Northern States Power Company
Prairie Island Nuclear Generating Plant
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Welch, Minnesota 55089

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10 CFR Part 2

U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Reply to Notice of Violation (Inspection Report 97008),
Deficiencies in the Corrective Action and Calculation Verification Programs

Your letter of July 16, 1997, which transmitted Inspection Report No. 97008, required a response to a Notice of Violation. Our response to the notice is contained in the attachment to this letter.

In this letter and attached response we have made new Nuclear Regulatory Commission commitments, these are indicated by italics.

Please contact Jack Leveille (612-388-1121, Ext. 4662) if you have any questions related to this letter.

TC Silberg
for
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Prairie Island Nuclear Generating Plant

c: Regional Administrator -- Region III, NRC
Senior Resident Inspector, NRC
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Attachment: RESPONSE TO NOTICE OF VIOLATION

RESPONSE TO NOTICE OF VIOLATION

VIOLATION 1

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality are promptly identified and corrected; and in the case of significant conditions adverse to quality, the cause of the condition shall be documented, appropriately reported to levels of management, and corrective action taken to preclude repetition.

Contrary to the above, as of May 16, 1997, a significant condition adverse to quality, which was identified 4 years earlier, had not been fully corrected. The significant condition adverse to quality was that cable tray installations did not meet the separation criteria specified in USAR Section 8.7.2. The condition was identified in February 1992 and it took over 4 years, until July 1996, to conclude that the cable tray configurations were outside the plant's design basis. After this determination, the licensee did not identify that the scope of the problem went beyond the original trays until the NRC identified more cable trays, including the pressurizer heater circuits, that did not meet the separation criteria.

This is a Severity Level IV violation (Supplement I).

Response to Violation 1

Reason for the Violation

Background:

Prairie Island's configuration management (CM) program description was submitted to the NRC in November 1989 (letter from CE Larson to A Bert Davis). CM's efforts over the past few years has resulted in 34 Design Basis Documents being developed and verified. This effort resulted in 910 Follow-On Items(FOIs) with 1311 recommended action items. All 910 FOIs were assessed (100%) which included operability and reportability determinations, 842 FOIs are closed (93%) , 1176 actions are completed (90%). Efforts to close the remaining action items are in progress.

FOI A0688 "Cable Tray Separation" was initiated in August, 1992 and assessed in February, 1993. The assessment determined that the cable tray system condition was operable and not reportable. The actions recommended by the assessment included installing cable tray barriers where adequate separation was not demonstrated and providing an evaluation of the acceptability of the present configuration..

The subsequent course of action was to prepare a safety evaluation to analyze and justify the as-found condition that would strengthen the initial operability determination

in the FOI assessment. This phase of the project focused on evaluating the 38 cases documented in the FOI assessment. The goal was to complete the safety evaluation and present it to the plant Operations Committee for concurrence on system operability along with a recommendation to install barriers to restore separation. During this phase of work, the assigned engineers concluded PI should not pursue justification of the as-found condition on a permanent basis by a change to the separation criteria.

The safety evaluation evolved from the original justification based on IEEE 384-1977 requirements to a more formal application of IEEE-384-1992 and also the application of reduced cable tray separation requirements based on industry testing. During this time, a representative of the IEEE committee that documented the industry cable tray separation testing program was contacted for information. The safety evaluation draft was revised and strengthened numerous times as guidance from IEEE Standard 384, which postdates the design of Prairie Island, was applied to upgrade the operability bases of the as-found installation.

During this time the reportability question was revisited. A written reportability determination which determined the condition was not reportable was prepared in July 1994 and distributed among the engineering team monitoring the task for concurrence. This determination concluded the condition was not in complete compliance with the USAR separation criteria as written but it was in conformance with USAR statements that formed the basis of the USAR numerical separation criteria. It therefore was not reportable under 10CFR 50.72 (b) (1) (ii) (B), "Condition Outside the Design Basis." This determination was prepared to establish non-reportability to the safety evaluation preparers but it was not presented to the Operations Committee.

The completed safety evaluation was presented to the Operations Committee for concurrence with the enhanced operability determination in July 1996. This evaluation justified each case of cable tray separation discrepancy by sequentially applying different methodologies that were developed from guidance in the IEEE standard and industry testing. The safety evaluation was accompanied by two reportability reviews prepared per plant procedures and guidance. For "Conditions Outside the Design Basis," the guidance document notes there are varying industry interpretations. Lacking specific direction for this issue, two reportability reviews (one of a non-reportable condition and a second for a reportable condition) were prepared for OC review . In that meeting the Operations Committee did determine the issue was reportable under 10CFR 50.72 (b) (1) (ii) (B), "Condition Outside the Design Basis." After the report was submitted, conference calls with NRC NRR and Region III ensued and the safety evaluation was discussed. Up to this point the scope of the problem beyond the initial 38 cases was not considered as the focus of this task was on the operability of what had been found to date. While NSP engineering was evaluating the next course of action and planning the LER response, the NRC resident inspector

emphasized his concern for the issue by initiating their own inspection and finding three additional cases that appeared to violate the separation criteria explained in the safety evaluation. These cases were evaluated as operable but one of these was also reported under the same regulation.

The 30 day written LER report subsequently submitted by NSP committed to do the following:

1. "Plant cable tray separation design and installation, including both original plant design and subsequent modifications, will be reviewed and all separation discrepancies identified will be evaluated and resolved. This work will be executed as follows:

   A. Plant cable tray installation drawings will be color coded by separation groups (trains and channels) and reviewed to identify possible cable tray separation discrepancies. A discrepancy occurs when two or more trays in a given area are closer together than allowed by the cable tray separation criteria and tray barriers are not installed in accordance with the plant design drawings. Cable tray separation criteria are defined in the USAR and plant design documents. This evaluation will be performed in plant areas that include safety related cable trays with the exception of the newly constructed (1992) D5/D6 Building (which is designed to current standards and includes separation groups separated by building areas).

   B. All potential cable tray separation discrepancies will be physically inspected and the separation will be documented. In addition, all cable tray barriers shown on the drawings will be inspected. Each cable tray separation discrepancy confirmed by the physical inspection will be identified, evaluated, and resolved. The evaluation, in addition to tray separation issues noted above, will include a review to confirm Appendix R safe shutdown is not affected by the cable tray interaction. The evaluation will include a determination of operability, and if required, appropriate entry into Technical Specification LCO conditions, and possible compensatory actions. The inspection will also evaluate the accuracy of installation drawings for tray separation distances versus the as-built installation.

2. A safety evaluation will be written to evaluate all cases of cable tray separation discrepancies that are identified as valid by this project.

3 The Site Engineering Manual will be revised to more clearly define the requirements for installation and maintenance of barriers when required for cable tray separation.

4. Implementation Schedule:

All cable tray separation discrepancies identified to date will be resolved by restoring cable tray separation to USAR and plant design requirements. The deadlines for this restoration is as follows:

- Unit 2: By the end of the next refueling outage which is scheduled to commence in January,1997.
- Unit 1: By April 1, 1997.

For the cable tray separation design and installation review discussed in Item 1 above, Corrective Action 1.A has already been started. We will provide future status reports to the Resident Inspector on Actions 1 through 3.

5. An independent review of existing reportability determinations on open Follow-on Item (FOI) assessments (from the Design Basis Documentation and Validation program) will be conducted. Initially a sample of 10% (10 FOIs) of the open FOIs (93) will be reviewed. This review will be completed by October 31, 1996. If warranted by the findings, the sample will be increased so that there is reasonable assurance that all FOIs currently open have been evaluated accurately for operability and reportability.

6. Consider training plant electrical system and design engineers and quality control inspectors on the following:

- Licensing and design requirements for cable tray separation.
- Installation requirements for trays and required barriers to comply with the design requirements and drawings.
- Requirement to maintain cable tray separation and barrier installations during subsequent plant modification and work activities."

Reason for Violation

The individuals involved in developing and writing the safety evaluation were untimely in completing the document. These individuals were incorrect in determining the issue was not reportable under 10CFR 50.72 (b) (1) (ii) (B), "Condition Outside the Design Basis". These individuals also failed to concurrently determine the extent of the cable tray system separation discrepancies beyond the initial identified cases, develop and plan the corrective actions, and present these corrective action recommendations along with the safety evaluation for Operations Committee review.

Corrective Actions Taken and Results Achieved

Actions to review the operability and reportability determinations made in previous FOI assessments and to determine the extent of the cable tray system separation discrepancies were committed to in the LER-96-13 response summarized above. The status of these actions will be addressed in the next section.

Corrective Steps That Will Be Taken to Avoid Further Violations:

A Untimely Corrective Action

In response to untimely corrective action program concerns noted in the 1997 Aux Feedwater System SSOPI , NSP assessed its corrective action program, which includes FOI action items, and identified the following strengths, weaknesses, changes completed and changes planned:

Corrective Action Program Strengths:

- Numerous problems self-identified (several generic issues identified)
- Staff empowered to identify problems and initiate corrective actions
- System engineering ownership results in high degree of system operability and reliability
- Operability and reportability determination documentation improving

Corrective Action Program Weaknesses:

- Many separate corrective action vehicles
- Lack of management involvement in prioritization
- Resources
- Status of some corrective action vehicles not reported to upper management or other affected personnel

Corrective Action Program Changes Completed

- Procedures revised to require additional management involvement in OEA prioritization
- Open OEA recommendations reprioritized
- Sample of open FOIs reviewed for proper operability and reportability assessment

Corrective Action Program Near Term Changes:

- *New condition reporting system to be introduced by September 1997 (consolidates some corrective action vehicles)*
- *Corrective action process owner designated by September 1997*
- *Employee Observation Report System revised by September 1997*
- Resource authorizations approved, vacancies being filled.

Corrective Action Program Longer Term Changes:

- *Institute a management oversight committee by December 1997*
- *Improve corrective action status reporting functions by December 1997*
- *Perform industry review of effective corrective actions programs by December 1997*
- *Institute additional corrective action program improvements in 1998*

B. Incorrect Reportability Determination and Cable Tray Separation Restoration

The present status of Actions 1 through 6 from LER-96-13 listed above are as follows:

1. Complete for Unit 2 and common plant areas. Unit 1 will be completed by end of next scheduled refueling outage presently planned to start in October 1997

2. It was determined by the Operations Committee that the safety evaluation format was not appropriate to address operability of existing cable tray separation discrepancies as they were confirmed from drawing review and inspections activities. In response an interim operability justification document was issued, and each confirmed separation discrepancy has been evaluated for operability against that document.

3. Engineering Manual Section 3.3.2.7 "Engineering Design Standard for Electrical Separation" was revised in October 1996 (Rev. 2) to incorporate

the safety evaluation basis and methodology. An additional revision to incorporate information on the detailed cable tray separation criteria developed during the project is planned.

4. The separation restoration for the initial 41 cases of separation discrepancies covering both Units 1 and 2 was completed on schedule.

5. The independent review of a sample of previous FOI assessments was completed in October 1996. "No instances of reportability or inoperability were found. However some (three) of the FOIs need further work to reach final reportability and operability determinations." For the three referenced FOIs requiring additional action items, one is complete, one is in final review, and one is ongoing.

6. Training request has been submitted and the initial program presentation is being developed for presentation in 1997 before the Unit 1 refueling outage.

Date When Full Compliance Will Be Achieved

Restoration of cable tray separation will be achieved by the completion of the next planed Unit 1 refueling outage presently scheduled to begin in October 1997. Other corrective actions listed in this report that address untimely corrective action, incorrect reportability determinations, and non-modification cable tray separation actions will be completed in 1998.

VIOLATION 2

10 CFR Part 50, Appendix B, Criterion III "Design Control," requires, in part, that design control measures shall provide for verifying or checking the adequacy of the design, such as by performance of design reviews or by use of alternate or simplified calculations.

Contrary to the above, as of the issue date for the calculations listed below, the design control measures failed to verify the adequacy of the design in that mathematical and process errors were not identified or new errors were introduced during the verification.

- "Condensate Storage Tank Piping Friction Loss NPSH," M-376-CD-001, Revision 0, October 1990, new errors were introduced by the independent reviewer who omitted approximately 45 feet of piping, ignored head losses through the entrance nozzle and pipe reducers, and used an incorrect value when determining the head loss through elbows.

- "Maximum Out of Service Time for Steam Line Drains Upstream of the Auxiliary Feedwater Pump Steam Supply Control Valves CV-31998 & CV-31999," SYS-AF-002, Revision 0, January 1992, contained errors in that it ignored 11 feet of piping. Also the independent reviewer introduced a mathematical error on the magnitude of 10^7 by failing to properly convert from seconds squared to hours squared.

- "Determination of Possible Flow Rate in Cooling Water (CL) to Auxiliary Feedwater Pump Piping with Gate Valve Half Open to Verify Design Flow Will Pass Thru Half Open Gate Valve," ENG-ME-292, Revision 0, October 1992, contained errors in that it contained the wrong number of elbows, used the wrong pipe size; and was based on a non-conservative pressure.

- "Detailed Analysis of Auxiliary Feedwater Pump Room Internal Flooding," V.SMN.94.006, Revision 0, April 1994, contained errors that doubled the flowrate of water under a room door and overestimated the capacity of a covered trench by at least ten percent.

- "Cooling Water Header Pipe Failure Causing Flooding in the Auxiliary Feedwater Pump/Instrument Air Compressor Room," Revision 1, ENG-ME-148, August 1995, contained errors in that it used the results of V.SMN.94.006 without question and assumed that V.SMN.94.006 calculated the capacity of the floor drains to remove water, when V.SMN.94.006 did not address the drains.

This is a Severity Level IV violation (Supplement I).

Response to Violation 2

Weaknesses were identified during the SSOPI in the area of design control as evidenced by discrepancies noted in specific calculations. As a result of the findings during the inspection five calculations required either a revision to correct a discrepancy or, in one instance, an additional calculation to provide justification for a basis used in a calculation. In all cases, the errors were determined to be minor and had no effect on the conclusions of the calculation.

Reason for the Violation

The reason for the violation in the area of Design Control stems from a failure to rigorously adhere to the requirements in the Prairie Island Site Engineering Manual. Failure to follow the specified requirements can be attributed to one of the following reasons:

- Personnel may be unaware of the requirements. Without knowing the extent of the requirements in the Site Engineering Manual, site engineering personnel were completing the verification process to a perceived standard. This misconception resulted in analytical results that may not have always been completely correct; however, in all cases noted, the correct course of action was selected and the conclusions were consistently conservative.

- Management failed to explicitly communicate expectations regarding the use of these requirements. Training has been previously performed on the Site Engineering Manual. However, training specifically focused on the requirements and expectations regarding the necessary rigor applied to the preparation and verification calculations has not been previously performed. Failure to complete this training has resulted in a failure to appropriately communicate these expectations.

Corrective Actions

NSP is taking the following short and long term actions to address the specific and programmatic weaknesses.

Short Term

The following short term corrective actions have been completed:

1. The subject calculations have been revised to correct the discrepancies. As previously noted, the revisions have similar conclusions as the original calculations.

2. The awareness of the engineering staff has been heightened to the importance of taking a rigorous approach to the preparation, checking and verification of all calculations. This is addressed further as part of the longer term corrective actions.

Long Term

The following long term corrective actions will be taken to address programmatic issues:

1. The administrative controls for the preparation, checking and verification of calculations are specifically covered in the Site Engineering Manual. A review of these controls indicates that the current requirements are adequate. The weakness is in the implementation of the requirements; that is, the engineering staff have not been adequately trained in regards to these requirements and the expectations for their use. To alleviate this problem, *training will be conducted by October 18, 1997 to ensure all personnel responsible for the preparation, checking and verification of calculations are aware of the requirements and expectations with regards to the rigorous approach for their use.* This rigorous approach includes ensuring that design inputs and assumptions are correct and referenced, verification that the methodology is correct, confirming the adequacy of the calculation techniques, etc.

2. *A sample of calculations will be reviewed to determine the extent of the potential problem with inaccuracies in design calculations by March 31, 1998.* The calculations reviewed during this sample will be selected based on safety significance. A higher degree of the sample will be focused on pump and hydraulic mechanical calculations. This is based on the inspection report which stated that calculations in others disciplines were acceptable. The sample will be reviewed for suitability of inputs and assumptions, accuracy of calculation techniques and adequacy of the final conclusions. The scope of the sample will be expanded as necessary, depending on the results of the initial sample.

3. *A review of the specific calculations used to support information in the Safety Analysis Report will be reviewed as part of the USAR Update Project.* This review will focus on verifying the assumptions and inputs to these analyses. The accuracy and suitability of these inputs will be confirmed, and the calculation result will be reviewed to ensure that it is reasonable.

Date When Full Compliance Will Be Achieved

Full compliance has been achieved.