspected to be caused by repetitive and continuous make-up to the accumulator from the UHI surge tank, which allowed nitrogen saturated water into the accumulator. The continuous make-up was caused by valve leakage in the system. The unit was in Mode 3 within 6 hours after UHI was declared inoperable as required by Technical Specifications. Corrective actions were initiated to determine and isolate leakage flow paths. (Additional discussion in LER 389/84-29 dated November 29, 1984).

During the NRC investigation of this portion of the event, an unresolved item (369/84-34-04, 370/84-31-02) was identified. This item states that Duke should continue to pursue identifying the cause of the nitrogen entrainment in the UHI accumulators and take action to preclude a buildup to an out of specification condition. In response to this unresolved item, Duke has identified the cause of nitrogen entrainment in the UHI water accumulator as leakage from the system which causes the surge tank to cycle and results in nitrogen saturated water to be injected into the water accumulator. Eventually, as this process continues, the concentration of nitrogen in the UHI water accumulator increases. The action necessary to correct this is to maintain the surge tank level constant by finding and isolating leakage paths. Two areas were investigated: the UHI check valve test header and the UHI discharge piping vent system. By performing various valve manipulations, it was determined that one leak path was from the UHI discharge headers through test header valves 1NI255B, 1NI257, 1NI262 and then to the RWST through check valve 1NI274. Work requests were written to repair "seat leak by" on valves 1NI255B, 1NI257, 1NI262. Valve 1NI255B has been repaired. The others will be done during the forthcoming refueling outage scheduled for April 1985.

Repair efforts were also initiated on certain valves in the UHI discharge piping vent system. Valves 1NI356 and 1NI357 were repaired to prevent seat leak by. Valve 1NI355 is scheduled to be replaced during the forthcoming outage.

The above actions were identified on Unit 1. The corresponding valves on Unit 2 were also identified and are in process of being repaired/replaced.

In addition to the preceding, blank couplings are scheduled to be installed in the check valve test header in place of valves NI262 and NI273. This modification is scheduled to be implemented during the 1985 refueling outage of Unit 1 and has been completed on Unit 2 during the current refueling outage.

At the time of preparation of this submittal, all work scheduled for completion during the Unit 2 refueling outage had either been completed or would soon be completed.

Following the shutdown of Unit 1 on October 31, 1984, four Upper Head Injection (UHI) Isolation Valves failed to close automatically as the UHI water accumulator was drained. The cause of this failure was discovered on November 1 to be incorrect installation of the accumulator level transmitters, which are intended to provide a "close" signal to the valves at a water level of 76.25 inches. Additionally, when the installation errors were corrected, it was discovered that the level switches were incorrectly calibrated. (Additional discussion is contained in LER 369/84-30 dated December 3, 1984.)

NRC has identified as an Inspector Followup Item (IFI 369/84-34-06 and 370/84-31-04) that Duke should review functional testing procedures associated with other plant differential pressure instruments in order to ascertain that such testing will demonstrate that affected structures, systems, and components will perform satisfactorily in service following work associated with these instruments. Where such testing is determined to be inadequate, action should be taken to resolve these inadequacies.

As noted in Attachment 4, Response to Violation 2, there are twenty-nine other differential pressure installation types (approximately 120 instruments) that could have the potential for installation errors with swapped impulse lines. These were examined and it was determined that either indications during normal process variations or during various functional tests that manipulated the process would detect installation with crossed impulse lines. The only case that was identified that might not have been detected through indications was the containment pressure interlocks to the containment spray system, since these do not have indicators in the circuit. These were physically examined and determined to be correct.

On November 14, 1984, Duke met with NRC in Atlanta to discuss the then recent events related to the Upper Head Injection (UHI) systems of both McGuire units. As a result of the discussion, several items were discussed which Duke agreed to review. These were to evaluate compliance with Technical Specification 4.5.1.2C; to evaluate the complete draindown of the UHI water accumulator as a means to satisfy the above specification; and to evaluate the apparent poor performance of Kerotest valves in recent McGuire history. The evaluation of those items was provided by Duke letter dated December 20, 1984.

NRC has recently identified as a concern and has requested that Duke address those corrective actions planned to ensure that required periodic surveillance testing provides an adequate degree of assurance of systems and components reliability. The procedures used by Duke to perform periodic surveillance

testing are developed from available technical documents, such as Technical Manuals, design information, and industry standards. They are prepared by qualified individuals and reviewed by other qualified individuals to assure that the testing specified is adequate and conducted in a safe manner. They are periodically reviewed to assure they are up to date to latest requirements. When deficiencies are found they are corrected and other necessary actions are taken.

In closing, throughout the course of events associated with the UHI system, Duke has aggressively pursued the appropriate actions to be taken based on the facts available. Facts which were identified were promptly reported to NRC. At the Enforcement Conference in November, a detailed discussion of the entire sequence of events was provided. Licensee Event Reports were provided as well as a letter in followup to the Enforcement Conference. Throughout the sequence, Duke considers that actions were taken in a responsible and professional manner.

ATTACHMENT 3

Duke Power Company
McGuire Nuclear Station
Response to Notice of Violation

Violation 1: Technical Specification 3.5.1.2 for both Units 1 and 2, required prior to November 1, 1984, that the UHI accumulator system be operable in Modes 1, 2, and 3 with pressurizer pressure above 1900 psig and further required that with the Upper Head Injection (UHI) accumulator system inoperable, except as a result of a closed isolation valve(s), the UHI accumulator system be restored to operable status within one hour or the unit be in at least hot standby within the next six hours and in hot shutdown within the following six hours.

Contrary to the above, the licensee operated Unit 1 from March 1983 to November 1, 1984, and Unit 2 from April 1983 to November 1, 1984, in Modes 1, 2, and 3 with the UHI accumulator system inoperable because the accumulator isolation valve closure setpoint was set at a level which was approximately 24 inches too high; and consequently, the volume of water required by Technical Specification 3.5.1.2 would not have injected as required.

Response to Violation 1:

a. The alleged violation is admitted.

b. The violation occurred due to personnel error. Also contributing to the violation was a deficient transmitter calibration procedure. (Please refer to LER 369/84-30 dated December 3, 1984.)

c. The immediate corrective actions included changing the procedure to incorporate the correct setpoints and then calibrating all UHI Level transmitters.

d. The following additional corrective action has been taken to avoid further violations:

   IAE Guideline #6 on safety-related setpoints has been revised to establish guidelines within IAE to ensure that calculated setpoints are reviewed and are correct. Training on this guideline has been conducted through IAE Administrative Routing to all IAE persons that have technical responsibilities. This consisted of individual crew discussions between supervisors and those individuals reporting to them. Details associated with the background of this revision were openly discussed.

   A copy of the revised guideline is attached.

e. The setpoints were revised and transmitter recalibration complete by November 4, 1984.

   Full compliance was achieved by completion of training on February 28, 1985.

Violation 2: 10 CFR Part 50, Appendix B, Criterion V, requires that activities affecting quality be prescribed by documented instructions, procedures, or drawings which shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to be above, Shutdown Request 7508 and Nuclear Modification Design Summary MG-1210 failed to provide adequate instructions and acceptance criteria to ensure the UHI accumulator system differential pressure instruments were correctly installed. Plant modifications to Unit 1 were performed in accordance with these instructions and acceptance criteria in April 1984, but the differential pressure instruments were installed backwards.

Response to Violation 2:

a. The alleged violation is admitted.

b. The violation occurred due to personnel error. The installation procedure did not require verification of proper tubing connection. (Please refer to LER 369/84-30 dated December 3, 1984.)

c. The transmitter was reinstalled correctly.

d. The following additional corrective actions have been taken to avoid further violations:

1. The incident was reviewed with all affected working groups on site (completion date November 14, 1984). The Unit Coordinator who had followed the problems with the UHI transmitters discussed in detail the installation error and setpoint errors.

2. McGuire IAE personnel performed a review of all IAE ΔP procedures to determine if a possibility exists for impulse line reversal during routine maintenance and calibration activities. After this review the following conclusions were reached:

a) The probability of impulse line reversal due to normal maintenance activities is extremely low. The main reason for the probability being low is due to the fact that physical modification of impulse line installation is required in order for reversal.

b) Due to the very low probability of impulse line reversal on maintenance procedures, it was determined that addition of an appropriately worded Limit and Precaution statement would resolve all concern in this area. The following Limit and Precaution statement was added to IAE ΔP procedures:

> "Appropriate precautions should be utilized to insure that high and low pressure impulse lines are correctly installed for proper output from instrument. Refer as necessary to correct instrument drawing for instrument involved."

The above Limit and Precaution was added to the following procedures:

IP/O/A/3204/01	IP/O/A/3209/02	IP/O/A/3250/05
10	01	04A
05	3214/01	3251/01
02	04	3007/15
09	05	/12
03		3090/05

In addition to the above procedure changes, a procedure change was made to IP/O/A/3090/25 "Installation of Instruments and Instrument Lines". On Enclosure 11.5 the following was added to Step 4, which verifies that impulse lines are connected to correct high and low instrument ports:

If the work performed could result in the high and low pressure impulse lines being mistakenly reversed, the lines shall be walked out as far as necessary to verify correct connections to high and low instrument ports.

NOTE: The changeout of some instruments to that of another type may require reversing the high and low impulse lines. Direct acting transmitters, that are used in reverse acting applications, require the high and low impulse lines to be reversed at the transmitter. High and low inputs are marked on the instrument housing.

There were 29 other installation types (approximately 120 instruments) that were identified by Duke that could have the potential for installation errors with swapped impulse lines. These were examined and determined that either indications during normal process variations or during various functional tests that manipulated the process would detect installations with crossed impulse lines. This included flow, level, and other differential pressure instruments. The only case that was identified that might not have been detected through indications was the containment pressure interlocks to the containment spray system, since these do not have indicators in the circuit. These were physically examined and determined to be correct.

Also 39 Nuclear Station Modifications and Nuclear Problem Reports which modified the plant in the past two years were examined following the same criteria as above and no problems were discovered.

Duke considers that these measures will address the NRC concern regarding future plant modification instructions providing adequate direction with respect to how the modification is to be properly accomplished.

e. Full compliance was achieved December 28, 1984 for providing adequate guidance to assure impulse lines are connected properly and November 14, 1984 for personnel training.

IAE Guideline # 6 Rev.# 01

Subject: Safety Related Setpoints Determination

Reference: N/A

Approval: Ronnie B. White 2/28/85

PURPOSE:

The purpose of this guideline is to give the authorized sources for safety-related setpoints.

DESCRIPTION:

Safety-related setpoints MUST be obtained from controlled documents. The following is a list of authorized controlled documents in preferred order:

A. Approved Specific Loop (Equipment) Procedure
B. Safety-Related Setpoints Reference Procedure (IP/0/A/3090/03)
C. Technical Specifications
D. Controlled (MC, MCEE, MCRS, etc.) Drawings
E. Controlled Vendors Drawings or Manuals (MCM Numbered)
F. Mechanical I&C List

Specifically prohibited sources for setpoints are previous Work Requests.

If a setpoint cannot be located in one of the above sources, contact the staff person to obtain the setpoint. If the setpoint does not appear in a controlled document, initiate a procedure change and have the setpoint listed in Safety-Related Setpoints Reference Procedure. The procedure change should include the source of the setpoint (who or how determined).

Where conflicts exist in listed setpoints, contact the Engineering staff member and/or Supervisor responsible for the system for a resolution prior to using a setpoint for calibrations. The staff person or supervisor will initiate getting the conflict corrected. If a setpoint is used that is not in agreement with a controlled document, use a temporary modification and its evaluation as to the operability of the system, to document the discrepancy until documents are corrected.

SETPOINT CALCULATIONS:

It is sometimes necessary to calculate safety-related setpoints from data obtained from the above sources. All calculated safety-related setpoints shall be listed in the applicable calibration procedure or in the Safety-Related Setpoints Reference Procedure (IP/0/A/3090/03). When calculated setpoints are being added to a procedure, the preparer of the procedure or procedure major change shall make these calculations and the basis for these calculations available to the applicable qualified reviewer. It shall be the responsibility of the qualified reviewer to verify that these setpoint calculations are correct.

Violation 3: 10 CFR Part 50, Appendix B, Criterion XI, requires that a test program be established to assure that testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is performed in accordance with written test procedures.

Contrary to the above, the licensee's test program failed to assure that the UHI accumulator system was tested in a manner that would confirm that the system would perform satisfactorily in service. Specifically, in April 1984, the functional test of the UHI accumulator system following replacement of the UHI accumulator system differential pressure instruments was performed in accordance with Calibration Procedure IP/O/A/3000/03E, Change 1, which consisted only of a dry calibration of the instruments. This inadequate test failed to reveal that the Unit 1 impulse lines were improperly connected to the differential pressure instruments, rendering the instruments inoperable and preventing required automatic closure of the accumulator isolation valves.

Response to Violation 3:

a. The alleged violation is admitted.

b. The post-modification test procedure was inadequate due to personnel error. The testing specified was insufficient and did not fulfill the requirement to verify proper functioning of the modification. (Please refer to LER 369/84-30 dated December 3, 1984.)

c. The transmitter was re-installed correctly and a full wet-calibration test was performed.

d. In order to avoid future violations of this type, future modification packages involving Safety Related equipment will be reviewed by personnel from each McGuire group affected by the modification to determine the testing required to verify the system operability.

   In addition, the duties of the station's accountable engineer for a modification were extended/clarified to include a modification implementation plan to:

   (a) Properly isolate plant so modificaiton work can begin
   (b) Develop complete post modification Functional Test to assure operability.

   Duke considers that this cross-discipline form of review, prior to modification implementation and clearly defined accountable engineer responsibilities will address the NRC concern regarding functional testing associated with post-modification work being adequate to demonstrate that affected systems and components will function satisfactorily in service.

e. Full compliance was achieved December 5, 1984.