



Commonwealth Edison

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DCJ

August 12, 1983

Mr. James G. Keppler, Regional Administrator
U.S. Nuclear Regulatory Commission - Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Quad Cities Generating Station Unit 1
Proposed Civil Penalty
NRC Docket No. 50-254

Dear Mr. Keppler:

By this letter, Commonwealth Edison Company responds to the Notice of Violation and proposed Imposition of Civil Penalties of the NRC, and its accompanying letter and inspection report, regarding the incident involving the insertion of control rods during a reactor shutdown on March 10 and 11, 1983 at the Quad Cities Station. In accordance with a previous arrangement, this response is submitted within 60 days of the Notice rather than 30 days as originally specified. We appreciate the extension of time given us to answer this complicated matter. We do not intend to protest the fine and are enclosing with this letter a check for \$150,000.

Edison understands the significance of the deficiencies identified in the Notice. The system on which we rely to ensure the safe operation of nuclear facilities depends upon a high level of performance of control room personnel. We recognize that the conduct which gave rise to this fine failed to meet that standard and was unacceptable. Edison, through initiatives both at the Station level and from its general office, is implementing extensive corrective actions to prevent the recurrence of this and similar incidents.

As described in Attachment A to this letter, the Quad Cities Station has instituted a wide range of measures, both immediate and long term, to address the concerns which have been raised. These actions involve the commitment of plant management to several programs and training sessions directed at promoting the appropriate attitude regarding adherence to procedures and the understanding of the importance of accurate documentation of events. They also encompass a comprehensive reassessment of procedures relating to the events involved with this incident and to general conduct of operations, aimed at minimizing the possibility of future misinterpretation of requirements.

Edison recognizes the need for management to foster awareness of the significance of such events in personnel involved in them and the need for management to promptly evaluate the continued effectiveness of these individuals in plant operations. In answer to the three questions in your letter addressed to such measures, Edison makes the following commitments.

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First, you requested that we discuss the actions taken or to be taken with the involved personnel to ensure that this type of event will not recur. In addition to the extensive retraining efforts described in Attachment A, the Quad Cities Superintendent plans to personally meet with each man involved with this incident to discuss with him his understanding of the incident and to emphasize the scope of importance of accountability for his actions. The Superintendent plans to conduct a similar series of accountability meetings with all plant personnel in groups regardless of their relationship to the incident.

Second you asked that we describe the system we are implementing to monitor the activities of such personnel. In addition to the periodic corporate and Station personnel reviews normally conducted, Edison proposes to implement, during the next six months, a special program to monitor all the work activities of control room personnel involved in the incident. On a monthly basis management representatives will evaluate their job performance during normal and any emergency conditions, paying close attention to activities involving system evolutions, log book documentation and shift turnover checklists. Any deviations from prescribed procedures and accepted standards will be brought to the attention of the Station Superintendent for specific corrective action.

Third, you requested that our letter address aspects of a program for short term corrective actions of future events involving such personnel. The Quad Cities management understands that the persons involved with this incident, along with all control room personnel, must be held accountable for their actions. In the future, the performance of a person identified as involved in an incident of the type which prompted this fine will be immediately evaluated by Station management to determine the necessity for relieving the individual of all or part of his responsibilities until a more complete investigation is possible. Among other things to be considered will be the person's work history and the seriousness of the event in question.

In summary, Edison reaffirms its commitment to the operational safety of its nuclear stations through procedural controls, adequate documentation of plant conditions and effective corrective actions. Through the measures we have described in this letter and the attachment to it we believe that the recurrence of this incident and similar incidents can be prevented, and that operation of Quad Cities Station can continue, as it has in the past, with full assurance of the public health and safety.

Very truly yours,



B. L. Thomas
Executive Vice-President

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ATTACHMENT A
RESPONSE TO NOTICE OF VIOLATION

COMMONWEALTH EDISON COMPANY)	Docket No. 50-254
QUAD CITIES NUCLEAR POWER STATION)	License No. DPR-29
UNIT 1		

This is Commonwealth Edison Company's response, pursuant to 10 CFR 2.201, to the Nuclear Regulatory Commission's Notice of Violation and Proposed Imposition of Civil Penalties issued on June 21, 1983.

Violation A

Quad Cities Technical Specifications Sections 6.2.A.1 and 6.2.A.9 require adherence to procedures covering safe shutdown of the reactor. The NRC alleges that contrary to these specifications the licensee did not adhere to procedures covering the safe shutdown of the reactor of March 10 and 11, 1983 as indicated below:

Example 1: The licensee failed to adhere to the control rod insertion sequence procedure, QTP 1600-S3, in that the control rod insertion sequence used during the shutdown was the reverse of the specified rod insertion sequence.

Example 2: The licensee failed to adhere to the normal shutdown procedure, QGP 2-1, in that the following actions were not accomplished:

- a. Reactor recirculation flow reduction and control rod insertion were not coordinated as specified in Sections D.2 and D.4;
- b. Rod worth minimizer (RWM) operability and control rod insertion sequence conformance was not established at approximately 30% reactor power as required in Section D.7.

Discussion:

Edison admits Violation A. In both examples cited, the violation occurred because of misinterpretation of the procedures to be used for control rod insertion, caused in part, by inadequate communication between individuals during shift turnovers. There was also a failure to recognize and evaluate the importance of deviations in events during reactor shutdown from that which would normally be expected to occur.

Corrective Action Taken to Avoid Further Noncompliance

1. Initial Investigation

Immediately upon discovery of the error on March 11, 1983 by the Quad Cities Lead Nuclear Engineer, the Station Superintendent, other Station management personnel and the NRC Senior Resident Inspector were notified. The same day Station personnel began investigating the incident and interviewing all persons involved. In addition, Station management contacted personnel on all shifts to inform them of the incident and emphasize the necessity of following procedures.

A formal corporate investigation (PRO Committee) was initiated on March 18, 1983. The report of the PRO Committee investigation was completed on April 12, 1983. It included suggestions which resulted in several of the corrective actions discussed in this Response.

On March 21, Edison requested that the General Electric Company analyze the out of sequence rod patterns for maximum rod drop accident worths. On March 29, 1983 General Electric notified Edison that the calculated maximum worth was acceptable and was less than the allowable criterion of 1% Delta-K.

2. Procedure Revisions Involving Control Room Conduct

In analyzing the events of March 10 and 11, 1983 in the Quad Cities control room, two areas of concern were ascertained; the first involved general concepts of control room conduct; the second dealt with specific practices and methods of operation pertaining to systems evolution and control rod movement. Procedures relating to both these areas were examined in light of the control rod insertion incident to determine the kinds of revisions which could be made to forestall the recurrence of this or other incidents.

In terms of general control room conduct, procedures and practices were reviewed and rewritten to improve the quality of interpretation, to foster adherence to all procedures and to enhance communication among control room personnel during shift turnovers. A new "Conduct of Shift Operations" procedure has been devised to provide an authoritative reference on general standards for responsibilities of control room personnel, communication of information during and between shift operations and procedure interpretation (QAP 300-2). It has incorporated the general recommendations provided by INPO during their last evaluation. The General Office is currently reviewing this revised procedure against INPO Good Practice OP-201 and OP-204.

The Station is also in the process of revising the shift turnover procedures for Shift Engineers, SCRE/STAs, and Operators to clarify and define the shift turnover responsibilities of each. (QAP 300-4, 300-5, 300-7.) Concurrently, Edison's General Office is requiring all stations to review such procedures to ensure the existence of guideline "checklists", explicitly listing the kinds of data to be communicated between shifts and establishing minimum levels for the exchange of information.

Extensive procedural changes are also being implemented at Quad Cities to improve procedures governing those aspects of control rod insertions which gave rise to the incident. As a result, a completely new procedural system for control rod movements and sequences and their documentation is being instituted which totally revises rod insertion sequence procedures QTP 1600-S2 through S5.

The system in place at the time of the incident involved the operator's coordination of information between sequence pages and separate cardexes. It did not demand specific documentation of each rod movement and it did not specifically assign responsibility and authority for changes in sequencing.

The new system uses a special book or "package" for each startup/shutdown period, containing a separate page for each rod array. Any rod movement must be specifically noted, along with the date and the time of each completed step, and the initials of the individual coordinating the movement. The new system also requires noting the method of verification of each rod movement, indicating whether it was done through the RWM or independently by an individual. The package will also include similar data sheets to note the sequence and maneuver reviews and special maneuvers. Any change in the manner of sequencing or movement requires a change of the page in the book; this can only be accomplished with the approval of a Nuclear Engineer.

Use of this system is governed by another new procedure, QGP 4-1. It clarifies use of the new sequencing system, responsibilities of control room personnel involved with it, use of all package and data sheets, document control and communication channels. Changes were also made in other procedures to coordinate them with the new system, including provisions for sequence approvals and new instructions on rod insertion and recirculation flow reduction. (e.g., QTP 1600-4; QGP 3-1.)

3. Procedure Revisions Involving Equipment

The incident has renewed the Station's concern about the functioning of the RWM during startup and shutdown periods. Both the NRC and the Edison investigations disclose that on account of the unreliability of the RWM in the past, control room personnel during the incident discounted indications it provided that the rod sequencing order may have been incorrect.

To prevent such misinterpretations and to strengthen the reliability of the RWM, procedures for the use and bypass of the RWM have been revised. New procedures now describe the operation of the RWM, outline the steps to be taken to determine its operability and the circumstances under which it can be declared inoperable, the method

for placing it in "bypass" and a method for RWM control rod verification. (QOP 207-1, 207-2, QTP 680 series, QTS 680-1.) Other existing procedures, such as startup, shutdown and associated checklists, were expanded to reference the new RWM operability and rod insertion steps. (QGP 2-1, 3, 4; QGP 1-S1, S2; QGP 1-1, 1-2.)

In addition to these procedural changes, the Station has initiated an investigation into the design and operation of the RWM by Edison's corporate Station Nuclear Engineering Department (SNED). On a short term basis, SNED is examining indications which identify the operability and non-operability of the RWM in all of its required roles. This study is intended to provide operators with additional guidance in use of the RWM. Among other things, it will determine the feasibility of activating the RWM at the beginning of each shutdown to confirm that the rod sequence has been initiated and is proceeding correctly. On a long term basis, the investigation will recommend improvements in RWM hardware and/or software.

4. Training

As noted before, the control rod incident prompted the Station to direct its attention, in particular, at the specific conduct giving rise to the incident and, in general, at the broader implications which underlie that specific conduct. As with procedural revisions, the Station will re-evaluate its training program with those two concerns in mind.

Shortly after the incident, the Station conducted special information sessions for control room personnel to alert them of the nature and immediate causes of the incident.

From April 5 through April 8, 1983, the Acting Lead Nuclear Engineer and the Operating Assistant Superintendent conducted several intensive training sessions for all control room personnel. At these meetings the Operating Assistant Superintendent discussed the significance of the March 10, 1983 incident and emphasized the serious concern over its occurrence. He explained the role of personnel accountability for all control room actions and the necessity of maintaining complete and adequate logs. He stressed, among other things, the necessity for complete adherence to written procedures and the need to investigate the reasons for any deviations between the procedures and events as they actually occurred during operation. These training sessions also included a review of the procedures pertaining to low power sequencing constraints (banked position withdrawal sequence rules), rod drop accident considerations for startups and shutdowns, and proper use of the RWM. Special attention was given to the delineation of shift and technical personnel responsibilities and the importance of adequate communication of items affecting the reactor during shift turnover.

For the long term, the Station is incorporating into its regular training and retraining programs increased emphasis on the importance of correct interpretation and complete adherence to written procedures. The training program will stress the importance of Station personnel to the safe operation of the reactor and the personal accountability of all individuals for the performance of their duties. Control room employees will be trained in the new procedures for control rod movement, operation of the RWM, shift turnover and proper communication.

It is believed that these training sessions will strengthen adherence to written procedures, improve communications and shift turnover, promote accountability and responsibility in control room personnel, and familiarize personnel with the proper methods for control rod movement and use of the RWM.

Date When Full Compliance Will Be Achieved

It is expected that all new station procedures and procedure modifications will be fully implemented by September 1, 1983. Training on these procedures will be completed by September 15, 1983.

Short term training of control room personnel as a direct response to rod insertion incident was accomplished by April 8, 1983. The re-evaluation of the long term training process is expected by January 1, 1984. The initial stages of the SNED RWM analysis will be finished by February 1, 1984. The Station investigation and procedural revisions attendant to it are expected to be completed six months after the SNED evaluation.

Violation B

10 CFR 50, Appendix B, Criterion V, requires that activities affecting quality shall be accomplished in accordance with documented procedures. The NRC alleges that contrary to the above, administrative activities affecting quality during shutdown of the reactor on March 10 and 11, 1983, were not accomplished according to documented procedures as indicated below:

Example 1: QAP 300-8, "Operating Logs", Sections C.2 and QAP 300-4, "Shift Change for Nuclear Station Operators," Sections C.1.b and C.1.c were not followed during the day shift and the evening shift on March 10 and 11, 1983, as illustrated by the failure of the Unit 1 logbook to contain the following information:

- a. A new procedure was issued for Unit 1 "fast" shutdown;

- b. The rod worth minimizer was taken out of service (bypassed) and compensatory measures were initiated;
- c. The time that rod insertion began and the time that the rod worth minimizer was bypassed;
- d. Persons other than the unit operator manipulated control rods (another licensed operator and an operator trainee).

Example 2 QAP 300-3, "Shift Change for Shift Engineers," Sections C.1.b and C.1.h, and QAP 1300-2, "The Standing Operating Orders," Section C.2, were not followed during the day shift and evening shift on March 10, 1983, and the night shift on March 10 and 11, 1983, as illustrated by the failure of the shift engineer's log book contain the following information:

- a. The rod worth minimizer was taken out of service and compensatory measures were taken;
- b. A new procedure was issued for Unit 1 "fast" shutdown.

Example 3 QAP 300-1, "Operations Department Organization," Section C.3.g, was not followed during the evening shift on March 10, 1983, and the night shift on March 10 and 11, 1983, in that both shift engineers became involved in a single operation during their shift (independent verification activities for the bypassed rod worth minimizer and shutdown surveillance testing activities), thereby losing their overall perspective of plant conditions.

Example 4 QAP 300-1, "Operations Department Organization," Sections C.3.1 and C.3.n, were not followed in that the shift engineer on evening shift, March 10, 1983, was not cognizant of the status of the rod worth minimizer and the insertion of control rods in an unapproved sequence, and no corrective actions were initiated to alleviate those conditions. Further, the shift engineer on night shift, March 10 and 11, 1983, was not cognizant of the insertion of control rods in an unapproved sequence, even though he was acting as the independent rod insertion sequence verifier in place of the inoperable rod worth minimizer.

Discussion

Edison admits that certain administrative activities affecting quality as identified in Violation B of the Notice were not accomplished according to documented procedures during shutdown of the reactor on March 10 and 11, 1983. In particular, Edison admits that the items listed in Examples 1 and 2 of Violation B were not entered into the appropriate logs and, as indicated in Example 4, the evening and night Shift Engineers were not cognizant of the insertion of control rods in an unapproved sequence.

With respect to the log entries, we would point out that the scope and detail of information to be contained in a log must remain a question of judgment; reasonable persons could differ as to whether some of the specific items cited should have been entered into the logs. Hindsight alone cannot be the sole criterion upon which to evaluate whether logs were properly maintained. For example, the use of a new control rod sequence, as was used here, would not normally be considered a "new" procedure for purposes of log entries. In this incident, although the operator believed he was using a new procedure, similar "fast shutdown" sequences had been used on several prior occasions and had been successfully accomplished using the same written procedures.

With respect to Example 3, we are unaware of any facts in either the NRC's or Edison's investigation of the incident to support the allegation that the night Shift Engineer became so involved in the independent verification activities for the bypassed RWM that he lost an overall perspective of plant conditions. We are concerned that this element of Example 3 suggests an interpretation of QAP 300-1, "Operations Department Organization," Section C(3)(g), which would preclude a Shift Engineer from becoming involved in any activities on his shift, regardless of their importance or his ability to comprehend other conditions. The procedure is intended to prevent a Shift Engineer from losing perspective of operating conditions beyond those on which he may actually be working. It is not meant to foreclose a Shift Engineer's direct involvement in any activities whatsoever.

Corrective Action Taken To Avoid Further Noncompliance

The rod insertion incident makes clear the importance of maintaining complete logs. This concern was an explicit part of the intensive April training sessions and will be included in the long term retraining of all control room personnel. (See answer to Violation A.) Further, it is planned to have SCREs periodically review with personnel on each shift, the logging procedures and their importance in providing continuity and accountability in control room actions. Assisting in this effort, the General Office Production Training Department is in the process of developing a training module for highlighting the need for literal adherence to procedures and proper documentation of any deviations to them.

The importance of the Shift Engineer and his crucial role in coordinating not only the overall operation of the plant but also the specific functioning of the control room, has been recognized. As discussed in the response to Violation A, the Station has conducted several special training sessions with Shift Engineers specifically impressing upon them the scope of their job responsibilities and the importance of adherence to procedures, documentation of events and the necessity of communication of plant conditions between shift personnel.

In light of the particular event, procedural modifications have been made in the specific area of control rod sequencing to assure that the Shift Engineer is aware of, understands and approves all sequence changes, and that he refers all rod sequencing questions to a Nuclear Engineer (QGP 4-1). Further, the changes in the rod insertion procedures diminish the possibility of improper sequencing by prohibiting the use of any sequence which is not first signed by both the NSO and Shift Engineer.

Date When Full Compliance Will Be Achieved

All procedural modifications are to be in place by September 1, 1983; training sessions regarding the procedures are to be completed by September 15, 1983. The short term training has already been conducted on April 5 through April 8, 1983 session. The module on proper log keeping should be available by February 1, 1984.

Violation C

10 CFR 50, Appendix B, Criterion XVII, states in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality." The NRC alleges that contrary to the above, QGP 2-1, "Normal Unit Shutdown", completed on March 10 and 11, 1983, did not furnish evidence of activities that occurred during shutdown of Unit 1 as indicated below:

- Example 1 Verification signatures appeared for QGP 2-1, Sections D.2.f, D.4 and D.7, although those activities were not accomplished as specified;
- Example 2 No name was recorded in QGP 2-1, Section D.38, identifying the independent verifier of rod movement while the rod worth minimizer was bypassed;
- Example 3 Although the procedural deviations listed above occurred, the shift engineer and unit operator reviewed and signed QGP 2-1 as completed, without noting any deviations.

Discussion

Edison admits Violation C. The violation occurred because of the misinterpretation of the procedures by the operator and Shift Engineer, their failure to comprehend fully the meaning of sign-offs and their oversight when signing the completed procedure of the missing initials which should have recorded the independent verifier of rod movement. It appears the operator believed he was implementing a "new" fast shutdown procedure. In good faith he assumed that the deviations he encountered from the normal shutdown procedures were acceptable as long as the intent of the procedure was met.

Corrective Action To Be Taken To Avoid Further Noncompliance

Edison recognizes the essential roles which accuracy of records and strict adherence to procedures play in assuring that the operation of a nuclear power plant is both safe and reliable. To that end, training sessions will be held at the Quad Cities Station, distinct from those already described in this response, to reaffirm the commitment of its personnel to properly document plant conditions and the faithful, explicit, observance of procedural directions. These sessions, to be conducted by the Superintendent, will include general meetings with all plant employees and separate conferences with each of the individuals involved in the incident. He will emphasize that a sign-off to any procedure must represent the literal performance of the procedure, and that any deviation from procedure should be documented and evaluated for the cause of the deviation and possible corrective actions, including formal modification of the procedure.

The Station has addressed the specific errors involving the verification activities cited in the Violation with several procedural changes. The procedure for independent verification of a bypassed RWM has been rewritten to require an indication of each verification. (See response to Violation A.) The "Conduct of Shift Operations" procedure has been developed to clarify the use of procedures, the need to note all deviations from procedures and to investigate their cause so that unexpected results do not continue. (See response to Violation A.)

Date When Full Compliance Will Be Achieved

All procedures are to be in place by September 1; training is to be accomplished by September 15.