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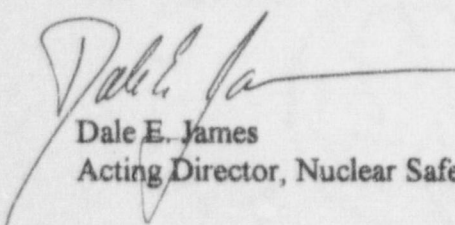
Subject: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Response To Inspection Report
50-313/98-01; 50-368/98-01

Gentlemen:

Pursuant to the provisions of 10CFR2.201, attached are the responses to the notices of violation identified during the inspection of Maintenance Rule implementation at Arkansas Nuclear One (ANO).

Per discussion with Dale Powers on June 4, 1998, an extension was granted until June 22, 1998, for submittal of our response to the notices of violation. Should you have any questions or comments, please call me at 501-858-4601.

Very truly yours,


Dale E. James
Acting Director, Nuclear Safety

DEJ/ajs

attachments

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U. S. NRC
June 22, 1998
Page 2

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NOTICE OF VIOLATION

During an NRC inspection conducted January 26-30, 1998, with in office inspection performed through March 30, 1998, five violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

- A. 10 CFR 50.65(b)(2) requires, in part, that the scope of the monitoring program specified in paragraph (a)(1) shall include certain non safety-related structures, systems, and components whose failure could prevent safety-related structures, systems, and components from fulfilling their safety-related function. 10 CFR 50.65(c) states that the requirements of this section shall be implemented by each licensee no later than July 10, 1996.

Contrary to the above, from July 10, 1996, until January 28, 1998, the Unit 2 turbine building sump system was not included in the scope of the Maintenance Rule program. The inclusion of the turbine building sump in the scope of the Maintenance Rule was necessary because of the adverse effect imposed on a safety system (emergency feedwater) as a result of the potential failure of the turbine building sump.

This is a Severity Level IV violation (Supplement 1) (50-368/9801-01). There is no response required to this violation.

- B. 10 CFR 50.65(a)(2) requires, in part, that monitoring as specified in 10 CFR 50.65 (a)(1) is not required where it has been demonstrated that the performance or condition of a structure, system, or component is being effectively controlled through the performance of appropriate preventive maintenance, such that the structure, system, or component remains capable of performing its intended function. 10 CFR 50.65(c) states that the requirements of this section shall be implemented by each licensee no later than July 10, 1996.

10 CFR 50.65(a)(3) requires, in part, that the holders of an operating license shall evaluate performance and condition monitoring activities and associated goals and preventive maintenance activities at least every refueling cycle provided the interval between evaluations does not exceed 24 months. Adjustments shall be made where necessary to ensure that the objective of preventive failures of structures, systems, and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems, and components due to monitoring or preventive maintenance.

Contrary to the above, as of July 10, 1996, the time that the licensee elected to not monitor the performance or condition of certain structures, systems, and components against established goals pursuant to the requirements of Section (a)(1), the licensee failed to demonstrate that the performance or condition of structures, systems, and components within the scope of 10 CFR 50.65 had been effectively controlled by

performing appropriate preventive maintenance. Specifically, the licensee failed to adequately demonstrate the performance or condition of the emergency feedwater initiation control system, the engineered safety features actuation system, the reactor building heating and ventilation system, the reactor building sumps, the reactor protection system, the traveling screens and screen wash system, and the 120 Vac instrumentation system had been effectively controlled by performing appropriate preventive maintenance. No availability measure was considered in the demonstration. Reliability and availability measures are both necessary to demonstrate that preventive maintenance had been effective to ensure that system functions will perform as required. Further, as a result of not establishing performance measures for availability of these structures, systems, and components, the periodic evaluation of preventive maintenance activities for Unit 1 performed in June 1997, in accordance with 10 CFR 50.65(a)(3), did not adequately demonstrate a balance of availability and reliability.

This is a Severity Level IV violation (Supplement 1) (50-313/9801-03).

- C. 10 CFR 50.65(a)(1) requires, in part, that the holders of an operating license shall monitor the performance or condition of structures, systems, and components, as defined in 10 CFR 50.65(b), against licensee-established goals in a manner sufficient to provide reasonable assurance that such structures, systems, and components are capable of fulfilling their intended functions. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken.

10 CFR 50.65(a)(2) requires, in part, that monitoring as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of a structure, system, or component is being effectively controlled through the performance of appropriate preventive maintenance and the structure, system, or component remains capable of performing its intended function. 10 CFR 50.65(c) states that the requirements of this section shall be implemented by each licensee no later than July 10, 1996.

Contrary to 10 CFR 50.65(a)(2), as of July 10, 1996, the time that the licensee elected to not monitor the performance or condition of certain structures, systems, and components against licensee-established goals pursuant to the requirements of Section (a)(1), the licensee had not demonstrated that the performance or condition of certain structures, systems, and components within the scope of 10 CFR 50.65 had been effectively controlled through the performance of appropriate preventive maintenance, as evidenced by the following examples:

1. The licensee failed to establish adequate measures to demonstrate the performance or condition of the traveling screens and screen wash systems. Specifically, the licensee considered the traveling screens' availability to be tracked under the service water systems, but one traveling screen on each unit could provide adequate flow to all the service water loops, such that any

one screen in Unit 2 and any three screens in Unit 1 could be unavailable indefinitely without impacting the availability of the service water loops. Allowing the traveling screens to reach such a state before taking corrective actions would not demonstrate that preventive maintenance was effective to control the system's performance or condition to maintain its intended function.

2. The licensee failed to demonstrate that the performance of a relay for the Unit 2 safety-related post-accident sampling system was being effectively controlled through the performance of appropriate preventive maintenance. Specifically, the licensee had established performance measures for this component of less than three functional failures per two cycles and no repeat functional failures. These measures were not adequate because the relay was only actuated once each cycle for surveillance testing of sampling valves and, therefore, it was unlikely to exceed two failures within two cycles. Thus, no adequate basis had been established to demonstrate that the performance or condition of the relay was being effectively controlled through the performance of effective preventive maintenance that the component remained capable of performing its intended function.
3. The licensee failed to demonstrate that the performance of the containment integrity function was being effectively maintained through the performance of appropriate preventive maintenance on the safety-significant containment isolation valves. Specifically, the licensee failed to demonstrate it had established adequate measures to evaluate the effectiveness of preventive maintenance on the containment isolation valves prior to placing them under Category(a)(2). A functional failure of either units' containment isolation valve, due to test leakage, would not have occurred until a limit imposed by Technical Specifications, Section 3.6.1, for integrated containment/reactor building leak rate was exceeded. Allowing containment isolation valves to reach such a state before taking corrective actions would not demonstrate that preventive maintenance was effective to control their performance or condition to maintain its intended function.
4. From July 10, 1996, through January 28, 1998, the licensee had failed to establish adequate measures to evaluate the appropriateness of the performance of preventive maintenance for the Unit 2 core protection calculator system. The licensee had recognized that the performance criteria were inadequate, but failed to evaluate the effectiveness of the new performance criteria established on December 9, 1997. Specifically, the licensee had failed to perform a historical performance review of the system data against the new performance criteria. On January 28, 1998, the licensee performed the historical review and identified one functional failure of the control element assembly calculator whose performance criteria were monitored under the core protection calculator system.

This is a Severity Level IV violation (Supplement 1) (50-313; 368/9801-04).

- D. 10 CFR 50.65(a)(1) states, in part, that holders of an operating license shall monitor the performance or condition of structures, systems, and components, as defined by 10 CFR 50.65(b), against licensee-established goals in a manner sufficient to provide reasonable assurance that such structures, systems, and components are capable of fulfilling their intended functions. Such goals shall be established commensurate with safety and, where practical, take into account industry-wide operating experience. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective actions shall be taken.

Contrary to the above, the current licensee-established goals for the Unit 2 main steam safety valves were not commensurate with safety. Safety valve performance was monitored against goals at a higher threshold for reliability than the normal performance criteria, which permitted exceeding the license limits as specified in Technical Specification 3.7.1.1 and the ASME/ANSI OM-1 987 Code, Part 1. Further, the corrective action established by the licensee could not be monitored by the goals. Implementation of the corrective action was not scheduled until January 1999.

This is a Severity Level IV violation (Supplement 1) (50-368/9801-06).

- E. 10 CFR 50.65(a)(1) requires, in part, that the holders of an operating license shall monitor the performance or condition of structures, systems, and components, as defined in 10 CFR 50.65(b), against licensee-established goals in a manner sufficient to provide reasonable assurance that structures, systems, and components are capable of fulfilling their intended functions. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken.

10 CFR 50.65(a)(2) requires, in part, that monitoring, as specified in 10 CFR 50.65(a)(1), is not required where it has been demonstrated that the performance or condition of a structure, system, and component is being effectively controlled through the performance of appropriate preventive maintenance and the structure, system, or component remains capable of performing its intended function. 10 CFR 50.65(c) states that the requirements of this section shall be implemented by each licensee no later than July 10, 1996.

Contrary to the above, on March 13, 1997, the licensee incorrectly permitted the 125 Vdc system for Unit 2 to remain under 10 CFR 50.65(a)(2) when preventive maintenance failed to assure that this system remained capable of performing its intended function. Specifically, a surveillance test failure of a swing charger was not identified as a functional failure. The combination of the missed failure and two previously identified failures demonstrated that the preventive maintenance being performed on this system was not appropriate. It failed to assure that the system remained capable of performing its intended function. Accordingly, the 125 Vdc

system should have been designated as a Category (a)(1) system following the failures.

This is a Severity Level IV violation (Supplement 1) (50-368/9801-07).

B. Response to Notice of Violation (50-313/9801-03)

As a result of not establishing performance measures for availability of the emergency feedwater initiation control system, the engineered safety features actuation system, the reactor building heating and ventilation system, the reactor building sumps, the reactor protection system, the traveling screens and screen wash system, and the 120 Vac instrumentation system, the periodic evaluation of preventive maintenance activities for Unit 1 performed in accordance with 10CFR50.65(a)(3), performed in June 1997, did not adequately demonstrate a balance of availability and reliability.

(1) Reason for the violation.

Maintenance Rule monitoring is established to track performance of structures, systems, or components (SSCs) and fulfill the requirements of 10CFR50.65. The objectives of the rule are to ensure that important systems are capable of performing their intended functions and that failures resulting in reactor trips and unplanned safety system actuations are minimized. When indications of unacceptable performance occur, the Maintenance Rule requires appropriate corrective actions to be implemented. Goals are to be established to monitor the effectiveness of the corrective actions and to focus management attention on those areas where performance does not meet expectations.

Systems within the scope of the Maintenance Rule are classified as either (a)(1) or (a)(2), referring to 10CFR50.65 paragraph (a)(1) or (a)(2). The (a)(2) classification is assigned to a system which satisfies its performance criteria indicating that the existing maintenance program on the system is adequate to maintain key system functions. A system which does not satisfy its performance criteria is evaluated for possible (a)(1) classification and may require a corrective action plan, goal setting, and increased management attention. Periodic assessments, as required by 10CFR50.65 paragraph (a)(3), are performed for each unit on a once per cycle basis to assess the effectiveness of maintenance actions.

The ANO Maintenance Rule Program was initially developed using NUMARC 93-01 as a guide. This guide has been endorsed by Regulatory Guide 1.160 as an acceptable means of implementing the Maintenance Rule. The industry guidance document implies that either availability, reliability, or condition performance criteria, or any combination, could be used as performance criteria for risk significant systems. ANO's interpretation of this guidance was that normally operating SSCs did not require unavailability monitoring.

Based on industry experience reviews, ANO determined that availability should be monitored on additional risk significant systems unless an appropriate technical justification is provided. The appropriate engineers were notified of the need to monitor availability but the methodology was not developed and the data was not assembled until December 1997. The failure to track past unavailability prior to this time caused the inappropriate availability reporting in the ANO-1 periodic review performed in June

1997. This issue was self-identified by ANO personnel and corrected prior to the NRC inspection.

(2) Corrective steps that have been taken and the results achieved.

The ANO Maintenance Rule Program was revised to require risk significant systems, including normally operating systems, to be monitored for unavailability unless an appropriate technical justification is provided.

An assessment of past availability performance was conducted. The systems listed in the violation have met their performance criteria for both availability and reliability; therefore, they have demonstrated adequate balance.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved on February 11, 1998, when availability monitoring for systems listed in the violation was completed.

C. Response to Notice of Violation (50-313; 368/9801-04)

The licensee had not demonstrated that the performance or condition of certain structures, systems, and components within the scope of 10CFR50.65 had been effectively controlled through the performance of appropriate preventive maintenance.

Response to example C1:

The licensee failed to establish adequate measures to demonstrate the performance or condition of the traveling screens and screen wash systems.

(1) Reason for the violation.

Maintenance Rule monitoring is normally conducted at the plant, system, or train level and is specifically geared toward determining how well an SSC has fulfilled its key functions. Certain systems have redundant components which can fulfill key system or train functions individually. "Masking" or "shadowing" occurs when one or more good performing redundant components are relied upon to satisfy the system or train function and poor performing components are "masked."

Based on guidance provided by various Maintenance Rule reference documents, ANO followed the plant probabilistic safety assessment (PSA) convention and tracked the unavailability and performance of the traveling screens and screen wash system as part of the service water system. However, since one traveling screen on each unit could provide adequate flow to the service water loops, there was a potential that inadequate performance of the traveling screens and screen wash system could be "masked" by the overall performance of the service water system. The cause of this violation was a misinterpretation of the intent of the guidance documents.

(2) Corrective steps that have been taken and the results achieved.

The ANO Maintenance Rule Program was revised to clearly identify traveling screen performance criteria for availability and reliability at the train level separate from the service water system.

Unavailability criteria have been established and past performance evaluated as adequate.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved on May 28, 1998, when past performance was evaluated as adequate based on the new criteria.

Response to example C2:

The licensee failed to demonstrate that the performance of a relay for the Unit 2 safety-related post accident sampling system was being effectively controlled through the performance of appropriate preventive maintenance.

(1) Reason for the violation.

The system engineer that originally developed the performance criteria for the ANO-2 post accident sampling system (PASS) misunderstood the scoping criteria for the Maintenance Rule and established the performance measure of less than three functional failures per two cycles and no repeat functional failures for many components in the PASS system. When the system engineer realized that the actual Maintenance Rule scope for ANO-2 PASS was only one relay, he made the appropriate change in scope. The performance measures were then not adequate because the relay was only actuated once each cycle for surveillance testing and, therefore, it was unlikely to exceed two failures within two cycles. Thus, no adequate basis had been established to demonstrate that the performance or condition of the relay was being effectively controlled through the performance of effective preventive maintenance.

The cause of this violation was the failure to reassess the adequacy of the performance criteria when the system scope was revised. The ANO Maintenance Rule Program does not include "changes in system scope" as a reason to reassess performance criteria.

(2) Corrective steps that have been taken and the results achieved.

The relay in the ANO-2 PASS system has been rescoped as part of another system of similar components with the same functions.

Past performance was evaluated as acceptable based on the performance criteria of the new system.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

The ANO System Engineering Desk Guide will be revised by December 1, 1998, to consider operating condition and testing intervals when establishing performance criteria and to require the reassessment of performance criteria when system scope is changed.

(4) Date when full compliance will be achieved.

Full compliance was achieved on May 23, 1998, when the PASS relay was rescoped and past performance was evaluated as acceptable.

Response to example C3:

The licensee failed to demonstrate that the performance of the containment integrity function was being effectively maintained through the performance of appropriate preventive maintenance on the safety-significant containment isolation valves.

(1) Reason for the violation.

The original performance criteria for the containment isolation systems were established based on a limiting number of functional failures of containment isolation components and, in addition, not exceeding the ANO-1 and 2 technical specification limits for total leakage. This was consistent with the Maintenance Rule philosophy used for other systems. A limit for the number of functional failures allowed was established but no attempt was made at defining a functional failure for each component. The appropriate system engineer evaluates conditions adverse to quality and determines if a functional failure has occurred.

Based on industry experience reviews, ANO determined that additional guidance should be established for when individual containment isolation valve seat leakage should be classified as a functional failure. In December 1997, the responsible system engineers determined the appropriate limits for single valve leakage but did not update the Maintenance Rule documents. Additionally, the total containment leakage performance criteria was revised but the Unit 1 database was not updated. Therefore, the performance criteria in the documents reviewed by the inspection team would not have demonstrated that the performance or condition of containment isolation valves was being assured through the performance of appropriate preventive maintenance. The cause of this violation was the failure of the system engineers to update the established functional failure criteria in the technical basis document or Maintenance Rule database.

(2) Corrective steps that have been taken and the results achieved.

The Maintenance Rule database and technical basis documents have been corrected to include individual and total containment isolation valve leakage criteria.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved on January 28, 1998, when the corrected Maintenance Rule documents were reviewed and approved.

Response to example C4:

The licensee failed to establish adequate measures to evaluate the appropriateness of the performance of preventive maintenance for the Unit 2 core protection calculator system.

(1) Reason for the violation.

On December 9, 1997, new performance criteria were established for the ANO-2 core protection calculator system. A historical performance review of the system data against the new performance criteria was not performed. The cause of this violation was that the system engineer making the change did not have an up-to-date copy of the System Engineering Desk Guide and failed to verify that it was the latest revision. A recent change to the desk guide required a past performance evaluation when performance criteria are changed.

(2) Corrective steps that have been taken and the results achieved.

The system engineer was provided with a copy of the latest revision of the desk guide.

The past performance evaluation was completed and the system was determined to be appropriately classified as (a)(2).

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved when the past performance evaluation was completed on January 28, 1998.

D. Response to Notice of Violation (50-368/9801-06)

The current licensee-established goals for the Unit 2 main steam safety valves were not commensurate with safety.

(1) Reason for the violation.

The intended function of the main steam safety valves (MSSVs) is to function as a group to provide adequate over-pressure protection. A system level performance criteria to monitor this function is established as, "No failures of the MSSVs as a group to provide steam generator over-pressure protection during a cycle." To provide a more predictive monitoring method, giving early warning of MSSV degradation, performance criteria of "Less than 3 functional failures of the MSSVs tested failing to lift within $\pm 3\%$ during MSSV testing per operating cycle," have also been established. This is based upon industry-wide operating experience and the ANO-specific valve design. Failure to meet this criteria has resulted in the MSSVs remaining in the (a)(1) category, even though the high lift setpoint problems have not resulted in the failure of the MSSVs as a group to perform their intended safety function.

The MSSVs were placed in the (a)(1) category in June 1996 based upon five MSSVs failing to meet Maintenance Rule performance criteria for failing setpoint testing during refueling outage 2R11. The (a)(1) goals were established to reduce the failure rate of valves exceeding setpoint tolerances at ANO to a rate consistent with industry operating experience. Actions were issued to determine acceptable performance and failure rates for MSSVs based on industry experience.

The corrective action plan for ANO-2 MSSVs includes changing the technical specification requirements as recommended by industry experience. The Maintenance Rule (a)(1) cause determination process has properly identified the ANO-2 MSSVs as not performing adequately with respect to industry standards and it has also identified that our technical specification limits of $+1/-3\%$ are not reasonable and should be revised. The technical specification change documentation is being assembled for submittal this year. The new technical specification limits of $\pm 3\%$ should be in place prior to the next ANO-2 testing interval in 1999.

A long-term goal, consistent with (a)(2) performance criteria, was established for refueling outage 2R14 that less than three MSSVs will lift above $+3\%$ of setpoint. To measure the effectiveness of the corrective actions performed during refueling outage 2R12, a short-term goal was established for refueling outage 2R13 that less than four MSSVs will lift above $+3\%$ of setpoint. In addition to these goals limiting the number of valves lifting above the ASME Code / revised technical specification requirements, other long-term and short-term goals were established to limit how far out of tolerance the failing valves could lift. These additional goals were: for refueling outage 2R13 all MSSVs will lift below $+5\%$ of setpoint and for refueling outage 2R14 all MSSVs will lift below $+4\%$ of setpoint. The short-term goals were established to provide a measure of

improvement compared to past performance. They would not indicate that the MSSVs were ready to return to an (a)(2) status.

The goals for individual MSSV setpoints were established based on achieving an acceptable failure rate for individual valves prior to dispositioning the main steam system to (a)(2). This setpoint failure rate was established consistent with industry operating experience. ANO believes that these goals, as well as the performance criteria, provided reasonable assurance that the key system function of providing adequate over-pressure protection for the steam generators would be maintained.

The cause of this violation was that the goals were stated ambiguously in that they could be interpreted as being non conservative or not commensurate with safety.

(2) Corrective steps that have been taken and the results achieved.

New goals were established commensurate with safety so that they are clearly identified at a lower threshold than the performance criteria and consistent with technical specifications.

The (a)(1) monitoring period for the MSSVs was changed to December 1, 2000.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved on June 4, 1998, when the new goals were approved for the ANO-2 MSSVs.

E. Response to Notice of Violation (50-368/9801-07)

The licensee incorrectly permitted the 125 Vdc system for Unit 2 to remain under 10CFR50.65(a)(2) when preventive maintenance failed to assure that this system remained capable of performing its intended function. Specifically, a surveillance test failure of a swing charger was not identified as a functional failure.

(1) Reason for the violation.

On March 13, 1997, a surveillance test failure of a non-connected swing battery charger was not identified as a functional failure. The system engineer that made the inappropriate functional failure determination had received no training on "masking" and "shadowing" concerns with respect to the Maintenance Rule. The need for training was identified in early 1997 and four training modules were developed covering appropriate aspects of the Maintenance Rule. "Masking" and "shadowing" were discussed in detail, with specific examples, during training in October 1997. This training was performed after the functional failure determination was made for the noted event.

(2) Corrective steps that have been taken and the results achieved.

When it was concluded that the initial functional failure determination on the swing battery charger was incorrect an assessment was made, per the Maintenance Rule Program requirements, as to whether the performance criteria were appropriate. The evaluation determined that the performance criteria were overly restrictive. A new performance criteria of less than three functional failures of the chargers per cycle was established and the 125VDC system remains classified as an (a)(2) system under the Maintenance Rule.

Qualification checklists have been established to track training of system engineers to document their qualification prior to performing Maintenance Rule engineering tasks.

Maintenance Rule documents were updated to reflect the new performance criteria.

Training of ANO system engineers on "masking" and "shadowing" was completed on October 28, 1997.

(3) Corrective steps that will be taken to avoid further violations.

The lessons learned from this violation will be discussed with system engineers by September 30, 1998.

(4) Date when full compliance will be achieved.

Full compliance was achieved on May 29, 1998, when the new performance criteria were approved.