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SUBJECT: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313/50-368
License Nos. DPR-51 and NPF-6
Response to Inspection Report
50-313/89-40; 50-368/89-40

Gentlemen:

Pursuant to the provisions of 10CFR2.201, attached is the response to the violations identified in the subject inspection report. As discussed between Messrs. Dwight Chamberlain of the NRC Region IV staff and Rick King of my staff, the date of this response was extended from January 3, 1990.

Very truly yours,

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Notice of Violation

A. Failure to Properly Torque Fasteners

Unit 2 Technical Specification 6.8.1 requires that written procedures be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Appendix A, Item 8, includes procedures for control of measuring and test equipment and for surveillance tests, procedures, and calibration. Plant Procedure 1025.020, "Bolting and Torquing Guidelines," has been established in accordance with this Technical Specification requirement.

Paragraph 8.4.2.A.3 of Plant Procedure 1025.20 requires the indicated torque be corrected in accordance with Attachment 4 when using a universal joint that extends the point of applied torque.

Contrary to the above on October 2, 1989, the inspector observed the use of a universal joint when torquing fasteners on the fuel injector collar plates for Emergency Diesel Generator 2K-4B without the indicated torque being corrected.

This is a Severity Level IV violation. (Supplement I) (368/8940-01)

Response to the Violation

1. The reason for the violation:

The violation occurred because procedure 1025.020 inappropriately required mechanical maintenance personnel to calculate torque correction factors and did not provide adequate instructions for doing so.

Although mechanical maintenance personnel have received training on correction factors required when using torque wrench adapters, this particular application was not included.

2. The corrective steps which have been taken and the results achieved:

The affected fuel injectors were removed and inspected. The tip gaskets were replaced and any warped collars or damaged studs were also replaced. Based on a review of condition reports written on the Unit 2 EDGs since the previous performance of the 18-month surveillance (March 1988), no past operability problems have been noted that were identified with overtorquing the fuel injector collar plates.

Procedure 1025.020 was revised to eliminate the requirement for mechanical maintenance personnel to calculate correction factors for torque wrench adapters. The procedure now requires that Maintenance Engineering be contacted to provide instructions for each use of such adapters. These instructions will be incorporated into the job order. This will eliminate the need for the craftsman to perform calculations in the field.

3. The corrective steps which will be taken to prevent recurrence:

Craft personnel were informally briefed on the changes to 1025.020 and more formalized training will be conducted and documented by March 30, 1990.

4. The date of full compliance:

Full compliance was achieved with the completion of the corrective maintenance on the EDG on October 14, 1989, and with the procedure revision to 1025.020 on November 22, 1989.

Formal training of craft personnel on the requirements of 1025.020 regarding the use of adapters will be completed by March 30, 1990, to provide further assurance that the potential for recurrence will be minimized.

Notice of Violation

B. Failure to Meet TS Requirements

Unit 2 Technical Specification 3.3.1, for reactor protective instrumentation states, "As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3.1 shall be Operable"

Table 3.3.1 states that for Modes 3, 4, and 5, at least two logarithmic (LOG) power level channels shall be operable.

Contrary to the above, on October 4 and 5, 1989, less than two log power level channels were operable in that all four channels had been removed from service for maintenance during a refueling outage.

This is a Severity Level IV violation. (Supplement I) (368/8940-02)

Response to the Violation

1. The reason for the violation:

The cause of the violation was personnel error. The modifications to the nuclear instrumentation channel were being performed with a separate job order for each channel. Each job order was reviewed and approved by the same Operations Shift Supervisor prior to initiating the work during three consecutive days. When approving the job order on the third channel of instrumentation on October 3, 1989, the Shift Supervisor did not recognize that performance of this job order would result in reducing the number of operable channels to less than that required by Technical Specifications. This Technical Specification violation was also not recognized by the Control Room Senior Reactor Operator who was informed by Maintenance personnel that the channel was being removed from service just prior to performance of the modification. Additionally, the same errors occurred on October 4, 1989, when the fourth channel was allowed to be removed from service.

The violation was also not discerned by control room personnel who performed the periodic monitoring (channel checks) of equipment required to be operable by the Technical Specifications. Following removal of the third and fourth nuclear instrumentation channels from service, it was noted on the monitoring logs that the channel checks could not be performed because the instruments were deenergized. However, these personnel did not refer to the applicable Technical Specification to ensure the requirements were being met.

During the time that the Log Power Level channels were inoperable, routine shutdown margin calculations were being performed once every twelve hours with no changes noted. Also, boron dilution monitors and startup nuclear instrumentation were available to monitor core reactivity conditions. Therefore, the safety impact of this event is considered minimal.

2. The corrective steps which have been taken and the results achieved:

At 0755 hours on October 5, 1989, three of the Log Power Level channels were returned to service, meeting the Technical Specification requirements for cold shutdown conditions.

The Operations Shift Supervisor and the Control Room Senior Reactor Operator received counselling. The Operations Shift Supervisor involved in this event provided training to other Operations personnel to ensure each crew member is aware of the purpose of the performance of channel checks when in Cold Shutdown.

During the most recent Operations training cycle, the Unit Two Plant Manager provided a review of this and other operational events to help improve overall attention to detail, to reemphasize the responsibilities of each licensed individual and to provide Operations management expectations.

3. The corrective steps that will be taken to prevent recurrence:

Simulator training will be provided to Operations personnel to reemphasize the requirements of the Technical Specifications associated with the Log Power Level channels. This training will be completed by March 1, 1990.

The Operations Department is in the process of developing a program to enhance tracking of the status of equipment required by Technical Specifications. Implementation of this program will provide better assurance that equipment will not be removed from service when required by Technical Specifications to be operable. This program is expected to be in place by March 30, 1990.

4. The date of full compliance:

Full compliance with Technical Specifications was achieved on October 5, 1989, when three Log Power Level channels were returned to service.

The following enhancements will be done to minimize the potential for recurrence:

- Simulator training related to this event will be provided for Operations personnel by March 1, 1990.
- The Technical Specification equipment status tracking program is expected to be implemented by March 30, 1990.

Notice of Violation

C. Failure to Maintain Appropriate Plant Procedures

Unit 2 Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained covering the activities recommended in Appendix A of Regulator Guide 1.33, Revision 2, February 1978. Appendix A, Item 8, includes procedures for control of measuring and test equipment and for surveillance tests, procedures, and calibrations. In addition, Appendix A, Item 9, includes procedures for performing maintenance. Plant Procedure 2306.005, "18 Month Surveillances on Unit 2 Emergency Diesel Generator 2K-4," and 2406.096, "2BS-1A/B Disassembly, Inspection and Reassembly," and Plant Procedure 1025.020, "Bolting and Torquing Guidelines," have been established in accordance with this Technical Specification requirement.

Contrary to the above, written procedures applicable to TS 6.8.1 were not appropriately maintained as described in the four examples discussed below:

1. Step 8.3.10 of Plant Procedure 2306.005 requires torquing of fasteners to 37 ft. lbs. for the reinstallation of the emergency diesel generator (EDG) fuel injector nozzles. The Fairbanks Morse technical manual for the EDG specifies a torque value of 20-25 ft. lbs. for these fasteners.
2. Step 8.3.1 of Plant Procedure 2306.005 requires a test pressure of 30-50 psig for the hydrostatic pressure test of the EDG engine jacket water system. The Fairbanks Morse technical manual for the EDG specifies a hydrostatic pressure of 50 psig for this test.
3. Steps 8.3.12 and 8.3.17 of Plant Procedure 2402.096 require torquing of the bearing cover fasteners to 160 ft. lbs. and cover plate fasteners to 243 ft. lbs. for Valves 2BS-1A/1B (refueling water tank discharge check valves). The Atwood and Morrill technical manual that was used to obtain this information is not applicable to valves 2BS-1A and 1B. The correct torque values for the bearing cover fasteners is 35 ft. lbs. and 305 ft. lbs. for the cover plate fasteners as noted in the vendor manual for this type of valve.
4. Step 8.4.2.A.3 of Plant Procedures 1025.020 requires that the indicated torque be corrected in accordance with Attachment 4 when using a universal joint that extends the point of applied torque. However, Attachment 4 does not provide instructions for correcting the applied torque for universal joints.

In the aggregate, these examples constitute a Severity Level IV violation. (Supplement I) (313;368/8940-03)

Response to the Violation

1. The reason for the violation and the results achieved:

Concerning example 1, the violation occurred due to a personnel error in that a discrepancy in the Fairbanks Morse technical manual concerning torque values for the fuel injector nozzle fasteners was not recognized or reconciled. The instruction section of the EDG technical manual stated in Section L that the required torque was 35-40 ft. lbs., but the specifications listed in Section B had 20-25 ft. lbs. Because Section L contained detailed instructions for inspecting and reassembling the fuel injector nozzles, the procedure was changed to use the torque values in this section. A Service Information Letter (SIL) issued in July 1986 stated that the correct torque value was 20-25 ft. lbs.; however, due to a vendor error the SIL was issued for a normally aspirated engine and not the turbo-charged engine model installed at ANO-2. After being contacted by ANO technical reviewers in October 1989, the vendor determined that the SIL should have been applicable to the turbo-charged model as well.

Example 2 occurred due to the failure to adequately validate and document a deviation from the vendor's published recommendations. In 1983, the integrity of the water seals in the turbocharger was questioned if they were to be subjected to a full engine jacket water pressure test (50 psig). At that time, the procedure was changed to correspond to the maximum normal system pressure. However, an adequate detailed, documented review of this deviation was not performed.

Example 3 occurred because the technical reviewer failed to recognize that the torque values in Technical Document TD A585.0040 of Technical Manual TM A585.0010 were not applicable to the 20-inch Atwood and Morrill check valves used for 2BS-1A/1B. The initial review of the Atwood and Morrill technical manual determined that TD A585.0040 was the best instruction available for disassembly and reassembly of 2BS-1A/1B, and the vendor has confirmed that no specific manual is published for the 20-inch check valves. Maintenance on the Atwood and Morrill check valves is considered to be generic with the only difference being the stud sizes on the bearing cover and the cover plate and the corresponding torque values required. Procedure 2402.096 was revised in March 1988 based on TM A585.0010 and the torque values were changed from 35 ft. lbs. and 305 ft. lbs. to 160 ft. lbs. and 243 ft. lbs., respectively. The original torque values, which were correct, were based on a bolting review performed in 1985.

Concerning example 4, the omission of the correction factor for using universal joints in torquing operations was an oversight on the part of the writer and the reviewers of procedure 1025.020 which was not corrected after being identified by the NRC inspector in Inspection Report 50-313/88-25; 50-368/88-25.

2. The corrective steps which have been taken and the results achieved:

For example 1, the EDG maintenance procedure 2306.005 was changed to require the correct fuel injector collar fastener torque value of 20-25 ft. lbs. after verification from Fairbanks Morse that this was the correct value. The EDG technical manuals have also been revised to require the same torque values in Section L as were listed in Section B. Fuel injectors which had been potentially affected by overtightening were removed and inspected. The tip gaskets were replaced as were any warped collars or damaged studs.

Concerning example 2, the hydrostatic pressure of the 2K-4A EDG engine jacket water system was successfully performed in accordance with procedure 2306.005 at 50 psig test pressure after replacement of cylinder liners and seals. The test which had been performed on EDG 2K-4B was evaluated and determined, with vendor concurrence, to have been acceptable.

Procedure 2402.096 cited in example 3 was changed to require the original torque values for 2BS-1A/1B and each bolt was retorqued to the correct value. The technical manual for the Atwood and Morrill check valves has been revised to change the applicability of valves 2BS-1A/1B from technical document TD A585.0040 to a specific drawing now referenced in the technical manual as TD A585.0090. Procedures covering other valves which were listed as applicable to TD A585.0040 were reviewed, and although the torque values in these procedures have minor inconsistencies (which are being reviewed for resolution), the torque values are adequate to ensure operability of these valves.

Regarding example 4, Bolting and Torquing Guidelines 1025.020 has been revised to eliminate the requirement for maintenance personnel to calculate correction factors for torque wrench adapters. The procedure now requires that a maintenance engineer be contacted for instructions for each use of adapters, and these instructions will be incorporated into the job order.

Changes discussed above for procedures 2306.005 and 2402.096 are temporary changes which will be incorporated into permanent procedure revisions by April 15, 1990. This date is acceptable as these procedures are typically performed during refueling outages, and the next Unit 2 refueling outage is scheduled for 1991. The revision to 2306.005 will include requiring a hydrostatic test pressure of 50 psig, as discussed in example 2.

3. The corrective steps which will be taken to prevent recurrence:

Each of the four examples deal generically with maintenance procedures which were considered inadequate. Example 4 is considered to be an isolated incident of a procedure which required craftsmen to perform a task (i.e., calculate correction factors for universal joints) but failed to provide adequate information to do so. The other three

examples concern the use of vendor technical manuals in developing procedures. In example 2, the basis for a deviation from the TM was not adequately documented. In examples 1 and 3, procedure technical data which had been correct was changed to correspond to values in the TMs, which were subsequently determined to be in error (example 1) or not applicable to the specific component in the procedure (example 3). These three examples indicate a lack of thoroughness or attention to detail on the part of the procedure writers and the vendor manual technical reviewers, which is being addressed as discussed below.

With regard to the maintenance procedure writers, it is their responsibility to verify the technical data in the procedures during the revision process, including verification of the applicability of the vendor technical manuals required and documentation of evaluations for deviations from the technical manuals. This responsibility is being reemphasized to the various groups involved in writing maintenance procedures. The contract specifications for the Procedure Writers Guide Upgrade contract for 1990 includes specific language to reinforce this requirement, and the remainder of the maintenance procedure writing staff (Preventive Maintenance procedure writers and the maintenance group in Nuclear Operations Standards) will be reminded by department meeting and memorandum of the level of detail necessary to properly validate the adequacy and applicability of vendor data used for procedure development and of the documentation required for deviations from the technical manuals. This action will be completed by February 1, 1990.

Regarding concerns about the technical reviews of the vendor manuals involved with these examples, the need to look for specific technical data which could impact applicability has been emphasized to the reviewers and further reviews of technical manuals are being performed. Example 1 identified a concern with the Service Information Letters issued by Fairbanks Morse. Other Fairbanks Morse SILs are being reviewed and the determination of their applicability will be confirmed with Fairbanks Morse. This review is expected to be completed by February 1, 1990. Example 3 identified a concern with the applicability of the Atwood and Morrill vendor manual with specific Atwood and Morrill valves and a potential concern with applicability determinations of certain other vendor technical manuals. As stated in a previous section of this response, other procedures for Atwood and Morrill check valves which had been determined to be applicable to the same technical document were reviewed and found to be adequate. Selected vendor technical manuals for other vendors are also being reviewed for potential applicability concerns, especially for torque values. This review is expected to be completed by February 1, 1990.

The current system for handling vendor information is considered to be adequate. Information received from vendors is evaluated for applicability and the technical manuals are revised as necessary. A weekly report of revised vendor technical manuals is issued to appropriate managers and

supervisors in Maintenance, Operations, and Nuclear Operations Standards to review for potential impact. When this report is received in Nuclear Operations Standards, the vendor technical manual revision is reviewed and affected procedures are identified. The technical manual revision is then evaluated to determine if immediate or long term procedure revisions are necessitated by the change to the technical manual. Procedure revisions are then implemented as needed.

To summarize the actions to prevent recurrence for each example:

- For example 1, the revision to the EDG Fairbanks Morse Technical Manual which corrected the torque valves in Section L will ensure the correct value is maintained in procedure 2306.006. Also, to further ensure the adequacy of information from Fairbank Morse, other Service Information Letters are being reviewed.
- For example 2, the need to adequately document evaluations performed for deviations from the vendor technical manual is being reemphasized to the personnel responsible for writing maintenance procedures.
- For example 3, the procedures for other Atwood and Morrill check valves were reviewed and found to be adequate, and other selected vendor technical manuals are being reviewed to verify their previously determined applicability to specific valves.
- For example 4, this is considered to be an isolated incident of inadequate guidance, and the procedure revision which requires Maintenance Engineering input for the use of torquing adapters will prevent recurrence of this event.

4. The date of full compliance:

Procedures 2306.005, 18-month Surveillance on Unit 2 EDG 2K-4, and 2402.096, 2BS-1A/1B Disassembly, Inspection, Reassembly, which were temporarily changed to correct the deficiencies, will be permanently revised by April 15, 1990 (examples 1, 2 and 3). Procedure 1025.020, Bolting and Torquing Guidelines, was revised on November 22, 1989, to resolve the identified deficiencies (example 4).

To minimize the potential for recurrence, the following will be done:

- Actions to remind maintenance procedure writers of their responsibility for technical data used in procedures will be completed by February 1, 1990.
- The review of the Fairbanks Morse SILs and of other selected vendor technical manuals for applicability will be completed by February 1, 1990.