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SUBJECT: Responds to NRC 910816 ltr re violations noted in Insp Rept 50-397/91-16.Corrective actions:improvement initiatives have been planned to strengthen mgt oversight & implementation of MOV program.

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September 16, 1991
G02-91-167

Docket No. 50-397

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Gentlemen:

Subject: NUCLEAR PLANT NO. 2, OPERATING LICENSE NO. NPF-21
NRC INSPECTION REPORT 91-16
RESPONSE TO NOTICE OF VIOLATION
RESPONSE TO NOTICE OF DEVIATIONS

The Washington Public Power Supply System hereby replies to the Notice of Violation and Notice of Deviations contained in your letter dated August 16, 1991. Our reply, pursuant to the provisions of Section 2.201, Title 10, Code of Federal Regulations, consists of this letter and Appendices A and B (attached).

In Appendix A, the violation is addressed with an explanation of our position regarding validity, corrective action and date of full compliance. In Appendix B, the deviations are addressed with an explanation of our position regarding validity, corrective action and date of full compliance.

In the cover letter to the Inspection Report and in your letter dated June 28, 1991, three specific programmatic concerns were also identified pertaining to our implementation of the recommendations of Generic Letter 89-10. The concerns were 1) the current Motor Operated Valve (MOV) program does not adequately utilize industry knowledge and experience, 2) the level of Supply System management attention and commitment to the MOV program needs improvement to ensure technical work quality and test program progress, and 3) the Quality Assurance organization needs to improve in the level of oversight of program activities to assure that deficient conditions are well documented, that commitments are followed, and that any deficiencies are promptly brought to the attention of management. In addition, several concerns were noted pertaining to the technical adequacy of our MOV program.

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The Supply System understands the importance of our MOV program and we agree that to date our program has not been well focused, and we also recognize that improvement is needed in the implementation of differential pressure testing. As a result, several improvement initiatives have been taken or are planned to strengthen management oversight and implementation of our MOV program. The following is an outline of these initiatives.

During our current extended outage, the WNP-2 staff (with the aid of a contractor) utilized the opportunity to conduct additional MOV static baseline testing, and also perform the in situ dynamic differential pressure testing on 22 MOVs. This testing indicated that margin, in terms of thrust, was available for the valves tested as set by our current program. This effort also provided assurance of the adequacy of program implementation pertaining to actual set-up of components. The success of this recent testing is a positive data point. Our program contains 163 valves. To date we have completed engineering calculations on 120 valves, static baseline testing on 108 valves and as, previously stated, in situ dynamic differential pressure testing on 22 valves.

Responsibility and accountability for the MOV program has been assigned to the Plant Technical Department. Enhanced supervision of the program is planned by adding increased senior level staffing within the Plant Technical organization to better integrate MOV testing with the overall MOV program. Increased MOV program staffing within the Generation Engineering organization is also planned. These actions are being taken to ensure that 1) sufficient resources are allocated to properly execute and maintain the program, 2) the program is consistent with industry initiatives, and 3) the integrity of the program is maintained. In addition, we will obtain industry expertise to assist in the improvements to our program.

The specific focus of increased management oversight will include reviewing the adequacy of the MOV program in areas such as requirements, scope, commitments and recommendations from both the NRC and industry to provide continued assurance that a solid, technical-based program is being implemented at WNP-2. Priorities for testing will also be reviewed such that MOVs with limited margin between operating requirements and analytical/design limits will be tested on a preferential basis to ensure that the valves can meet all operational characteristics while remaining within design parameters. Furthermore, MOV trending requirements covering maintenance aspects, as well as performance indicators, will be identified and emphasized to ensure those requirements are clear and carried out. We also plan to take advantage of outside resources to provide an overview of our processes.

We are also currently participating in the regional utility meetings pertaining to MOV operational experience, and the next Region V Utility Meeting on MOVs is currently planned to be conducted at WNP-2. In addition, the Supply System will continue its participation in the MOV User's Group and the BWR Owners Group Committee on MOVs, the participants of which come from all regions of the country and represent many utilities. Supply System management continues to support its commitment to these utility information exchanges. Through this involvement we feel that improvements to our program will be achieved by incorporating industry experience into WNP-2 testing and methodology.

Furthermore, from a technical perspective, the following is a list of actions also planned to improve the technical adequacy of our program.

- The justification for each MOV in a safety-related system that is not included in the MOV program will be documented.
- An Engineering standard for design basis reviews will be written.
- An Engineering standard for performing MOV sizing and switch setting calculations will be written.
- WNP-2 plans to test all MOV program testable valves, or will provide justification for not testing.
- A revision to the WNP-2 MOV program will address valve failure analysis, corrective action, and trending.
- Differential pressure testing results will be utilized, as deemed appropriate, to further refine thrust calculation methodology.

Further actions pertaining to improved technical adequacy are also included in our attached response to the Notice of Deviations (Appendix B).

Quality Assurance overview improvements are also ongoing and planned in the areas of technical assessments, surveillances and audits. A technical assessment on outage modification activities is currently in progress. Included in the scope of this assessment are reviews of 1) engineering calculations of differential pressures and thrust settings for selected safety-related MOVs, and 2) the MOV testing procedure, the Maintenance Work Request (MWR) for MOVATs testing and the temporary procedures for in situ testing of selected MOVs. Further technical assessments are also planned in the future to evaluate the technical adequacy of the MOV program. In addition, a Plant Quality Assurance surveillance on MOV deficiency corrective action is currently scheduled to be performed during the November - December, 1991 time-frame. Following completion of the surveillance, a Corporate Quality Assurance audit on MOV program activities will also be performed. We are also evaluating our process of analyzing individual concerns for significance, pertaining to broader programmatic implications, in an effort to develop methods to strengthen our oversight of the program.

In summary, several efforts have either been taken or are planned to strengthen the management, implementation and overview activities associated with the MOV program. These improvement initiatives are intended to provide assurance that 1) sufficient resources are allocated for program management and implementation, 2) the program is technically sound and consistent with industry initiatives, 3) the integrity of the program is maintained, and 4) program activities are in compliance with NRC recommendations.

We were also asked in the cover letter to the Inspection Report to provide an assessment of whether the deficiencies noted in the MOV Inspection Report were systematic of engineering work in general. The Supply System prides itself in providing strong technical solutions in all of its work. This has been demonstrated many times in the past. This strength can only be a strength if the program definition and standard are well understood by management and the implementing organizations. The Supply System recognizes this has not always been the case. The Assistant Managing Director has challenged the Operations Directorate, Engineering Directorate and the Licensing and Assurance Directorate to evaluate our major programs and determine where we are different from industry norms. We propose that this subject be included as a topic for discussion during a subsequent management meeting.

Very truly yours,

GD Bouchey

G. D. Bouchey, Director
Licensing & Assurance

JDA/bk
Attachments

cc: JB Martin - NRC RV
NS Reynolds - Winston & Strawn
PL Eng - NRR
DL Williams - BPA/399
NRC Site Inspector - 901A

During an NRC inspection conducted from May 20, 1991 through June 21, 1991, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1991), the violation is listed below:

10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings", sates, in part,

> "Activities affecting quality...shall be accomplished in accordance with these instructions, procedures or drawings..."

Administrative Procedure 1.3.12, Revision 14, "Plant Problems - Problem Evaluation Request", Paragraph 1.3.12.7.A, states, in part,

> "Any Supply System employee who observes a plant problem or a potential significant problem should immediately notify his/her Supervisor and initiate a PER..."

Paragraph 1.3.12.3.A.1.5 defines a Plant Problem as,

> "A potential significant problem requiring disposition, corrective action or a reportability assessment."

Contrary to the above, a Problem Evaluation Report (PER) was not written when instances of degraded spring packs in Limitorque actuators were observed by Supply System employees during the testing and refurbishment of the following safety related motor operated valves:

> FPC-MO-175 on 3/12/91 under MWR No. AR3151
> FPC-MO-172 on 3/19/91 under MWR No. AR3149

These deficiencies were significant conditions potentially affecting the operability of the valves.

This is a Severity Level IV Violation (Supplement 1).

Validity of Violation

The Supply System acknowledges the validity of this violation. The reason for the violation was less than adequate attention to detail resulting in the failure to document identified problems in accordance with the requirements of Plant Procedure (PPM) 1.3.12, "Plant Problems - Problem Evaluation Request." Although the decision was made prior to the outage to replace all Generic Letter 89-10 valve spring packs instead of refurbishing the packs, a Problem Evaluation Request (PER) should have been written to determine if further evaluation or additional corrective actions were necessary.

Corrective Steps Taken/Results Achieved

1. When this was brought to our attention during the MOV Team Inspection, a PER (291-0513) was written to further address the situation where, during diagnostic testing, spring packs were found not to meet vendor (Limitorque) requirements. In this particular case, the PER was elevated to a Material Deficiency Report (MDR 291-0513). An MDR is a document used to disposition Plant problems which directly relate to material, equipment or components (both installed and non-installed). All MDRs require that a root cause analysis be performed.

2. The Plant Technical MOV Program Coordinator and Plant Maintenance Engineers involved in MOV program activities have been made more familiar with the requirements of PPM 1.3.12 and the documenting of Plant problems. Approximately 40 PERs have been written to document various discrepancies discovered as part of the MOV work effort. Also, almost one-half of those PERs were written prior to the team inspection.

Corrective Action to be Taken

As part of the MDR process, a root cause analysis is currently being performed to further evaluate the situation of the degraded spring packs and determine if any additional corrective action is needed. In addition, a formal reportability evaluation will also be performed by the Plant Technical Compliance group as part of the PER/MDR process to assess the potential cumulative impact of degraded spring packs.

Date of Full Compliance

Although the Supply System was in full compliance on June 7, 1991 when PER 291-0513 was written to further address the problem, the root cause analysis and formal reportability evaluation will be completed no later than November 30, 1991.

Appendix B

During an NRC inspection conducted from May 20, 1991 through June 21, 1991, deviations from your written commitments were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions", 10 CFR Part 2, Appendix C, (1991), the deviations are listed below:

A. In response to NRC Generic Letter 89-10, "Safety Related Motor-Operated Valve Testing and Surveillance," dated June 28, 1989, Washington Public Power Supply System, the licensee, stated that:

(1) By June 28, 1990, the program description and schedule as required by the Generic Letter would be available for onsite NRC review (Supplement 2 to the Generic Letter extended that time to January 1, 1991), and

(2) The recommendations of the Generic Letter would be completed subject to certain schedule adjustments involving motor-operated valve (MOV) testing.

Contrary to the above, as of June 7, 1991, the following recommended actions had neither been addressed nor included in the licensee's established program:

1. Emergency operating procedures had not been reviewed for the purpose of establishing the scope of the subject program as recommended in NRC response to question 6 of Supplement 1 to the Generic Letter.

2. Nominal operating pressures were used in the program as the design basis for operability of certain valves in lines connected to the reactor vessel, rather than the maximum differential pressure as described in recommended action "a" of the Generic Letter.

3. Valve mispositioning had not been considered in determining bounding differential pressure and flow conditions, as recommended in NRC response to question 15 of Supplement 1 to the Generic Letter.

4. Calculations for MOV sizing and switch settings had not considered the effects of high ambient temperature and seismic loading, as recommended in NRC response to question 16 of Supplement 1 to the Generic Letter.

5. Thermal overload switch setting affect on the capability of MOVs to perform their designated safety function had not been addressed, as recommended in NRC response to question 21 of Supplement 1 to the Generic Letter.

Validity of Deviation

The Supply System acknowledges the validity of this deviation. The reason for the deviations (Items 1, 3, 4 and 5) was a less than adequate (incomplete) understanding of the new requirements of Supplement 1 to Generic Letter 89-10. The Supply System Program Plan for Motor Operated Valves was issued approximately at the same time that Supplement 1 was published and, as a result, the program did not include the information contained in that Supplement. For Item 2, the reason for the deviation was less than adequate communication in that the Supply System was using pressures based on those submitted by the BWR Owners Group.

Corrective Steps Taken/Results Achieved

The Supply System is taking action to correct this lack of understanding in each specific area identified. A discussion of the deviations identified and actions taken to-date are described as follows;

1. Item 1

   An existing calculation prepared prior to the issuance of Generic Letter 89-10 was used in establishing the scope of the generic letter. The specific purpose of the calculation was not to identify the scope of MOVs to be included in Generic Letter 89-10. A review was performed of the calculation methodology which indicated that one of the safety function categories of valves to be listed was, "UTILIZED IN EMERGENCY PROCEDURES". Although not specifically defined, this indicates that consideration of the Emergency Operating Procedures was taken into account. Further evaluation is currently in progress.

2. Item 2

   Nominal operating pressures were used in differential pressure calculations for specific valves in lines connected to the reactor vessel (e.g., Reactor Water Cleanup). This value was based on the BWR Owners Group differential pressure methodology developed in response to Generic Letter 89-10. The Supply System is currently in the process of re-assessing these values.

3. Item 3

The Supply System response (Letter, G02-89-230, GC Sorensen (SS) to NRC, dated December 22, 1989) to Generic Letter 89-10 stated that, "The BWR Owners Group (BWROG) is developing a generic position to form a sound technical basis for BWR plant responses to the generic letter. The Supply System is participating in this effort and the generic position will be reviewed after it is completed to determine the applicability to WNP-2." This statement was intended to convey the message that the BWROG generic position was not yet finalized and that the Supply System would review the generic position when it was complete. Although the response to the generic letter at the time was not specific as to whether we were committed to consider valve positioning, the Supply System will endorse the BWROG generic position that consideration of position-changeable valves is not technically warranted. The BWROG position pertaining to this issue is currently being evaluated within NRR.

4. Item 4

The calculations for MOV sizing and switch settings do account for the reduced output torque of specific size DC motors at high temperatures. The derating of specific size motors has been addressed by Limitorque in its selection guidelines, and the effect of high ambient temperature on the output torque of AC motors is currently being studied by Limitorque. The Supply System is continuing to followup on this additional testing.

Seismic loads, or inertial building filtered loads resulting from safety relief valve (SRV) lifts or containment accident condition scenarios (e.g., pipe break) are not assessed in the operator thrust evaluation since this stem thrust load component is judged to be an ignorable second order affect. The influence of the building (i.e., piping) inertial loads on operator/valve performance involves consideration of three primary areas comprising the operator, stem and valve internals. These considerations are outlined as follows:

a) As demonstrated by extensive plant-specific testing, valve operator functional performance is relatively unaffected by the imposition of concurrent seismic (or other inertial) loadings. These valve operator functional tests are documented under WNP-2's equipment qualification program. The testing program was designed to encompass both the maximum magnitude of plant-specific inertia loads as well as reflect the various combinations of operator, valve style, and mounting (yoke) configurations. Under the prescribed dynamic loads and mounting configurations the operators were concurrently exercised utilizing degraded 80 percent supply voltages. In all cases the operator performance met load specification requirements and were, therefore, qualified for service under dynamic loading. Representative test information was compiled from sources including Limitorque and various valve manufacturer's test programs.

In situ static deflection tests were performed on many of the actual plant valves. These tests side loaded the valve yokes to induce bounding inertial equivalent deflections, or misalignments, between the valve stem, valve stuffing box (packing) and operator drive sleeve. In this statically-deflected condition the valves were successfully operated, in situ, at degraded voltage to demonstrate operability and maintenance of closing time requirements.

In sum, it is concluded from comprehensive testing efforts and supplemental analyses that the impairment of the operator (i.e., degradation of stem thrust) due to both internal inertial loads and misalignment of the stem is slight (ignorable). In retrospect, these test results appear reasonable from an engineering judgment perspective since the required stem thrust forces (especially for fast-valve cases) are many times larger than the inertial loads developed by the relatively light weight internal components of the operator's drive mechanism.

b) The stem is a relatively light weight valve component whose inertially-generated load and resultant friction loading within the valve stuffing box or gland, is judged to be small in comparison to the normal loads generated by the packing compression. This assessment is also substantiated by the previously cited static deflection tests which induced maximum potential stem binding conditions.

c) It is well understood that the fluid forces acting on the plug/wedge play significantly in determining the required stem thrust. The operator is overcoming a combination of seating loads (wedge seat friction),. moving mass inertial loads (operator, stem and valve internals), packing friction and projected area direct fluid pressure loading. In addition, the fluid pressure is also acting normally to the plug/wedge sliding surfaces and is, therefore, generating significant friction loading which resists the effort of the operator. Considering the generally high working pressures and large plug/wedge surface areas it is clear, a-priori, that this component of friction load will substantially bound the friction load induced by seismicity.

As an example, assume a ten-inch valve with a wedge weight of a hundred pounds operates at 200 psid in a 5g seismic field. Assuming a static coefficient of friction of 0.5, the friction force due to pressure loading is nearly 9,000 pounds whereas the seismic induced friction (again recalling this is an intermittent load) is 250 pounds, or about three percent of the pressure induced friction load. Our example conservatively ignores the other fluid and valve loads (cited above) which the operator is sized and tested in situ to overcome. In recognition of these additional loads, the seismic-induced operator loading component (i.e., combining both frictional and inertial components of the valve's total moving mass) will tend to a fractional percentage of the required stem thrust and it is, therefore, deemed ignorable.

5. Item 5

Pertaining to Thermal Overload (TOL) sizing, the Inspection Report discussion delineates a number of factors such as higher-than-normal current, increased packing loads, line pressure, repeated cycling, etc., which suggest that a larger-than-normal thermal overload is required. The Regulatory Guide 1.106 methodology in place at the time of WNP-2 design and construction was to size the overloads at 125 percent and bypass them at 300 percent. However, neither of these alternatives provided adequate protection from locked rotor current. Accordingly, the WNP-2 method (Architect/Engineer - Burns and Roe, Inc.) of sizing the thermal overloads at three sizes larger than normal (approximately 140 percent) was chosen to assure that the overload would be capable of bounding variations in motor current due to uncertainties such as tight packing, reduced voltage, setpoint drift, as well as accommodating increased torque (200 percent full load amps) for approximately 200 seconds. The upstream fuse (sized at 125 percent) provides protection from locked rotor currents and branch circuit fault protection.

The above methodology is an acceptable approach to prevent spurious tripping, and the Supply System plans to continue to use nameplate currents in the TOL application calculations. However, when MOV running currents exceed 115 percent of nameplate full load current, an engineering evaluation will be performed to ensure adequacy of TOL sizing. Since industry standards and codes use rated (nameplate) amperes, it is our intent to continue to use rated amperes and include factors to account for variations in operating conditions.

Ambient temperatures at the motor control centers have been considered in the sizing of TOLs. However, ambient temperature is not a consideration because the motor control centers, for safety-related valves, are located in rooms which are temperature-controlled so that the maximum room temperature is 40 degrees C (104 degrees F).

The Supply System approach, which was approved by the NRC in the WNP-2 Safety Evaluation Report (NUREG-0892), provides a prudent alternative to the methods delineated in Regulatory Guide 1.106

In addition, the Supply System recently (June, 1991) issued a procedure which defines the criteria for sizing fuses and motor overloads. The procedure is Engineering Standard EES-5, "Selection of Fuses and Overloads for Protection of 460 VAC and 125 - 250 VDC Motors," Revision 0.

Corrective Action to be Taken

1. Item 1

A review of the existing calculation (NE-02-88-06) will be performed to ensure that the scope of our Generic Letter 89-10 program includes those MOVs utilized in the Emergency Operating Procedures.

2. Item 2

A programmatic review of differential pressure calculations will be performed to evaluate those valves connected to the reactor vessel. The review will consider use of the lowest relief valve setpoint pressure for applicable valves. Following the review, calculations will either be revised as necessary or justification will be provided for use of nominal operating pressure.

3. Item 3

The Supply System will revise its response to Generic Letter 89-10 by submitting a clarification pertaining to our endorsement of the BWROG generic position that consideration of position-changeable valves is not technically warranted. We also will continue to monitor the progress and final NRR resolution of this issue. Any additional actions, if necessary, will be taken following the NRR review.

4. Item 4

The effect of high ambient temperature will be factored into the MOV sizing evaluation for AC motors following completion of the ongoing Limitorque evaluation to quantify such effects. (At a July 1991 MOV Users Group Meeting, Limitorque indicated that testing would be complete near the end of October 1991.)

With regard to seismic loading, it is deemed that the seismic component addition to valve thrust requirements is negligible. However, the issue merits generic assessment within the industry and the Supply System intends to stay fully abreast of these developments.

5. Item 5

The Supply System will continue to review its calculation methodology for consistency with the intent of future revisions to Regulatory Guide 1.106, ANSI/IEEE Standard 741-1986 and industry practice. Furthermore, the Supply System will include a review of thermal overload settings in the Generic Letter 89-10 Program. During this review, fuses will be evaluated to ensure that thermal protection is provided to the motors.

Date of Corrective Action Completion

1. Item 1

The evaluation of calculation NE-02-88-06 will be completed by the 1992 Maintenance and Refueling Outage.

2. Item 2

The review of differential pressure calculations will be completed by the 1992 Maintenance and Refueling Outage.

3. Item 3

The revised response to Generic Letter 89-10 pertaining to the BWROG generic position on position-changeable valves will submitted by January 1, 1992.

4. Item 4

The Supply System will review the results of Limitorque's AC motor testing by January 31, 1992, assuming that Limitorque provides those results to the industry by November 1, 1991 as currently scheduled. If the November 1, 1991 scheduled forecast date is not met, the Supply System will review the test results within three months following issuance by Limitorque.

5. Item 5

The reviews of calculation methodology and thermal overload settings are ongoing and will be completed as new industry standards are developed.

B. Page 8.3-30 of the WNP-2 FSAR includes a section on "Minimum Voltage", which states in part:

> "All Class 1E motors, as a minimum, have torque characteristics suitable for the driven load to accelerate their connected loads to rated speed with only 80% of rated voltage applied to the motor terminals."

Contrary to the above, on June 6, 1991, the calculation for motor operated valve RCIC-V-8 indicated that the Class 1E motor was inadequately sized for 80% of rated voltage. A voltage of 87% of rated voltage was used in the calculation determining motor suitability instead of 80% of rated voltage, as committed in the FSAR.

Validity of Deviation

The Supply System acknowledges the validity of this deviation. The reason for the deviation was less than adequate communication. Although a 10CFR50.59 Safety Evaluation had been performed to justify a higher voltage, the change to the FSAR was not made as required. The voltage level of 87 percent was used to calculate the motor torque requirements for valve RCIC-V-8 to establish the actual expected worst-case voltage condition.

Corrective Steps Taken/Results Achieved

1. Following re-evaluation the calculation for RCIC-V-8 was revised back to the 80 percent voltage level.

2. Other valves which require greater than 80 percent voltage have been documented on Nonconformance Report 289-0860, with an accompanying Justification for Continued Operation (JCO) and 10CFR50.59 Safety Evaluation.

Corrective Action to be Taken

An FSAR Change Notice (SCN) will be prepared to revise the FSAR commitment to allow deviation from the established 80 percent voltage requirement, provided that analysis justifies using the less-conservative voltage level.

Date of Corrective Action Completion

The SCN will be completed by July 1992, and the FSAR will be revised in the subsequent annual submittal.