

December 4, 2001

EA-01-297

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
Quad Cities Nuclear Power Station
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION - UNIT 2
NRC INTEGRATED INSPECTION REPORT 50-254/01-08; 50-265/01-08

Dear Mr. Kingsley:

This refers to a letter from Mr. Timothy Tulon dated September 10, 2001, denying the Non-Cited Violation of 10 CFR 50.9 sent to you by our letter dated June 11, 2001.

After consideration of your response, we have concluded that two of the three examples of inaccurate performance indicator reporting that comprised the Non-Cited Violation of 10 CFR 50.9 should be retracted. NRC records will be corrected to reflect this conclusion. The third example remains valid and still results in the safety system functional failure performance indicator for Unit 2 crossing the threshold from Green to White in the first quarter of 2000; therefore, the Non-Cited Violation of 10 CFR 50.9 remains valid. The reasons for our conclusions are stated in the enclosed evaluation.

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Sincerely,

/RA/

James L. Caldwell
Deputy Regional Administrator

Docket Nos. 50-254; 50-265
License Nos. DPR-29; DPR-30

Enclosure: As Stated

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EVALUATION OF EXELON'S DENIAL OF NON-CITED VIOLATION 50-265/01-08-01

Restatement of Non-Cited Violation 50-265/01-08

On June 11, 2001, Inspection Report 50-254/01-08; 50-265/01-08 was issued. This inspection report included the following Non-Cited Violation as stated in the Summary of Findings:

No Color. Inspectors found that the licensee reported safety system functional failure data improperly. The three improperly reported safety system functional failures involved failures of the safe shutdown makeup pump, the Unit 2 emergency diesel generator, and Unit 2 intermediate range nuclear monitors.

Review by the inspectors and by program specialists from the Office of Nuclear Reactor Regulation determined that these three events should have been reported as safety system functional failures. Had these been reported properly in either the January 2001 or April 2001 submittals, the safety system functional failure performance indicator would have shown eight failures for first Quarter 2000 Unit 2 data, and seven failures for fourth Quarter 2000 Unit 2 data which would have indicated performance in the regulatory response or White band. The actual submittals showed performance indicator data in the licensee response or Green band. Because the information was related to a performance indicator that would have changed from Green to White had the complete information been submitted, this was considered a Non-Cited Violation of 10 CFR 50.9.

Summary of Licensee's Response to Non-Cited Violation 50-265/01-08

The licensee concluded that the events in question did not constitute safety system functional failures (SSFFs), and that its submittals of performance indicator data in 2000 and in January and April 2001 were complete and accurate and did not result in a violation of 10 CFR 50.9. The licensee correctly asserts that only those failures meeting the 10 CFR 50.73(a)(2)(v) reporting criteria should be reported as SSFFs based on NEI 99-02, Revision 0, NUREG-1022, and Frequently Asked Questions 8, 9, 10, and 143.

Inoperable Intermediate Range Monitors (IRMs) Event

This event involved having two IRMs out of four in the same trip system inoperable with the reactor in Mode 5 (refueling).

The licensee asserts that this event would not have prevented the fulfillment of a needed safety function because (1) the scram function of the IRMs is not credited in any Updated Final Safety Analysis Report (UFSAR) Chapter 15 accident analysis; (2) at the time of the event there were at least two operable IRMs in each trip system, therefore, had the scram function of the IRMs been called upon, the redundancy designed into the system would have assured that a scram signal would have been generated; and (3) throughout this event the reactor was in Mode 5, all control rods were at the full-in position and there was an out-of-service card on the rod motion control switch.

Therefore, the safety function of having all control rods insert into the core as a result of an IRM generated scram was met.

Unit 2 Division II Emergency Diesel Generator Vent Fan Switch Event

This event involved the discovery of the power select switch for the Unit 2 Division II Emergency Diesel Generator (EDG) vent fan in the alternate position. This would have resulted in the vent fan, upon a start signal being received by the Unit 2 Division II EDG, being powered by the Unit 1 Division II emergency bus which is fed by the Unit 1 Division II EDG following a loss of offsite power (LOOP). Normally the Unit 2 Division II EDG vent fan is powered by the Unit 2 Division II emergency bus, which is fed by the Unit 2 Division II EDG following a LOOP.

The licensee asserts that the event would not have prevented the fulfillment of a needed safety function because the Unit 1 Division II EDG was operable throughout the event and capable of providing power to the Unit 2 Division II EDG vent fan, if required. The utilization of the Unit 1 Division II EDG for power to a support system (i.e., the Unit 2 Division II EDG vent fan) would not constitute a lack of independence between the Unit 2 Division I and Unit 2 Division II.

Safe Shutdown Makeup Pump

This event involved an erratic safe shutdown pump (SSMP) controller, such that the SSMP would not have been capable of providing the flow required by Technical Specifications.

The safety function of the SSMP is to provide an inventory control function to satisfy the requirements of 10 CFR 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," as described in the Safe Shutdown Analysis and in the UFSAR Section 5.4.6.5.

UFSAR Section 5.4.6.5.1, "Design Basis," states that the purpose of the SSMP system is to provide cooling water to the Unit 1 or Unit 2 reactor core in the event that the reactor becomes isolated from the main condenser simultaneously with a loss of the feedwater system. To achieve this purpose, the SSMP system was designed to supply makeup water to the reactor core at the same capacity as the RCIC system; specifically, 400 gal/min over a reactor pressure range of 1135 -165 psia.

UFSAR Section 5.4.6.5.2, "Design Description," states the SSMP system was installed as a common backup to the Unit 1 and Unit 2 RCIC systems to satisfy the requirements of 10 CFR 50, Appendix R, Section III.G, "Fire Protection Safe Shutdown Capability." The system bypasses fire zones which could theoretically disable the RCIC system; this is discussed in Section 3.0 of the Safe Shutdown Report (Fire Protection Reports, Volume 2).

The licensee references an internal NRC memorandum and asserts that it states, "the term "needed" in 10 CFR 50.73(a)(2)(v) means only those systems for which the UFSAR explicitly claims credit to shut down the reactor, remove residual heat, control the

release of radioactive material, or mitigate the consequences of an accident.” The licensee states that the UFSAR Chapter 15 accident analyses do not credit the function performed by the SSMP. The licensee also asserts that the internal memorandum concludes, “that a system failure is not reportable simply by virtue of the inclusion of that system in TS.” The licensee concludes that the TS requirement of the SSMP to be operable does not make the failure of the SSMP reportable per 10 CFR 50.73(a)(2)(v), and therefore, the event was not reportable as a SSFF.

NRC Evaluation of Licensee's Response

The timing of these events, February, March, and November, 2000, indicate that the previous revision of 10 CFR 50.73 applies and therefore NUREG 1022, Revision 1.

Inoperable Intermediate Range Monitors (IRMs) Event

10 CFR 50.73(a)(2)(v)(A) requires reports for any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition. To be reportable under 10 CFR 50.73 (a)(2)(v), an event must reasonably be expected to prevent a system from completing one of the safety functions listed in the regulation. This means that the safety analysis description of the system must indicate that the system performs one of the functions. Also, to prevent a system from completing one of the safety functions, the event must affect more than one train of the system. If these conditions are met, the event is reportable regardless of when the failures were discovered or whether or not the system was needed at the time (NUREG 1022, Page 66, 70).

Quad Cities UFSAR Section 7.6.1.4.1.B, “Design Basis,” states that the IRM system has two functions: 1) detect and indicate neutron flux level in the range between the source range monitor and the power range monitor; and 2) generate trip signals to prevent fuel damage from a single operator error or a single equipment malfunction. The TS basis also contains similar statements. Therefore, the IRM system clearly performs one of the functions listed in the regulation. It shuts down the reactor.

Technical Specification 3.1.A-1 requires a minimum of three operable IRM channels for each RPS Trip System when in Refueling.

UFSAR Section 7.6.1.4.2, “System Description,” states the IRM subsystem is composed of eight miniature fission chamber located radially in the core as shown in Figure 7.6-4. The figure also shows the assignment of IRM detectors to each RPS channel. The assignment is made to provide coverage of each quadrant of the reactor core with one detector in each channel bypassed.

UFSAR Section 7.6.1.4.3, “Design Evaluation,” states that the number and location of the IRM detectors have been analytically and experimentally determined to provide sufficient intermediate range flux level information under the worst permitted bypass and chamber failure conditions.

To be reportable, disconnecting two IRMs in RPS trip system B and one IRM in trip system A must prevent a full scram when reactor power is between the upper end of the SRM range and the lower end of the APRM range. The RPS trip logic normally requires one signal from trip system A and one signal from trip system B to achieve a full scram. Given that two IRMs remained operable in trip system B and three remained operable in trip system A, there was capability to generate a full scram. However, the unavailable IRMs were located in the central core region and it remains unclear whether or not the system could detect a localized reactivity excursion and trip the reactor before fuel damage occurred. Extensive analysis would be needed to determine whether the remaining IRMs were sufficient to protect the central core region and such analyses were not performed. As noted previously, during refueling, the Technical Specifications and the UFSAR require three operable IRM detectors to ensure adequate core coverage under worst conditions using the existing analysis. Thus, without additional analysis, less than three IRMs in each RPS trip system during refueling would be reportable under 10 CFR 50.73 (a)(2)(v).

The specific event in question, on February 5, 2000, when IRMs 16 and 17 were inoperable in RPS trip system B while in refueling was a safety system functional failure, because there were less than three operable IRM channels in RPS Trip System B. The event alone could have prevented the fulfillment of the safety function of a system that is needed to shut down the reactor and maintain it in a safe shutdown condition.

Regardless of whether or not this event is reportable under 10 CFR 50.73 (a)(2)(v), it should be noted some of the licensee's arguments in the denial of violation dated September 10, 2001 are incorrect. In Attachment 2 to the denial letter, Page 1 of 3, Item 1, the licensee asserts that "As described in the referenced letter, the term 'needed' in 10 CFR 50.73(a)(2)(v) means only those systems for which the UFSAR explicitly claims credit to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of a accident. The Chapter 15 accident analyses at QCNPS (i.e., control rod drop, loss of coolant, ...) do not credit the IRM function. Therefore, there is no needed safety function associated with the IRMs." The "referenced letter" is a memorandum dated March 15, 2001, responding to Task Interface Agreement 99-030 regarding RCIC failure reportability at Monticello. The NRC also issued a subsequent document, NRC Regulatory Issue Summary 2001-14 dated July 19, 2001, which provides guidance regarding RCIC failure reportability at BWRs in general.

The discussions in the referenced documents repeatedly state that they are applicable only to the reportability of RCIC system failures pursuant to §50.73(a)(2)(v). They do not support the general assertion that the failure of a system is reportable only if that system is credited in an Accident Analysis in Chapter 15 of the UFSAR. Additionally, inclusion in Chapter 15 would mean the IRM performs the function of mitigating an accident. Since the IRM system is not in Chapter 15 it is true that it does not mitigate an accident but as shown above it does perform a function to shut down the reactor. Chapter 15 alone is inadequate basis to say the event is not reportable. The licensee's denial letter further states that the reactor was in Mode 5 with all rods in and an out-of-service card on the rod motion control switch such that the safety function was met. However, just because the safety function was met does not preclude reportability

under 10 CFR 50.73 (a)(2)(v). Failures must be reported regardless of whether or not an alternate system could have or did perform the function and independently of whether or not the system was needed at the time (NUREG 1022, Rev. 1, page 66, 70). Furthermore, the event occurred at a time when the IRMs and associated scram were required to be operable. Therefore, this example remains valid.

Safe Shutdown Makeup Pump (SSMP)

This event involved failure of the SSMP controller such that the pump would not operate in automatic. The licensee initially reported this event under 10 CFR 50.73 (a)(2)(v) but later retracted the LER.

As in the IRM event the licensee relies on TIA 99-030 and UFSAR Chapter 15 to claim this event is not reportable. As mentioned in the opinion on the IRM event, UFSAR Chapter 15 alone is inadequate basis to say the event is not reportable.

However, in its initial LER, the licensee noted that the SSMP was always operable from the control room in automatic throughout the event in question. Inspectors subsequently verified that the controller failure was unique to local operation of the SSMP and a separate controller, unaffected by the local controller failure, governed SSMP operation from the control room. In addition, the manual capability of the SSMP remained available from the local station. As a result, inspectors concluded that operation of the SSMP in the event of a fire would be available in automatic or manual from the control room. If the fire forced evacuation of the control room, licensee procedures would direct operators to the SSMP room which would make it reasonable to assume manual operation of the SSMP. Accordingly, this controller failure is no longer considered a safety system functional failure and this example of the Non-Cited Violation is retracted. NRC records will be corrected to reflect this retraction.

Unit 2 Division II Emergency Diesel Generator (EDG) Vent Fan Switch Event

This event resulted from the Unit 2 EDG vent fan power select switch being in the alternate position such that the fan received power from the Unit 1 safety bus instead of Unit 2.

To be reportable under 10 CFR 50.73 (a)(2)(v), an event must be reasonably expected to prevent a system from completing one of the safety functions listed in the regulation. This means that the safety analysis description of the system must indicate that the system performs one of the functions. Also, to prevent a system from completing one of the safety functions, the event must affect more than one train of the system. If these conditions are met, the event is reportable even if an alternate safety system could have or did perform the function (NUREG 1022, Rev 1, page 66, 70).

Due to the loads supplied by the EDGs, it is clear that the onsite power system performs all of the functions listed in the regulation. Therefore, the reportability determination for this event depends on whether both trains of onsite power for Unit 2 were not functional. The LER issued for this event clearly shows that both trains of onsite electrical power for Quad Cities Unit 2 were inoperable. One diesel was made inoperable by the vent fan

switch being in the wrong position and the second was inoperable due to maintenance. However, in determining reportability, credit can be taken for reasonable operator action to correct minor problems. Heroic actions and unusually perceptive diagnosis during stressful situations should not be assumed (NUREG 1022, Rev 1, page 66).

The diesel room temperature is annunciated at 125 degrees F. The alarm response procedure for the annunciator, QCAN 901-8, refers to a separate procedure if the room temperature alarm is due to room ventilation failure. That procedure, QCOA 6600-06, provides instructions for the case where the EDG is needed and the vent fan is not operating which include placing the selector switch to an available power supply and starting the fan. These actions, which are in a procedure that includes diagnosis and correction, are reasonable operator actions to correct a minor problem. Therefore this event is not reportable under 10 CFR 50.73 (a)(2)(v). Accordingly, this EDG vent fan switch misalignment is no longer considered a safety system functional failure and this example of the Non-Cited Violation is retracted. NRC records will be corrected to reflect this retraction.

NRC Conclusion

NRC investigation into the licensee's denial of the Non-Cited Violation has determined that two out of three of the examples of inaccurate performance indicator reporting comprising the Non-Cited Violation should be withdrawn. The third example remains valid. However, the third example by itself, if reported correctly, would have caused the safety system functional failure performance indicator for Unit 2 to cross the threshold from Green to White in the first quarter of 2000. Therefore, NRC concludes that the Non-Cited Violation remains valid.