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U.S. Nuclear Regulatory Commission
Document Control Desk
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Perry Nuclear Power Plant
Docket No. 50-440
Response to Unresolved Item
50-440/92014-01

Gentlemen:

This letter acknowledges receipt of the Unresolved Item contained within Inspection Report 50-440/92014 dated September 16, 1992. The report identified areas examined by Region III Inspectors from July 6 through August 7, 1992.

Our response to Unresolved Item 50-440/92014-01 is provided in Attachments 1. Attachment 2 provides abstracts for the three LERs discussed in this response.

If you have any questions, please feel free to call.

Sincerely,

Michael D. Lyster

MDL:DWC:ss

Attachment

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

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9211170061 921113
PDR ADOCK 05000440
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Operating Companies
Cleveland Electric Illuminating
Toledo Edison

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50-440/92014-01

Restatement of Unresolved Item

One concern was identified by the inspectors regarding the effectiveness of corrective actions taken for three licensee event reports (LERs). LER Nos. 90-32, 92-10, and 92-13, stated identical corrective actions for personnel errors which resulted in procedural steps being either omitted or incorrectly sequenced. These corrective actions failed to prevent recurrences. Performance in the following three areas was not thorough for these LERs:

- (1) Procedure Generation Control: The root cause analysis of these three events identified human error as the root cause. However, the analysis did not address why the instrument and control (I&C) technicians made repeated errors in generating the written procedures.
- (2) Procedure Review Process: Procedure reviewers failed to identify the procedural errors. The root cause analysis did not address the failures of the review process.
- (3) Documentation of Root Cause Analysis: Discussions with the licensee provided additional information regarding the root causes and the corrective actions that were considered. However, this information was not included in these LERs.

The effectiveness of corrective actions that were taken for these LERs was considered as an unresolved item (URI) (50-440/92-014-01 (DRS)) pending review of a written response requested from the licensee.

Background

All three of the events discussed in this response were caused by deficiencies in work orders which are developed, reviewed, and performed in accordance with Plant Administrative Procedure (PAP-0905) "Work Order Process". This procedure is utilized to perform non-repetitive type tasks that require written instruction. The complexity of the tasks covered in PAP-0905 can vary from relatively simple to extremely complex. Because these I&C work orders were required to be worked with the equipment energized, and in some cases required logic actuations or equipment cycling, these work orders would be classified on the "complex" end of the scale.

Analysis for LER 90-032

LER 90-032 addressed failures of both the work order generation and review processes. This LER stated in its root cause section "An I&C planner was responsible for assembling materials and constructing the work order, and within it, the job traveler which provided the step-by-step procedure for testing, changing the relay, and retesting the relay. Additionally, an I&C Supervisor and I&C engineer reviewed the package to ensure that it could be worked as written. The I&C personnel who were responsible for the planning and reviewing of the work order did not notice that the step to remove the jumper was not in the proper sequence. This resulted in the jumper being removed when the conditions which could cause an RHR "A" shutdown cooling

system isolation were still present." The above excerpts demonstrate that the accountability of the reviewer was recognized by the personnel responsible for development and approval of the LER.

It should be noted that the event documented by LER 90-032 occurred during Refueling Outage 2 as part of a large-scale replacement of several hundred control relays. The I&C work planning organization was a major participant in developing the plan to safely and efficiently perform this activity. Some factors considered prior to implementing this changeout included plant safety (first and foremost), impact on operational administrative requirements, impact on equipment (excessive cycling of pumps, valves, and relays), and human to equipment interface (determining the appropriate mental and physical loads of the technicians performing the relay changeout evolutions). Literally thousands of steps were planned and executed correctly during this changeout and testing of hundreds of control relays. LER 90-032 documented a problem associated with the changeout of one of these relays. These factors in addition to training, procedures, workload, and resources were considered during evaluation of LER 90-032. Accordingly, the event was determined to be caused by an isolated personnel error that did not require any further root cause analysis, such as an HPES evaluation.

LER 90-032 was closed by the NRC in Inspection Report (IER) 91003. The evidence cited in the report to support closure of this LER stated: "The inspector concluded that the licensee had performed a prompt evaluation of the cause of this event and appropriate corrective actions had been implemented".

Analysis for LER 92-010

LER 92-010 addressed failures of both the work order generation and review processes in its root cause section. The LER stated "An I&C planner was responsible for assembling materials and constructing the work order, and within it, the job traveler which provided the step-by-step procedure for testing, changing the relay, and retesting the relay. Additionally an I&C supervisor reviewed the package to ensure that it could be worked as written. The I&C personnel who were responsible for the planning and reviewing of the work order did not notice that the 1B21-K0148D relay was in a channel that would cause the initiation of the Balance of Plant isolation signal if the relay was removed." Again, the personnel responsible for development and approval of the LER recognized the responsibilities of the reviewers in the work order generation and review processes. The similarities between the analyses provided in LERs 90-032 and 92-010 are recognized. Both of these events were investigated and the reports generated by the same individual. Because independent and thorough investigations for both events led to similar conclusions, the format utilized for LER 90-032 was again used for LER 92-010. It should not be inferred that the investigation and reporting of LER 92-010 was in any way inadequate or incomplete due to the selection of writing style.

During the investigation of LER 92-010, LER 90-032 was considered to be a similar event because it was a second case of work order planning and review of relay replacement errors resulting in an ESP actuation. However, LER

90-010 did not document LER 90-032 as a "previous error" because of the following differences:

- 1) The circuitry that was being manipulated was different for the two events.
- 2) The specific type of work order flaw was different.
- 3) The personnel responsible for the planning and review for errors were different for each event.
- 4) Approximately 18 months separated these two events.
- 5) The events were perceived to be isolated occurrences.

Prior to concluding that LER 92-010 had been caused by a personnel error, the following additional factors were carefully considered: training; procedures; workload; and resources.

Analysis for LER 92-013

LER 92-013 addressed repeat failures of the work order generation process under the Safety Analysis section of the LER. The LER stated "Previous LERs written to document unexpected ESF actuations resulting from inadequate work orders include LER 90-032, in which improper sequencing of steps in a work order resulted in a Residual Heat Removal Shutdown Cooling System isolation, and LER 92-010, where an unexpected outboard Balance of Plant Containment isolation occurred while following a work order in which proper precautions had not been provided. The administrative procedure controlling the planning of work orders clearly requires that precautions be included to prevent system isolations." As demonstrated by the above excerpts, the LER investigation process clearly identified the similarities shared by the subject events. Additionally, the effectiveness of prior corrective actions was re-evaluated in this same section of the LER as evidenced by the following excerpt: "The corrective actions taken for the previous two events reminded personnel of the requirements in the work planning procedure, but could not be reasonably expected to completely eliminate the possibility of human error in work order preparation."

LER 92-013 recognized failures of the review process in its safety analysis section. The LER stated that the "event resulted from a failure by the work planner and the work order reviewers to recognize the bypass switch limitations when the TSVs are greater than 90% open." Again, the above demonstrates that personnel responsible for development and approval of the LER had considered the accountability of the reviewer during the review process.

Documentation of Investigation Results

In accordance with the requirements of 10CFR50.73(b)(2)(i), the Licensee Event Report shall contain: "A clear, specific, narrative description of what occurred so that knowledgeable readers conversant with the design of commercial nuclear power plants, but not familiar with the details of a particular plant, can understand the complete event." Additionally, 10CFR50.73(b)(2)(ii)(D) states that the cause of each component or system failure or personnel error is to be stated, if known.

10CFR50.73(b)(2)(ii)(J)(2) states that for each personnel error, the licensee shall discuss: (i) Whether the error was a cognitive error (e.g., failure to recognize the actual plant condition, failure to realize which systems should be functioning, failure to recognize the true nature of the event) or a procedural error; (ii) Whether the error was contrary to an approved procedure, was a direct result of an error in an approved procedure, or was associated with an activity or task that was not covered by an approved procedure; and (iv)(5) Reference to any previous similar events at the same plant that are known to the licensee."

When these events occurred, careful analysis was performed to pull together valid "common threads" to develop a more comprehensive picture of how and why the specific event and other similar events had occurred. Although many factors were carefully considered, the conclusion that consistently came to the surface was that in situations where complex operations are planned and reviewed, some possibility for human error exists. Over time, an error in the planning process can occur in conjunction with an error in the review process, and these errors may result in a procedural error that is implemented in the field. The exact reasons that the individuals made the personnel errors for the three LERs described above could not be determined. Speculation of what might have caused these errors and a listing of everything considered, within the LERs themselves would detract from the clarity and direction of the reports.

10CFR50, Appendix B, Criterion XVI, states "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

Licensee Event Reports are written to be concise factual reports, providing information to the NRC and the nuclear industry. These reports are not reflective of Perry's entire Corrective Action Program. Plant Administrative Procedure (PAP-0606), "Condition Reports and Immediate Notifications", establishes the Condition Report (CR) as the primary means to document and provide for the investigation, notification and reporting of potentially reportable events, and events requiring the submittal of reports to outside agencies. Additionally, Condition Reports also provide for the reporting of abnormal plant conditions or events which require further action and review by the plant staff to correct underlying causes and prevent recurrence. Condition Reports are written for each LER, and often address issues which may not be necessary for the LER, but require site followup for 10CFR50, Appendix B, Part A.I, compliance. For example, Condition Report 92-152 provided two additional corrective actions that did not appear in LER 92-013. One corrective action required an evaluation to be performed to determine if any weaknesses existed in the I&C work order planning/review process and, if necessary, determine any appropriate corrective actions. I&C management fully evaluated and addressed the possibility of programmatic problems through this mechanism.

In summary, Perry believes that the requirements stated above were met for each of the LERs reviewed in this response. Perry will continue efforts to include all relevant and appropriate information in LERs, while in all cases satisfying the requirements of 10CFR50.73. Additionally, related information will be maintained in the associated documentation and condition report investigation packages, in accordance with 10CFR50, Appendix B, Criterion XVI. Current packages for all of the subject LERs were made available to the inspectors during Inspection 92014.

Adequacy of Corrective Actions

The corrective actions taken for LERs reviewed in this response reminded personnel of the requirements in the work planning procedure. Although no corrective actions could reasonably be expected to completely eliminate the possibility of human error in work order preparation, the corrective actions chosen for these events were intended to strongly reinforce the elements of proper work order preparation and review. The personnel involved in these events have intense pride in the quality and professionalism of their work. These events, put in context of the rest of I&C work order planning and review activities, are not indicative of a programmatic or training problem. For example, from January 1, 1990 through September 8, 1992, I&C personnel planned five thousand three hundred thirty-two (5,332) work orders, resulting in only four Condition Reports, three of which were LERs, an error rate of .0007, errors per work order. However, while this number is low, I&C personnel continue to strive for zero errors. In addition, they are committed to continuously review their activities for potential improvements. A subsequent review of the events has not brought forth any additional corrective actions.

I&C supervisors, planners, and technicians will review this Unresolved Item response to further stress the importance of continuous, error-free planning, review, and implementation of work orders. In addition, Compliance Unit personnel who investigate and prepare LERs will also review this Unresolved Item response to re-emphasize the requirements for complete and accurate LER preparation.

LER 90-032 Abstract

On November 16, 1990, at approximately 2243, the performance of an inadequate procedure which required disconnecting wires to test relay contacts, resulted in a Residual Heat Removal (RHR) "A" shutdown cooling system isolation. The procedure was a work order to replace a control relay. Although the steps were performed in the sequence required by the work order, a step to remove a jumper was incorrectly sequenced. As a result of the jumper removal, an RHR "A" shutdown cooling system isolation was initiated. Control Room Operators discovered the RHR "A" pump tripped and responded in accordance with approved instructions to restore from the RHR "A" shutdown cooling system isolation.

The cause of this event is a procedure deficiency, inadequate instructions. The Instrumentation and Controls (I&C) personnel who planned and reviewed the work order did not notice that the step to remove the jumper was not in the proper sequence. This resulted in the jumper being removed when the conditions which could cause an RHR "A" shutdown cooling system isolation.

The I&C personnel involved in this event have been involved in the investigation and have been adequately made aware of their errors. To prevent recurrence, I&C personnel involved with the planning and review of work orders will be trained to this event and to the importance of proper sequencing of actions in all work orders. Additionally, this event will be reviewed by all licensed operators during requalification training.

LER 92-010 Abstract

On April 30, 1992, at 1112, maintenance activities to replace control relays resulted in an inadvertent Outboard Balance of Plant Containment isolation. The activities were being performed under an Instrumentation and Controls (I&C) work order. The plant was placed in the appropriate condition for the relay replacement by inserting the trip signal on one isolation channel. The work order was intended to then direct technicians to replace the relays on the tripped channel; however, in accordance with the work order instructions, technicians removed a relay that was not part of the tripped isolation channel. When the relay was removed another isolation channel tripped and completed the logic to cause an Outboard Balance of Plant Containment isolation.

The cause of this event is an inadequate work order. The I&C personnel who were responsible for the planning and reviewing of the work order did not notice that one of the relays was in a channel that would cause the initiation of the Balance of Plant isolation signal if the relay was removed. I&C personnel involved in this event have assisted in the investigation and have been adequately made aware of their errors. To prevent recurrence, I&C personnel involved with the planning and review of work orders will be trained to this event with emphasis placed on the importance of attention to detail in all aspects of work order preparation and review. As part of the established requalification training program, all plant licensed operators will be instructed on the lessons learned from this event.

LER 92-013 Abstract

On May 14, 1992 at 1120, while troubleshooting a slow opening condition on #2 Turbine Stop Valve (TSV), the TSVs were opened greater than 90% with the Main Steam Line (MSL) drain valves open, resulting in an MSL drain isolation on low condenser vacuum. Immediate corrective actions was taken to stop TSV troubleshooting until the problem could be identified and corrected.

The root cause of this event is an inadequate procedure (Work Order). The low main condenser vacuum trip is bypassed when the key locked Condenser Low Vacuum Bypass Switches are placed in the bypass position and the TSVs are less than 90% open. The work order controlling the troubleshooting of the #2 TSV did not include any precautions regarding the opening of the TSVs to greater than 90%, nor did it include any steps to prevent the actuation of the low condenser vacuum trip logic. Corrective actions taken for this event included revision of the work order to prevent further trip logic actuations. A note will be added to the generic work order associated with the TSVs to remind planning personnel of the loss of the trip bypass function when the TSVs are greater than 90% open. All licensed operators, Instrument and Control (I&C) technicians and I&C planners will be trained on the lessons learned from this event.